COMPARATIVE ECONOMIES OF DIFFERENT TYPES OF COTTONSEED OIL MILLS AND THEIR EFFECTS ON OIL SUPPLIES, PRICES, AND RETURNS TO GROWERS

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
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PREFACE

Acknowledgment is made to C. B. Gilliland, chief of the Research Division, Fats and Oils Branch, Production and Marketing Administration, for general direction of the study; Julia J. Allen, analytical statistician, who made valuable contributions through her intimate knowledge of the facts and figures and their relationship to the central objectives; Donald Jackson, agricultural economist, for his assistance in working through difficult theoretical problems and evaluation and presentation of the data; Clifford H. Keirstead, agricultural economist, for assistance in analyzing the influence of size of mill on costs and returns; George W. Kromer, agricultural economist, for his help in selecting the mills; Thomas B. Smith, agricultural economist, for background data from the U. S. Census of Manufactures and other secondary sources; and John A. Baker, formerly agricultural economist, for aid in early planning of the study.

The designs, specifications, operating requirements, and technical explanations of 67 mills appearing in this report were worked out by the Engineering Experiment Station of the Texas Agricultural and Mechanical College System, under a contract with the U. S. Department of Agriculture. A. Cecil Wamble, manager, Cottonseed Products Laboratory, and S. P. Clark, associate research engineer, were in charge of this work. Carrying out the contractor's responsibilities was difficult, especially as there was no precedent to go by.

Sidney J. Armore and Richard J. Foote, agricultural economists of the Bureau of Agricultural Economics, developed the supply-demand relationship for cottonseed oil, which is used in the report in calculating the general economic effects of a change in type of cottonseed oil mills on the price of oil and returns to cotton farmers.

From their information on the actual experiences of about 15 widely scattered cottonseed oil mills, Daniel H. McVey and W. W. Fetrow, agricultural economists, Farm Credit Administration, provided invaluable checks on the findings of this report.

Helpful suggestions and counsel were given by T. H. Gregory, executive vice president, John F. Moloney, economist, and other members of the National Cottonseed Products Association.

R. T. Doughtie, Jr., cottonseed technologist, Cotton Branch, Production and Marketing Administration, provided useful information on cottonseed analyses and the number of presses and linters in existing oil mills, and made useful contacts with the cottonseed oil-milling and related industries.

The Pacific Fire Rating Bureau and the Protection Mutual Fire Insurance Co. recommended fire protection features of mills designed for this report and provided a basis for calculating insurance costs on buildings and machinery and cottonseed and cottonseed products.

The following firms contributed in more than an ordinary manner to the completion of this work: V. D. Anderson Co., Cleveland, Ohio; Bauer Bros. Co., Springfield, Ohio; Braden Steel Corp., Tulsa, Okla.; R. W. Butler, Bryan Building Products Co., Bryan, Tex.; Chicago Bridge & Iron Co., Chicago, Ill.; Crouse-Hinds Co., Syracuse, N. Y.; Fort Worth Steel & Machinery Co., Fort Worth, Tex.; The French Oil Mill Machinery Co., Piqua, Ohio; Hardwicke-Etter Co., Sherman, Tex.; Howe Scale Co., Rutland, Vt.; Lillie-Hoffman Cooling Tower Co., St. Louis, Mo.; Link-Belt Co., Chicago, Ill.; The Marley Co., Kansas City, Mo.; Missouri-Kansas-Texas Lines, Dallas, Tex.; Missouri-Pacific Lines, St. Louis, Mo.; Muskogee Iron Works, Muskogee, Okla.; National Blow Pipe & Manufacturing Co., New Orleans, La.; Southern Pacific Lines, Houston, Tex.; Texas Automatic Sprinkler Co., Dallas, Tex.; Union Special Machine Co., St. Louis, Mo.; Valley Foundry & Machine Works, Fresno, Calif.; Westinghouse Electric Supply Co., Houston, Tex.; Blaw-Knox Co., Pittsburgh, Pa.; and Carver Cotton Gin Co., East Bridgewater, Mass.

The study on which this report is based was made under authority of the Agricultural Marketing Act of 1946 (RMA, Title II).

Note.—The study on which this report is based was made by the Fats and Oils Branch of the Production and Marketing Administration in 1948–53, and the report was ready for publication in June 1953. The newly created Agricultural Marketing Service is now responsible for the work. The word "former" has not been inserted before references to the Production and Marketing Administration and the Bureau of Agricultural Economics because the report was set in type before the reorganization of the Department of Agriculture became effective on November 2, 1953.

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SUMMARY

On the recommendation of the Cotton and Cottonseed Advisory Committee of the United States Department of Agriculture, a study was undertaken to determine: (1) The comparative economies of different types of cottonseed oil mills; and (2) the effect of industrywide changes in types of mills on the supply and the price of cottonseed oil and the value of cottonseed sold by growers. Four types of mills were studied: Hydraulic, screw-press, direct-solvent, and prepress-solvent.

The main conclusions of the study are, as follows:

(1) As a general rule, for whatever volume of seed that may be available to an operator at prevailing prices f. o. b. gins, the prepress-solvent process ranked first in profitability or net revenue, the direct-solvent process second, the screw-press process third, and the hydraulic process last. (For exceptions and qualifications of this general statement see pp. 139–142.) This proposition covers mills of each type, ranging from 40- to 400-ton daily crushing capacity and representing annual crushes ranging from approximately 10,000 to 100,000 tons of seed.

The comparative economies of different types of processes handling the same crush, varied by size of mill, by size of crush, and among mill areas. For example, at a 21,100-ton crush (under 1949–50 cost-price relationships) the calculated amount, by which the net revenue of the prepress-solvent process exceeded that of the hydraulic process, ranged from $3.12 to $4.25 per ton of seed in six widely separated mill areas. Similar comparisons of all types of processes at different specified crushes are shown in table 85. These areas represented the industry in respect to extremes in all important cost and revenue items.

From an analysis of net revenue differences among these areas, calculations were made of the least possible advantages of one process over another at specified crushes which were applicable to any mill area. In the example of a 21,100-ton crush, the least possible advantage of the prepress-solvent process over the hydraulic process in any area was calculated at $2.63 per ton. Similar comparisons for other crushes are shown in table 93 for all types of processes.

This conclusion was reached in terms of new mills because there is no way of placing all types of mills on a strictly comparable basis through a study of the mills currently in use. Accordingly, the conclusion does not mean that it would be more economical for operators in individual cases to shift from their present mills to newer and more efficient-type mills. Investment costs in existing mills may have already been written off over a period of years so that it would be more economical for owners of many older mills to continue with their present setups. The extent to which this is true depends on knowledge of local conditions. But comparison of the relative economies of different types of mills, as shown in this study, with an operator's own setup (including his local seed supply and the useful life of his present mill) would be helpful in deciding on the feasibility of any major change in his plant.

In this connection, it should be pointed out that the conclusions of this study are conservative with respect to changes in types of mills on the net earning power of mills as well as on the value of cottonseed sold by farmers. This is so because the study involved the use of the 1949–50 average annual price of 11.67 cents per pound of prime crude cottonseed oil; and this price was especially low compared with the price of oil in other recent years, with the value of other cottonseed products, and with most cottonseed processing costs.

(2) Assuming different types of mills as operating at their normal rates, the calculated effects of industrywide change from hydraulic to other type processes on (a) the supply of cottonseed oil, the supply of total edible fats and oils (excluding butter and lard), and on (b) the price of cottonseed oil were as follows:

	Increase in oil supply		
Type of mill	*Cottonseed*	*Total edible fats and oils excluding butter and lard*	*Decrease in price of cottonseed oil*
	Percent	*Percent*	*Percent*
Hydraulic	0. 0	0. 0	0. 0
Screw press	2. 1	1. 1	1. 8
Direct solvent	9. 0	4. 5	7. 6
Prepress solvent	10. 8	5. 4	8. 9

The basis of these calculations is explained in detail on pages 228 through 230.

(3) Finally, in view of their different effects on the supply and value of cottonseed oil, how would industrywide changes in types of mills affect the value of cottonseed sold by growers?

This question could be resolved only through comparing the cost and revenue of the marginal mill (or mills) of the current industry with those of the marginal mills of alternative industry conditions. (The marginal mill of an industry is recognized as the smallest mill (1) whose services are required for processing the total seed crop (approximately 5 million tons) and (2) whose annual crush is just large enough to enable the mill to make only

enough revenue to meet total cost, including depreciation and interest on capital investment. The value of cottonseed to growers is dependent on the cost of this marginal mill (or mills) because the price of seed must be low enough to enable it to cover its total cost.) In the current industry, the marginal mill was estimated to be a 4-press hydraulic mill having an annual crush of approximately 6,000 tons of seed. A larger mill was calculated to require a larger tonnage in order to meet all costs, including depreciation on investment requirements of a new plant.

It was assumed that industrywide changes in types of mills would involve increasing the size of the marginal mill (or mills) in the current industry from approximately 6,000- to 10,600-ton crush because calculated net revenues were not regarded as warranting the construction of a new mill of any type unless a crush of at least 10,600 tons of seed was available.

Under these conditions, and assuming "perfect competition," the effect of industrywide change in types of mills on the value of cottonseed sold by growers was calculated as follows:

Industry	*Marginal mill crush, Tons of seed*	*Increased value per ton of cottonseed sold by growers, Percent*
Current industry	6, 000	0. 0
Alternative industries:		
Complete hydraulic	10, 600	9. 1
Complete screw-press	10, 600	10. 9
Complete direct-solvent	10, 600	6. 9
Complete prepress-solvent	10, 600	7. 8

Differences in the effect of industrywide changes in types of mills on the value of cottonseed sold by growers arise from correspondingly different effects (1) of such change on the supply and value of cottonseed oil and (2) of change in the *type* and *size* of the marginal mill (or mills) of the industry on per ton processing cost, exclusive of seed. In general, greater benefits to growers are possible from industry shifts to more economical *size* mills than from any mere change in *type* of mill.

If all mills were to shift to the most efficient type of processing for given seed supplies, the gains in efficiency (under "perfect competition") would be passed on to the producer of cottonseed, on the one hand, and the consumer of cottonseed oil, on the other. If shifts from one type of mill to a more efficient type were limited to a relatively few individual cases, the competitive position of firms making the shift would be improved. Oil supply would be increased and price lowered somewhat. But prices of cottonseed would still be determined by the purchasing power of the remaining marginal mills. If, however, almost all mills were to shift to the most efficient type of processing, the remaining less efficient types of mills would be seriously squeezed between falling oil prices and rising seed costs. But, even under such circumstances, many such mills would be able to compete because they have already written off their investment cost so that such cost is negligible except for replacement and repairs. This advantage will disappear, of course, as newer mills succeed in amortizing their investments.

COMPARATIVE ECONOMIES OF DIFFERENT TYPES OF COTTONSEED OIL MILLS AND THEIR EFFECTS ON OIL SUPPLIES, PRICES, AND RETURNS TO GROWERS

By JOHN M. BREWSTER, *agricultural economist, Marketing Research Division, Agricultural Marketing Service*

I. OBJECTIVES AND APPROACHES

In determining the effects that possible changes in types of cottonseed crushing mills may have on market outlets for cottonseed products and returns to growers, four types of mills are considered. They are: Hydraulic, screw-press, direct-solvent, and prepress-solvent.

These types stem from different techniques used in separating cottonseed meats into oil and meal. This operation in hydraulic plants is accomplished by a discontinuous application of mechanical pressure, and in screw-press mills by a continuous application. In direct-solvent mills the oil is washed from the meats with a hexane solvent—a petroleum derivative. In prepress-solvent mills the meats are run through screw presses, called prepresses, and then passed on to the solvent extractor for complete separation into meal and oil. As pointed out by Rea and Wamble (*9*),[1] the chief effect of the prepress operation is to increase greatly the capacity of a given size solvent extractor, lower solvent requirements, reduce the percentage of fines, and appreciably increase oil recovery per ton of seed.

The present (1951–52) industry is comprised of approximately 323 active mills, as follows: 249 hydraulics; 62 screw-press; and 12 direct- and prepress-solvent mills.

The oldest process, by far, is the hydraulic. Screw-press mills were first used by the cottonseed industry immediately after World War I. The first direct-solvent mills were installed at the close of World War II, and the first prepress-solvent mills about 1949. In 1948, when this study was begun, there were only four direct-solvent mills. The solvent process had been widely adopted by the soybean industry so the question arose as to whether the cottonseed industry should not do the same.

With the possibility in mind of a widespread technological revolution in the cottonseed industry, the National Cottonseed Advisory Committee of the Department of Agriculture said:

> The mechanical pressing of cottonseed currently practiced is not basically different from that used 75 years ago although there have been improvements in mechanical design of the same processing units. The relative efficiency of hydraulic mills has long been the subject of attack, primarily because of the excessive man-hour labor requirements and the excessive amount of oil left in the cake and meal. The solvent method is currently receiving concentrated attention by the cottonseed milling industry because it saves labor and power, recovers more oil and lends itself more readily to the development of new products and the evolution of totally new methods for the recovery of the desired components of cottonseed. The solvent-screw press process recovers a still higher percentage of oil. A shift from mechanical to solvent plants could mean that practically all of the approximately 375 mills would become obsolete within the next few years, present plant locations abandoned, storage requirements increased, and the transportation pattern readjusted to meet the changed conditions.[2]

For these reasons this committee recommended in 1947 that a study be made of the "Effects of Changes in Processing Methods, Including Solvent Extraction, upon the Cottonseed Industry, Market Outlets, and Returns to Growers." This report gives the findings to date.

This chapter (1) sets forth the central problem and objectives of the study, (2) states the guiding assumptions of the analysis, (3) points out the necessity of comparing mills at each of specified volumes of seed crushed annually, (4) describes the selection of mills to be studied, (5) indicates the types of data required to carry out the investigation, and (6) describes the selection of mill areas considered.

THE PROBLEM

The recommendation of the Advisory Committee was interpreted as raising three fundamental questions. First, what type and size of mill would be most economical throughout the industry? Stated in this form, the question was found to be unanswerable, for the reasons stated on pages 3 and 4. The question that could be answered was: Which type and size of mill is most economical for certain specified volumes of seed that *may* be available in given localities. The answer to this question, therefore, became the first major objective of the study. The decision as to which volume is actually available and hence which *size* mill of *any* type is most economical in particular localities is left to local judgment.

[1] Italic numbers in parentheses refer to Literature Cited, p. 235.

[2] The number of *active* mills at the end of World War II was 375.

Second, what would be the effects of industrywide change in types of mills on total supplies of cottonseed products and their value per ton of seed? The answer to this query evidently resolves itself into a consideration of the extent to which such change would affect the total supply of cottonseed oil, as it would alter only the supply and price of oil. It would not alter supplies of linters, as all types of mills use the same methods for separating linters from cottonseed. Also, supplies of meal would remain the same, as the weight of the additional oil removed from cake or meal by direct- or prepress-solvent mills is replaced by adding an equivalent weight of hulls to the meal. This addition would reduce supplies of hulls somewhat (never more than 50 pounds per ton of seed) but not enough to affect substantially the price of hulls.

The third and final query concerns the extent to which industrywide shifts in types of mills would affect the value of cottonseed sold by growers.

The main burden of work in the study arose in connection with the first objective, as an analysis of mill economies involves a comparison of the net returns of different types and sizes of mills under the same cost-price relationships. When this comparison is once made, the effects of industrywide shifts in types of mills on the total supply of cottonseed oil may be quickly calculated. The effects of this change in oil supply on the price of oil may then be calculated by the use of equations, developed by the Bureau of Agricultural Economics for this purpose. When this is done, the effect of industrywide changes in types of mills on the value of cottonseed sold by growers may be approximated through comparison of the cost and revenue of the marginal mill of the present industry with those of alternative industries which may arise under conditions of stable competition.[3] Although these effects can be calculated, it should be recognized that they will occur gradually over a period of several years and, therefore, tend to be concealed by changes in population, consumption habits, national income, and the like.

Chapters II through V bring together basic information necessary for reaching a conclusion on any of the objectives of the study. Chapter VI analyzes the relative economies of the four types of cottonseed milling processes. Chapter VII analyzes the effects of possible industrywide changes in types of mills (1) on total cottonseed oil supplies, (2) on the price of oil, and (3) on returns to growers.

GUIDING ASSUMPTIONS

The following assumptions were accepted as basic throughout this study. They are important because they clarify, broadly speaking, what the study does not consider as well as what it does.

First, it was assumed that the mills were exclusively engaged in processing cottonseed into its first products. In other words, the fact that mills sometimes crush other oilseeds and often run mixed-feed or other side-line businesses was regarded as having no bearing on the comparative efficiency of different mills. If a side-line feed business, for example, were profitable to a hydraulic mill, it should be equally so to a solvent mill, but that is irrelevant to the question of which mill can process cottonseed most economically.

Second, it was assumed for the analysis of the comparative economies of different types of mills that all mills were new. In other words, the question was which of the various types of mills that might be built in any locality would yield the most net revenue per ton of seed processed under given cost-price relationships, irrespective of any investment which may already be tied up in an old mill. To be sure, it will not be economical for the owner of an old mill to shift to a new mill until the old one is so worn out or inefficient that his expected return after total cost (including fixed and current costs) from a new mill is greater than his net return after current cost from his old one. And he cannot be forced out of business until his total returns are less than his current costs. The study thus analyzes the comparative economies of different milling processes in terms of new mills, leaving to local judgment the immediate question of whether an owner of an old mill should now shift to a new mill or continue exploiting the useful life of his present plant.

Third, it was assumed that the various mills studied were run under the same standardized rules. In this way, individual differences in managerial ability or judgment have been disregarded. It is true that the same mill may prosper under the rules of one management and fail under those of another. But the purpose of this study is to analyze the effect of differences in *mills* and not differences in *management*. In line with this purpose, different mills were subjected to the same operating rules.

Fourth, it was assumed that equivalent skills, needed for operating different mills, are available in any given locality at uniform wages. It was also assumed that equivalent local services, such as supplies or repairs, were likewise available. Local judgment is best prepared to make necessary allowances wherever these assumptions may be out of line with actual circumstances.

Fifth, it was assumed that customers are willing to pay the same price for a given form of meal (slab cake, bulk meal, sacked meal, pellets, cracked or sized cake) irrespective of the type of mill that produced the meal. In making this assumption, it was recognized that some cottonseed meal has

[3] The marginal mill of an industry is here recognized as the smallest or least efficient mill whose services are needed to enable the industry to handle a given crop of seed, and hence whose costs must be covered by the total value of products per ton of seed.

been sold at a discount. And as Moore (*6*) has pointed out, in contemplating a shift from a hydraulic or screw-press to a solvent mill (prepress or direct), a mill operator should assure himself beforehand of the attitude of his customers toward a change to solvent meal. However, as discounts on solvent meal have tended to disappear over a brief period of time, the same meal prices for all types of mills were used.

For some users, prepress-solvent meal has the disadvantage of being finer and drier than hydraulic or screw-press meal and, therefore, does not mix as well with other feeds. Also, solvent meal does not have the toasted flavor and odor of mechanically produced meals; however, for many users, these disadvantages are offset by its higher protein content as well as higher digestibility.

The analysis was carried out in terms of 1949–50 cost-price relationships, the most recent period for which requisite conditions and data were available. The 1949–50 average price of 11.67 cents per pound of oil was especially low compared with the prices of oil in other years, with the value of other cottonseed products, and with most costs for processing cottonseed. As a consequence, findings of the study are conservative with respect to the effect of change in types of mills on their net earning power and on the value of cottonseed sold by growers. Moreover, the findings may be improved and kept up to date through establishment of methods that both describe changes in production techniques and measure changes in cottonseed processing cost-price relationships.

NECESSITY FOR COMPARING MILLS AT SAME VOLUMES OF SEED CRUSHED

Specifying the most economical size of mill (whatever the type) requires a schedule of prices, which any size mill that may be built in a given location must pay for what it buys and receives for what it sells. But there can be no established schedule of cottonseed prices which shows how seed costs will vary with the quantity purchased. A cottonseed oil mill operator, as a rule, cannot obtain, at the same price, volumes of seed which are substantially larger than those which he customarily purchases. The reason is that the overall seed supply of the cotton industry is fixed, and this fixed supply is substantially less than the amount needed to permit year-round operation for all mills. This fixed nature of the seed supply arises from the fact that cottonseed is a byproduct of cotton and does not vary in quantity with seed price changes. As a consequence, a given operator can increase his customary supply only by diverting seed from competitors—a practice which immediately increases his competitor's processing costs. As a means of protecting his business, the competitor is forced to bid up the seed price to whatever point is necessary to retain his customary supply of seed.[4]

Therefore, the effort to substantially expand a mill operator's customary seed supply is soon checked by an indeterminate, but prohibitive, seed diversion cost. An operator is not interested in the size of mill which would make him the most profit if he could obtain any quantity of seed he desired at prevailing prices. The practical question facing him is what type and size of mill would be most economical for the limited volume of seed that is actually available at prevailing prices.

Since only local persons know what these volumes are in individual cases, it follows that no formal analysis can specify the most economical *size* mill for any given locality. However, by the use of the prevailing costs for seed f. o. b. gins, it is possible to determine which type and size of mill could return the most net revenue per ton of seed for each of specified volumes of seed which *may* be available in any given mill area. Local judgment is then best qualified to state just what these volumes actually are.

So far, the indeterminancy of the most economical size mill in any given locality has been discussed solely on the basis of the impossibility of knowing how seed cost may vary with the volume purchased. It should be pointed out, however, that for some size mills the same indeterminancy may be associated with meal and hull returns and salary overhead.

Generally, a mill sells part of its meal locally and the rest wholesale, at a lower price. The larger the mill, the greater the proportion of the meal it must sell wholesale; and hence the lower the average value of all meal it produces. The same principle applies to hulls. In calculating the effect of change in size of mill on average meal (or hull) returns, it was assumed in this study that change in the size of mill would not affect the wholesale price of meal.

In checking with mill operators on this point, the assumption was felt to be true within wide limits, but it might require some qualification for the larger crushes used in this study. Just how much was not known. For example, an operator might expand his wholesale meal market from 10 to 40 tons per day without taking a discount, but, if he increased it up to 75 or 100 tons, he might have to move into a buyers' market instead of a sellers' market. That is, he might have to sell to users of very large volumes of meal who are able to buy at a lower price than purchasers of small quantities. For this reason, the assumption just stated may be quite reliable when used in determining the effect of different types of

[4] There are ways of forcing up the cost of seed other than mere price "bidding." Such ways include purchasing gins that provide seed, giving meal discounts to gins, and performing various "good will" services. For this reason, the term "cost" instead of "price" of seed at gins is used in this report.

mills on net revenue, and yet be subject to qualification when used for calculating the effect of increasing the size of a mill upon net returns.

Salary overhead was calculated on the basis of data made available by the National Cottonseed Products Association, on the relationship between the overhead charges per ton and size of crush. It is possible, however, that not enough "large" mills were included in this calculation to give a fully accurate picture of the variation of overhead with size of mill beyond a certain point, for example, 50,000-ton crushes and over.

Although these possible indeterminancies should be kept in mind, they do not preclude specification of which size and type of mill is most economical for each volume of seed which may be available.

SELECTION OF MILLS

The question now arises as to what volumes of seed should be selected as a means of making the most useful mill comparisons.[5]

For any specified operating rate (amount of seed processed per 24 hours), full 12-month operation was the most profitable length of season for any given mill. Net revenue varies substantially with different operating rates. But available seed varies from year to year in line with cotton acreage and yield per acre. Therefore, it appeared most desirable to compare all four types of processes when operating for a full season at their normal rates, realizing that either this rate or season might need to be altered from year to year in line with variations in the seed supply.

Data were available for only 5 direct-solvent and 5 prepress-solvent mills, all of which had to be utilized in the study in order to have a minimum number of observations for these 2 processes. This gave nine different volumes or annual crushes of cottonseed because, as shown in table 1, the normal daily crushing capacity is the same only for the largest mills (400 tons per day).

TABLE 1.—*Direct- and prepress-solvent cottonseed crushing plants: Minimum, normal, and maximum daily operating rates and annual crushing capacities at normal rate* [1]

Plant	Volume of seed processed per 24 hours			Annual capacity
	Minimum rate	Normal rate	Maximum rate	
	Tons	*Tons*	*Tons*	*Tons*
Prepress solvent:				
Plant 1	30	40	50	10, 560
Plant 2	60	80	100	21, 120
Plant 3	120	160	200	42, 240
Plant 4	180	240	300	63, 360
Plant 5	270	400	450	105, 600
Direct solvent:				
Plant 1	40	50	65	13, 200
Plant 2	75	100	125	26, 400
Plant 3	150	200	250	52, 800
Plant 4	225	300	375	79, 200
Plant 5	300	400	500	105, 600

[1] 12-month operations, averaging 22 working days of 24 hours each per month.

Fortunately, these 9 crushes also represented 5 different size screw-press mills and 8 hydraulic mills operating a full 12-month season at their normal rates. Table 2 arrays these crushes in order of size and shows the series of mills requiring a full season to process each crush. It will be noted that the first, second, third, and fourth prepress-solvent mills can be compared with only hydraulic mills having 4, 8, 16, and 24 presses, respectively, running a full season, as there are no other mills of any type that will crush the same amount of seed in the same period of time. For the same reason, the first direct-solvent mill can be compared only with a 2 press screw-press mill; but the second, third, and fourth direct-solvent mills can be compared with 4-, 8-, and 12-press screw-press mills, respectively, and also with 10-, 20-, and 30-press hydraulic mills, all operating a full season. Four types of mills, operating a full season and having the same annual crush, are

[5] Requiring mills of each type to handle the same volume of seed would not be necessary in measuring the comparative economies of different types of milling processes *if* there were any way of knowing the prices that a given operator would have to pay for different volumes of seed. (The ways in which cost of all inputs and outputs except seed varied, as a given operator changed the size of his crush, were either known or could be calculated with reasonable accuracy, as previously indicated.) For, if such knowledge were possible, finding the most economical type and size of mill throughout the industry could be accomplished through the following steps: (1) In a given mill area (locality) and starting with the smallest mill of a given type, say hydraulic, (a) find its optimum crush through varying its daily crushing rate and length of season until that volume of seed is found which will yield the most total net revenue for that mill; (b) repeat this procedure for each next larger mill until the volume of crush and corresponding mill are found which will yield more total net revenue than any other size of mill of the given type; (c) repeat steps (a) and (b) for each of the other types of processes. These steps would then show the volume of crush and optimum mill for each type of process that would give the most total net revenue, although volumes of seed handled by the optimum mills might be quite different, and most probably would be. (2) Repeating steps (a), (b), and (c) for representative mill locations would show which type and size of mills would be most economical throughout the industry.

With no precedent to go by, this study was initially planned along these lines. When sufficient data became available in the course of the study for testing this approach, the test showed that the approach led to an absurd result—that the most economical mill in the poorest mill locality in the industry was the biggest possible mill running for the longest possible season, and at the fastest possible rate. This result clearly pointed to the indeterminancy of the volume of available seed at quoted prices, for the reasons stated above. Under this circumstance, the relative efficiencies of different types of mills could be approximated by assuming that they handled the same specified volumes of seed, leaving to local judgment the question of which volumes of seed could be obtained at uniform f. o. b. gin costs, and hence the question of which size of mill of any type is most economical in any given area.

possible only in respect to the fifth prepress-solvent, the fifth direct-solvent, the 16-press screw-press, and the 40-press hydraulic mills.

TABLE 2.—*Daily capacities of different types of cottonseed crushing plants, operating 12 months, for each of specified volumes of seed crushed annually*

Type of plant	Crushing capacity per 24 hours [1]
ANNUAL CRUSH: 10,600 TONS	
	Tons
Prepress solvent: Plant 1	40
Hydraulic: 4 press	40
ANNUAL CRUSH: 13,200 TONS	
Direct solvent: Plant 1	50
Screw press: 2 press	50
ANNUAL CRUSH: 21,100 TONS	
Prepress solvent: Plant 2	80
Hydraulic: 8 press	80
ANNUAL CRUSH: 26,400 TONS	
Direct solvent: Plant 2	100
Screw press: 4 press	100
Hydraulic: 10 press	100
ANNUAL CRUSH: 42,200 TONS	
Prepress solvent: Plant 3	160
Hydraulic: 16 press	160
ANNUAL CRUSH: 52,800 TONS	
Direct solvent: Plant 3	200
Screw press: 8 press	200
Hydraulic: 20 press	200
ANNUAL CRUSH: 63,400 TONS	
Prepress solvent: Plant 4	240
Hydraulic: 24 press	240
ANNUAL CRUSH: 79,200 TONS	
Direct solvent: Plant 4	300
Screw press: 12 press	300
Hydraulic: 30 press	300
ANNUAL CRUSH: 105,600 TONS	
Prepress solvent: Plant 5	400
Direct solvent: Plant 5	400
Screw press: 16 press	400
Hydraulic: 40 press	400

[1] Operating at normal rates.

However, for none of these 9 crushes, except the largest, were comparisons restricted to mills operating a full 12-month season. Although 12 months is the most profitable season for a given mill, the larger of 2 mills, by working a shorter season, may be able to crush the same volume of seed at less cost. As a consequence, the total of 23 mills, operating a full season, was expanded, by varying the length of season, to include enough mills (67) to show which mill of each type could process each of the selected volumes of seed at the greatest net revenue per ton, whatever the differences in their daily crushing capacity or length of season. This final selection of mills is shown in table 3. In the stub and first two columns, the sequence of mills for each annual crush follows the order in which they were added in each series, and the order in which data were tabulated later in this report. The purpose was to discover the optimum mill of each type for each of the specified volumes of seed.

TABLE 3.—*Daily crushing capacities and lengths of operating seasons for different cottonseed plants crushing specified volumes of seed annually*

Type of plant	Crushing capacity per 24 hours [1]	Length of operating season	
		Months	24-hour working days
ANNUAL CRUSH: 10,600 TONS			
	Tons	*Number*	*Number*
Prepress solvent:			
Plant 1	40	12. 0	264
Plant 2	80	6. 0	132
Direct solvent:			
Plant 1	50	9. 6	211
Plant 2	100	4. 8	106
Screw press:			
2 press	50	9. 6	211
3 press	75	6. 4	141
Hydraulic:			
4 press	40	12. 0	264
6 press	60	8. 0	176
8 press	80	6. 0	132
ANNUAL CRUSH: 13,200 TONS			
Direct solvent:			
Plant 1	50	12. 0	264
Plant 2	100	6. 0	132
Prepress solvent: Plant 2	80	7. 5	165
Screw press:			
2 press	50	12. 0	264
3 press	75	8. 0	176
4 press	100	6. 0	132
Hydraulic:			
6 press	60	10. 0	220
8 press	80	7. 5	165

See footnote at end of table.

Table 3.—*Daily crushing capacities and lengths of operating seasons for different cottonseed plants crushing specified volumes of seed annually*—Con.

ANNUAL CRUSH: 21,100 TONS

Type of plant	Crushing capacity per 24 hours [1]	Length of operating season	
		Months	24-hour working days
	Tons	*Number*	*Number*
Prepress solvent:			
Plant 2	80	12. 0	264
Plant 3	160	6. 0	132
Direct solvent: Plant 2	100	9. 6	211
Screw press:			
4 press	100	9. 6	211
5 press	125	7. 7	169
Hydraulic:			
8 press	80	12. 0	264
10 press	100	9. 6	211
12 press	120	8. 0	176

ANNUAL CRUSH: 26,400 TONS

Direct solvent:			
Plant 2	100	12. 0	264
Plant 3	200	6. 0	132
Prepress solvent: Plant 3	160	7. 5	165
Screw press:			
4 press	100	12. 0	264
5 press	125	9. 6	211
Hydraulic:			
10 press	100	12. 0	264
12 press	120	10. 0	220

ANNUAL CRUSH: 42,200 TONS

Prepress solvent: Plant 3	160	12. 0	264
Direct solvent: Plant 3	200	9. 6	211
Screw press:			
7 press	175	11. 0	241
8 press	200	9. 6	211
Hydraulic:			
16 press	160	12. 0	264
22 press	220	8. 7	192
24 press	240	8. 0	176

ANNUAL CRUSH: 52,800 TONS

Direct solvent: Plant 3	200	12. 0	264
Prepress solvent: Plant 4	240	10. 0	220
Screw press:			
8 press	200	12. 0	264
10 press	250	9. 6	211
Hydraulic:			
20 press	200	12. 0	264
22 press	220	10. 9	240
24 press	240	10. 0	220

See footnote at end of table.

Table 3.—*Daily crushing capacities and lengths of operating seasons for different cottonseed plants crushing specified volumes of seed annually*—Con.

ANNUAL CRUSH: 63,400 TONS

Type of plant	Crushing capacity per 24 hours [1]	Length of operating season	
		Months	24-hour working days
	Tons	*Number*	*Number*
Prepress solvent: Plant 4	240	12. 0	264
Direct solvent:			
Plant 4	300	9. 6	211
Plant 5	400	7. 2	158
Screw press:			
10 press	250	11. 5	253
12 press	300	9. 6	211
Hydraulic: 24 press	240	12. 0	264

ANNUAL CRUSH: 79,200 TONS

Direct solvent:			
Plant 4	300	12. 0	264
Plant 5	400	9. 0	198
Prepress solvent: Plant 5	400	9. 0	198
Screw press:			
12 press	300	12. 0	264
14 press	350	10. 3	226
Hydraulic:			
30 press	300	12. 0	264
36 press	360	10. 0	220
40 press	400	9. 0	198

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5	400	12. 0	264
Direct solvent: Plant 5	400	12. 0	264
Screw press: 16 press	400	12. 0	264
Hydraulic: 40 press	400	12. 0	264

[1] Operating at normal rates.

The concept of season and rate, used in this selection of mills, needs further explanation.

An operating month, as used here, included an average of 22 working days of 24 hours each, allowing an average of 8 days for cleanups and other purposes.[6] This concept of an operating

[6] As used in this report, the number of operating months per season does not always coincide with an equal number of calendar months. A 3-month operating season (66 operating days) will not fall within the 3 calendar months of September, October, and November, the reason being that, in the earlier phases of the cotton-harvesting season, the flow of seed from gins to mills is usually not sufficient to make continuous operations possible. Sometimes a mill will have to shut down and wait for seed. As a consequence, a 3-month operating season, which includes a total of 66 operating days, was considered as extending over more than 3 calendar months. The same principle applied to 4- and 5-month operating seasons, but not to longer seasons.

month checks reasonably well with the general practice of the industry. For example, assuming mills operated for the whole year at the rate of operations in their "big month," their maximum annual crush would be 12 times that of the "big month." After measuring the average relationship in 1947 between this annual maximum crush and the number of months in which mills carried on operations, Kromer and Smith (*5*) found that, in general, mills utilized about 60 percent of their monthly capacity.

The operating rate of any mill is subject to wide variation, and each rate denotes a different daily crushing capacity. Three rates were used in case of direct- and prepress-solvent plants, as shown in table 1. The second was called the normal rate. It is the rate ordinarily used by engineers in designing a mill, also the rate at which operators usually run mills when "conditions are right." The other two rates were called the minimum and maximum rates, respectively. In general, the minimum rate for direct- and prepress-solvent mills was considered as being 75 percent of the normal rate which, in turn, was considered as being 80 percent of the maximum rate.

In the case of hydraulic and screw-press mills, the daily rate or capacity of any mill is actually its number of presses times a given press rate. Four press rates were taken into account in connection with hydraulic mills: 8, 10, 12, and 14 tons of seed per press per 24 hours. The first was called "minimum," the fourth "maximum," the second "normal" and the third "other." These rates appear to be fairly typical of the industry. For example, during 1947 operators of 72 hydraulic mills in the Mississippi Valley region reported the number of presses per mill and also estimated the overall daily crushing capacity per mill under "normal conditions." In terms of these data, extraction rates ranged from 6 to 17 tons per press per 24 hours. Altogether, there were 12 different rates; but in only 2 cases was the rate more than 14 tons per press per 24 hours, and in only 1 case was it less than 7 tons. In 62 cases (86 percent of the total) the rate ranged from 8 to 14 tons.

TABLE 4.—*Mississippi Valley region: Number of hydraulic mills, by press rates, 1947*

Press rate (tons per press per 24 hours)	Hydraulic mills	Percentage of total
	Number	*Percent*
9 (average)	72	100.0
7	7	9.7
8	19	26.4
9	11	15.3
10	16	22.2
11	9	12.5
12	4	5.5
14 and over	3	4.2
Other [1]	3	4.2

[1] Not identified in order to avoid disclosure of individual mills.

For similar reasons, 4 rates were used for all screw-press mills: 20, 25, 30, and 35 tons per press per 24 hours, and again the first was called "minimum," the fourth "maximum," the second "normal," and the third "other."

TYPES OF DATA REQUIRED

Broadly speaking, five types of data were required for the purposes of the study as follows: (1) Seed qualities, (2) seed product yields, (3) initial investments and operating requirements of each type and size of mill, (4) cost rates of plant and operating requirements, and (5) product selling prices.

These subjects are dealt with at length in the next four chapters. Items 2 and 3 were developed through engineering techniques. Items 1, 4, and 5 were developed from published sources and surveys.

SELECTION OF MILL AREAS

Boundaries of mill areas are always vague and shifting as well as overlapping, so that they are usually identified only by the addresses of individual mill sites. The economic characteristics of such areas are essential in analyzing comparative mill efficiencies. From the cost side of mill operations, the more important of these characteristics are seed costs at gins, seed availability, wage rates, electric power rates, and property tax rates. From the revenue side of operations, the most important characteristics of mill areas are their meal and hull market patterns and seed qualities. The essential elements of meal market patterns are the forms of meal produced, the maximum size of the local market for each form of meal, the price differentials between different forms of meal, and the differential between local and wholesale prices for each particular form of meal. The main features of mill-area hull market patterns are the maximum size of the local hull market and the differential between the local and wholesale prices for hulls.

Each area is essentially unique because of the wide variability of each of these characteristics among mill areas, and the very limited total number of mill areas. As a consequence, the industry as a whole cannot be analyzed through the random sampling technique. Nor is use of this technique necessary to the objectives of this study, because a few mill areas can be selected that represent the industry with respect to the range of all important cost items (labor, power, etc.), seed qualities, availability of seed, and market patterns. As a consequence, analysis of the relationship between costs and returns for the different mills at specified crushes in such areas will show the range of relative profitabilities within which the same mills would usually fall in any locality. Also, the analysis will show which type of milling process will usually be most economical in any locality. This showing can

TABLE 5.—*Cottonseed quality and production, meal and hull market characteristics, wage rates, and tax rates in typical cottonseed oil mill areas*

Mill area [1]	Geographical location: Region, subregion, and State	Seed quality [2]: Oil	Ammonia	Free fatty acid	Moisture	Foreign matter	Grade	Cottonseed produced within area of 75-mile radius [3]	Meal marketing pattern [4]: Approximate amount of local meal sales: Bulk	Sacked	Cracked or sized cake	Pellets	Total	Normal proportion of type of meal sold wholesale: Slab	Bulk	Sacked	Pellets
		Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
	Coastal Plains:																
1	North Carolina	18. 6	3. 48	3. 6	12. 3	0. 9	89. 3	100, 000	0	2, 600	0	0	2, 600	----	34	66	----
2	South Carolina	18. 7	3. 64	4. 9	12. 0	. 6	88. 0	134, 700	0	1, 600	0	0	1, 600	----	13	87	----
3	do	18. 5	3. 71	1. 6	12. 1	. 4	98. 0	188, 900	0	700	0	0	700	----	2	98	----
4	Georgia	18. 4	3. 75	2. 1	12. 3	. 5	95. 2	115, 500	0	700	0	0	700	----	4	96	----
5	do	18. 5	3. 72	1. 5	12. 3	. 6	98. 6	103, 700	0	1, 200	0	0	1, 200	----	4	96	----
6	do	18. 2	3. 70	4. 3	12. 7	. 5	93. 0	73, 800	0	600	0	0	600	----	9	91	----
7	Alabama	18. 6	3. 73	1. 3	11. 8	. 5	100. 1	71, 300	0	1, 100	0	1, 200	2, 300	10	31	59	----
8	do	18. 3	3. 69	1. 9	12. 6	. 6	96. 5	47, 800	0	1, 300	0	0	1, 300	10	31	59	----
9	Mississippi	18. 8	3. 73	1. 3	11. 8	. 8	98. 8	53, 400	0	1, 900	0	0	1, 900	----	4	96	----
	Eastern Hilly and Piedmont:																
	Eastern Hilly:																
10	Alabama	18. 5	3. 83	. 8	12. 0	. 7	101. 0	139, 600	0	1, 700	0	0	1, 700	----	----	100	----
11	Mississippi	19. 2	3. 71	1. 4	11. 4	. 8	100. 8	248, 500	0	4, 200	100	0	4, 300	----	----	100	----
12	do	18. 7	3. 64	. 8	12. 5	. 7	100. 2	401, 400	0	900	400	0	1, 300	----	----	100	----
	Piedmont:																
13 (I)	North Carolina	18. 4	3. 53	2. 9	12. 3	. 7	91. 8	127, 100	0	3, 100	0	0	3, 100	----	----	100	----
14	South Carolina	18. 6	3. 67	2. 7	12. 1	. 5	93. 1	119, 000	0	700	0	0	700	----	----	100	----
15	do	18. 5	3. 73	1. 9	12. 1	. 5	96. 9	140, 300	0	700	0	0	700	----	----	100	----
16	Georgia	18. 6	3. 75	1. 2	12. 2	. 5	99. 8	88, 300	0	1, 600	0	0	1, 600	----	----	100	----
	Delta:																
17	Tennessee	18. 1	3. 56	. 9	13. 6	1. 2	95. 9	711, 100	0	1, 300	0	0	1, 300	----	9	91	----
18	Mississippi	19. 3	3. 70	1. 6	11. 8	1. 3	99. 8	348, 800	0	1, 900	0	0	1, 900	78	----	22	----
19	do	19. 4	3. 71	2. 0	11. 6	1. 1	99. 3	430, 500	0	0	0	0	0	84	----	16	----
20	Arkansas	18. 3	3. 63	. 9	12. 5	1. 5	97. 2	461, 800	0	5, 100	0	0	5, 100	21	----	79	----
21	do	18. 8	3. 68	1. 0	11. 1	1. 1	100. 5	200, 100	0	1, 300	200	0	1, 500	21	----	79	----
22 (II)	do	18. 3	3. 63	. 9	12. 5	1. 5	97. 2	500, 300	0	100	0	0	100	----	25	70	5
23 (III)	Louisiana	18. 7	3. 79	2. 1	11. 8	. 8	96. 9	74, 800	0	3, 100	0	0	3, 100	85	----	15	----
	Central Humid:																
	Ozark-Ouachita:																
24	Arkansas	18. 8	3. 64	. 8	11. 0	1. 1	100. 7	155, 400	0	10, 700	800	100	11, 600	6	----	93	1
25 (IV)	Oklahoma	17. 7	4. 00	. 7	10. 4	1. 0	99. 1	23, 300	0	3, 200	2, 600	0	5, 800	----	----	100	----
	Sandy Lands:																
26	Arkansas	18. 8	3. 78	1. 0	11. 3	1. 2	101. 5	65, 900	0	3, 100	0	0	3, 100	44	----	56	----
27	Louisiana	18. 7	3. 81	1. 4	11. 1	. 8	100. 0	145, 600	0	2, 600	100	0	2, 700	64	----	36	----
28	Texas	18. 2	3. 94	. 8	9. 8	. 8	100. 6	165, 100	0	4, 700	800	400	5, 900	44	----	56	----
29	do	18. 2	3. 94	. 8	9. 8	. 8	100. 6	176, 000	0	4, 300	4, 300	0	8, 600	44	----	56	----

	Gulf Coastal Prairies:																
30	Texas	18. 1	3. 98	1. 2	9. 6	. 9	96. 1	106, 800	0	1, 800	600	0	2, 400	38	----	47	15
31	----do	18. 1	3. 98	1. 2	9. 6	. 9	96. 1	145, 200	0	500	400	0	900	38	----	47	15
32	----do	18. 1	3. 98	1. 2	9. 6	. 9	96. 1	214, 700	0	1, 000	0	500	1, 500	38	----	47	15
	Texas Blacklands:																
33	Texas	18. 0	4. 03	. 7	9. 3	. 7	100. 9	155, 600	0	6, 600	0	0	6, 600	4	----	68	28
34	----do	18. 0	4. 03	. 7	9. 3	. 7	100. 9	248, 500	0	2, 400	0	1, 300	3, 700	2	----	63	35
35	----do	18. 0	4. 03	. 7	9. 3	. 7	100. 9	294, 800	0	4, 300	100	2, 800	7, 200	----	11	75	14
36	----do	18. 0	4. 03	. 7	9. 3	. 7	100. 9	279, 500	0	3, 500	1, 200	2, 500	7, 200	----	12	77	11
37	----do	18. 0	4. 03	. 7	9. 3	. 7	100. 9	253, 800	0	4, 300	0	0	5, 100	30	----	67	3
38	----do	17. 8	3. 84	. 9	9. 5	. 6	99. 1	160, 600	0	1, 000	0	0	1, 000	40	4	55	1
39	----do	17. 8	3. 84	. 9	9. 5	. 6	99. 1	96, 900	0	2, 900	200	300	3, 400	40	4	55	1
40 (V)	----do	18. 0	4. 03	. 7	9. 3	. 7	100. 9	231, 900	0	13, 300	0	12, 900	26, 200	----	----	62	38
41	Oklahoma Prairies: Oklahoma	17. 7	4. 00	. 7	10. 4	1. 0	99. 1	54, 800	0	9, 500	4, 700	8, 400	22, 600	----	----	74	26
	Central Semi-Arid:																
	Low Plains:																
42	Oklahoma	17. 6	4. 00	. 7	10. 4	1. 0	98. 2	232, 900	0	5, 400	0	7, 800	13, 200	4	9	60	27
43	Texas	18. 3	4. 15	. 6	9. 1	. 8	102. 6	287, 600	0	1, 500	0	3, 000	4, 500	7	1	57	35
44	----do	18. 3	4. 15	. 6	9. 1	. 8	102. 6	210, 100	1, 100	5, 300	0	900	7, 300	----	8	57	35
45	High Plains: Texas	18. 0	4. 16	. 7	9. 2	. 7	101. 8	688, 700	0	6, 300	0	9, 400	15, 700	6	3	51	40
46	Texas Grazing: Texas	17. 8	4. 15	. 7	9. 1	. 6	100. 6	87, 600	0	700	0	1, 600	2, 300	----	7	51	42
	Irrigated (West):																
47	Texas	20. 5	3. 84	. 5	7. 1	. 3	110. 0	91, 000	0	4, 900	0	900	5, 800	----	----	64	36
48	Arizona	19. 6	3. 96	1. 4	8. 3	1. 2	104. 5	190, 000	3, 800	4, 500	1, 200	2, 000	11, 500	----	----	59	41
49	California	18. 8	3. 96	. 4	8. 3	. 6	103. 5	320, 000	8, 800	22, 400	400	1, 300	32, 900	5	30	58	7
50 (VI)	----do	18. 8	3. 96	. 4	8. 3	. 6	103. 5	345, 000	2, 600	23, 500	0	3, 600	29, 700	----	10	65	25

[1] See footnotes at end of table.

TABLE 5.—*Cottonseed quality and production, meal and hull market characteristics, wage rates, and tax rates, in typical cottonseed oil mill areas*—Continued

Mill area [1]	Geographical location: Region, subregion, and State	Meal marketing pattern [4]: Price per ton: Slab: Wholesale	Bulk: Wholesale	Bulk: Local	Sacked: Wholesale	Sacked: Local	Pellets: Wholesale	Pellets: Local	Hull marketing pattern [4]: Approximate amount of local hull sales	Price per ton: Local	Price per ton: Wholesale	Hourly wage rate [5]	Tax rate per $100 of total investment [6]
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
	Coastal Plains:												
1	North Carolina		57. 35		61. 20	63. 80			1, 600	10. 05	7. 85	0. 76	1. 03
2	South Carolina		57. 20		61. 05	63. 65			1, 000	12. 50	10. 30		
3	South Carolina		57. 20		61. 05	63. 65			3, 200	13. 15	10. 95		
4	Georgia		55. 00		58. 85	61. 45			700	14. 40	12. 20		
5	Georgia		55. 00		58. 85	61. 45			1, 300	11. 55	9. 35		1. 57
6	Georgia		56. 00		59. 85	62. 45			500	14. 12	11. 92		
7	Alabama		53. 50		57. 35	59. 95			1, 800	11. 82	9. 62		2. 01
8	Alabama		53. 50		57. 35	59. 95			2, 100	11. 82	9. 62		1. 56
9	Mississippi		55. 00		58. 85	61. 45			3, 900	14. 40	12. 20		1. 68
	Eastern Hilly and Piedmont:												
	Eastern Hilly:												
10	Alabama				58. 65	61. 65			1, 900	9. 88	7. 18		2. 16
11	Mississippi				58. 65	61. 65			3, 000	9. 88	7. 18		3. 60
12	Mississippi				58. 65	61. 65			2, 800	9. 88	7. 18		
	Piedmont:												
13 (I)	North Carolina				60. 90	63. 90			1, 800	12. 00	9. 30	. 76	1. 25
14	South Carolina				58. 45	61. 45			500	13. 93	11. 23		1. 00
15	South Carolina				58. 45	61. 45			600	13. 93	11. 23		1. 09
16	Georgia				59. 55	62. 55			1, 200	13. 46	10. 76	. 76	3. 66
	Delta:												
17	Tennessee	54. 45	57. 05		59. 90	61. 75			5, 700	6. 45	4. 20		2. 85
18	Mississippi	55. 30	57. 90		60. 75	62. 60			500	9. 64	7. 39		
19	Mississippi	55. 30	57. 90		60. 75	62. 60			0	9. 64	7. 39	. 78	
20	Arkansas	53. 25	55. 85		58. 70	60. 55			9, 000	5. 70	3. 45		. 89
21	Arkansas	53. 25	55. 85		58. 70	60. 55			2, 700	5. 70	3. 45		. 81
22 (II)	Arkansas	53. 85	56. 45		59. 30	61. 15			800	3. 05	3. 05	. 77	. 72
23 (III)	Louisiana	53. 45	56. 05		58. 90	60. 75			3, 300	9. 80	7. 55	. 80	. 81
	Central Humid:												
	Ozark-Ouachita:												
24	Arkansas				59. 90	62. 45			12, 500	7. 27	4. 77		1. 03
25 (IV)	Oklahoma				59. 95	62. 50			3, 100	9. 70	7. 20	. 90	1. 40
	Sandy Lands:												
26	Arkansas				56. 45	59. 00			2, 900	7. 72	5. 22		
27	Louisiana				56. 45	59. 00			4, 100	8. 23	5. 73		2. 64
28	Texas				56. 45	59. 00			6, 100	7. 72	5. 22		1. 57
29	Texas				56. 45	59. 00			2, 000	10. 78	8. 28		2. 41
	Gulf Coastal Prairies:												
30	Texas				57. 55	60. 10			3, 000	7. 94	5. 44		1. 11
31	Texas				57. 55	60. 10			1, 600	7. 94	5. 44		1. 39
32	Texas				57. 55	60. 10			7, 600	7. 94	5. 44	. 75	2. 61

	Texas Blacklands:												
33	Texas	54. 60			58. 90	61. 45	60. 85	63. 40	5, 800	8. 01	5. 51	. 78	2. 76
34	Texas	54. 65			58. 95	61. 50	60. 90	63. 45	5, 000	8. 54	6. 04		1. 29
35	Texas	53. 95			58. 25	60. 80	60. 20	62. 75	8, 300	8. 90	6. 40		1. 39
36	Texas	54. 00			58. 30	60. 85	60. 25	62. 80	1, 100	9. 14	6. 64	. 81	3. 04
37	Texas	54. 60			58. 90	61. 45	60. 85	63. 40	2, 500	8. 58	6. 08	. 77	1. 86
38	Texas	55. 20			59. 50	62. 05	61. 45	64. 00	800	9. 51	7. 01		1. 26
39	Texas	55. 20			59. 50	62. 05	61. 45	64. 00	1, 700	9. 51	7. 01		1. 54
40 (V)	Texas	54. 88			59. 18	61. 73	61. 13	63. 68	3, 000	8. 44	5. 94	. 95	2. 83
41	Oklahoma Prairies: Oklahoma.				61. 68	64. 23	63. 98	66. 53	6, 600	8. 86	6. 36	. 92	2. 86
	Central Semi-arid:												
	Low Plains:												
42	Oklahoma		59. 34		62. 89	64. 99	64. 94	67. 04	6, 600	8. 40	6. 45		1. 50
43	Texas		54. 82		58. 37	60. 47	60. 42	62. 52	7, 100	7. 60	5. 65		2. 00
44	Texas		54. 53		58. 08	60. 18	60. 13	62. 23	9, 200	7. 24	5. 29	. 75	2. 12
45	High Plains: Texas				61. 67	63. 77	63. 67	65. 77	25, 500	7. 24	5. 29	. 96	2. 59
46	Texas Grazing: Texas				58. 67	60. 77			2, 000	8. 33	6. 38		1. 48
	Irrigated (West):												
47	Texas		54. 68	56. 13	58. 73	60. 03	60. 98	62. 28	8, 400	8. 97	6. 82	1. 05	2. 17
48	Arizona		56. 01	57. 46	60. 06	61. 36	62. 31	63. 61	16, 100	13. 11	10. 96		1. 61
49	California		57. 61	59. 06	61. 66	62. 96	63. 91	65. 21	22, 100	14. 08	11. 93		
50 (VI)	California		55. 06	56. 51	59. 11	60. 41	61. 36	62. 66	33, 000	15. 10	12. 95	1. 50	2. 12

[1] Roman numerals denote mill areas for which detailed analyses of cost-return relationships were made for all mills considered in this report.

[2] Five-year average compiled from *Cottonseed Qualities in the U. S.* publications, 1944 through 1948, Production and Marketing Administration, Cotton Branch, for all mill areas except those in Irrigated region for which data were compiled from *Cottonseed Qualities in the Far West, 1951–52* (the only year data were available).

[3] Based on 1943–47 average cottonseed production from *Cottonseed Supply Areas.* By John M. Brewster, Production and Marketing Administration, Fats and Oils Branch.

[4] Based on 1949–50 survey of cottonseed meal and hull sales by Production and Marketing Administration, Fats and Oils Branch.

[5] Based on reports from cottonseed oil mill operators.

[6] Based on survey of city and county tax rates by Bureau of Agricultural Economics.

then be tested through setting up an extreme case which compares the relative profitabilities of the different mills by combining the extreme cost and revenue characteristics of the few selected areas in such a way as to show the *minimum* differences in profit arising from a change in type of mill at specified crushes in any mill area. In this way, the most economical process which could be expected in any locality can be determined. This phase of the analysis is accomplished in chapter VI.

In line with the facts just stated, six widely separated mill areas were finally selected. They are as follows:

Mill area I	Southeastern North Carolina
Mill area II	North Delta, Ark.
Mill area III	South Delta, La.
Mill area IV	Eastern Oklahoma
Mill area V	North Blacklands, Tex.
Mill area VI	Central California

The following list shows the way in which these areas embodied the extremes of the industry in respect to the important economic variables of cottonseed mill areas:

Mill area I:
1. Low wage rates (76 cents per hour)
2. Low workman's compensation rates
3. Simplest meal market in the industry, producing only sacked meal and having a small local market of 3,100 tons
4. Highest differential in the industry between local and wholesale prices of sacked meal
5. Low seed grade (91.8) and high cost of Standard grade seed f. o. b. gins
6. High free fatty acid content of seed (2.9 percent)
7. Low ammonia content of seed (3.53 percent)

Mill area II:
1. Very high seed density
2. Negligible local market (100 tons) for meal
3. Negligible local market (800 tons) for hulls

Mill area III:
1. Highest electric power rates
2. Large wholesale market (16,000 tons) for slab meal and small local market (3,100 tons) for sacked meal
3. Low cost of Standard grade seed f. o. b. gins
4. Low property tax rates

Mill area IV:
1. Lowest seed density
2. Medium size (5,800 tons) local market for sacked meal
3. Low oil content of seed (17.7 percent)

Mill area V:
1. Large local market (12,900 tons) for pellet meal
2. Large local market (13,300 tons) for sacked meal
3. Medium wage rates ($1 per hour)
4. High ammonia content of seed (4.03 percent)
5. High property taxes

Mill area VI:
1. Highest wage rates ($1.50 per hour)
2. Low power rates
3. Lowest free fatty acid content of seed (0.4 percent)
4. High grade of seed (103.5)
5. High oil content of seed (18.8 percent)
6. Largest local market (23,500 tons) for sacked meal
7. Small local market (2,600 tons) for bulk meal
8. Small local market (3,600 tons) for pellets
9. Largest local market (33,000 tons) for hulls

Important economic characteristics are shown in table 5 for 50 widely scattered localities. This number included all extreme cases and was selected from a more extensive list which is not shown.

Seed densities were found through measuring the 1943–47 average amount of cottonseed produced within a 75-mile radius of given mill locations.

It is commonly recognized that wage rates for mill labor are highest in the Far West, next highest in the central arid and central humid regions, and approximately equivalent to the minimum wage in other regions except for a few "big city mills." This common knowledge was checked through formal inquiries in the localities for which rates are shown in table 5.

Property and assessment tax rates were obtained from local tax authorities. These rates, as shown in table 5, were the basis of the tax system in given cases, but it is recognized that their application varies among individual properties. Although too cumbersome to show in table 5, electric power rates were determined from an examination of power rate schedules of power companies servicing mill localities.

The meal and hull market patterns were developed from reports from 172 mills, widely scattered throughout the Cotton Belt, on their 1949–50 marketings of meal and hulls and the usual proportions in which each type of meal produced was distributed between the local and wholesale markets. The way in which meal and hull price information, as shown in table 5, was developed from these reports is described in detail in chapter V.

II. COTTONSEED PRODUCT YIELDS

This chapter describes the way in which cottonseed product yields were calculated in this report. This information was necessary for the designing of mills as well as for computing mill revenues.

Four products are involved: Oil, meal or cake, linters, and hulls.

COTTONSEED OIL YIELDS

Calculation of oil yields for any mill required three types of data: (1) Percentage of oil in seed, (2) percentage of ammonia in seed, and (3) pounds of oil left in 8-percent ammonia cake and in the hulls from 1 ton of seed.

It was assumed that the pounds of oil left in 8 percent ammonia cake and hulls from processing 1 ton of seed, by a hydraulic press operated at a rate of 16 tons of seed per 24 hours, are as shown in table 6 for seed containing varying amounts of ammonia.

The total yield of oil per ton of seed crushed at this rate was used as a base from which gains of oil yields were measured.

The oil yields per ton of seed crushed from any seed by any extraction rate of each type of mill may be determined by adding the appropriate oil gains, as shown in table 7, to the total oil yield by the hydraulic press operated at a rate of 16 tons of seed per 24 hours.

TABLE 6.—*Amounts of oil left in 8-percent ammonia cake for each ton of cottonseed processed by hydraulic press, operating at the rate of 16 tons of seed per 24 hours, by ammonia content of seed*

Ammonia in seed (percent)	Amount of oil left [1]	Ammonia in seed (percent)	Amount of oil left [1]
	Pounds		*Pounds*
2.80	50	3.80	59
2.85	50	3.85	60
2.90	51	3.90	60
2.95	51	3.95	60
3.00	52	4.00	60
3.05	53	4.05	61
3.10	53	4.10	61
3.15	54	4.15	62
3.20	54	4.20	62
3.25	55	4.25	62
3.30	55	4.30	62
3.35	56	4.35	63
3.40	56	4.40	63
3.45	56	4.45	63
3.50	57	4.50	63
3.55	57	4.55	64
3.60	57	4.60	64
3.65	58	4.65	64
3.70	58	4.70	64
3.75	59	4.75	65
		4.80	65

[1] Approximately 4 pounds of this amount remained in hulls.

Source: Rules Governing Transactions Between Members of the National Cottonseed Products Association, 1950–51. Pp. 121–122.

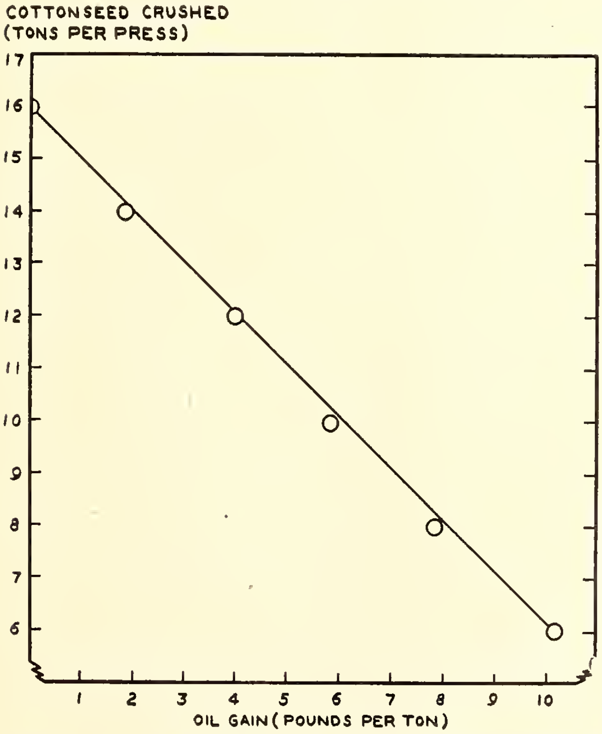


FIGURE 1.—Oil gain per ton of cottonseed related to hydraulic press capacity.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 7.—*Gains in cottonseed-oil yields per ton of seed processed, by types of mills and extraction rates*

[Hydraulic rate of 16 tons per press per 24 hours=base (zero)]

Extraction rate	Charges per 24 hours	Pressing time	Oil gain per ton of seed
HYDRAULIC MILL [1]			
Press rate (tons per press per 24 hours):	*Number*	*Minutes*	*Pounds*
6	20. 0	67. 0	10. 2
8	26. 7	49. 0	7. 9
10	33. 3	38. 2	5. 8
12	40. 0	31. 0	4. 0
14	46. 7	25. 1	1. 8
16	53. 3	22. 0	0
SCREW-PRESS MILL			
Press rate (tons per press per 24 hours):			
20			18. 0
25			14. 0
30			10. 0
35			6. 0
DIRECT-SOLVENT MILL [2]			
Plant rate:			
Minimum			43. 0
Normal			41. 0
Maximum			39. 0
PREPRESS-SOLVENT MILL [2]			
Plant rate:			
Minimum			49. 0
Normal			48. 0
Maximum			47. 0

[1] Standard 15 box press, 600 lb. of seed per press per charge and 5 minutes press loading and unloading time.

[2] These oil gains should be used only on seed between about 3.5 and 4 percent ammonia. For ammonia percentages higher and lower than this range the oil gains given will be incorrect.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Data for hydraulic mills based on Bulletin No. 13, Engineering Experiment Station, Univ. of Tenn. Data for screw-press mills based on "High Capacity Expeller Operations." By John W. Dunning and H. P. Keahey. Jour. of Amer. Oil Chem. Soc. Vol. XXIX, No. 12. Pp. 627–628

For example, if cottonseed contains 3.5 percent ammonia and 20 percent oil, the oil yield per ton of seed crushed by a hydraulic press, operating at a rate of 16 tons per 24 hours, would be 343 pounds. The total oil in 1 ton of seed is 400 pounds (20 percent × 2,000) and 57 pounds of this total is left in the meal and hulls (table 6) For a hydraulic press crushing 10 tons per 24 hours,

TABLE 8.—*Calculated cottonseed product yields per ton of seed processed by different types of cottonseed oil mills operating at normal rates, in mill areas I through VI, 1949–50*

Type of mill	Yield per ton in—				Total [1]
	Oil	Meal	Hulls	Linters	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
MILL AREA I					
Hydraulic	316. 80	829. 55	569. 65	178	1, 894
Screw press	325. 00	829. 55	561. 45	178	1, 894
Direct solvent	352. 00	829. 55	534. 45	178	1, 894
Prepress solvent	359. 00	829. 55	527. 45	178	1, 894
MILL AREA II					
Hydraulic	313. 80	853. 05	545. 15	178	1, 890
Screw press	322. 00	853. 05	536. 95	178	1, 890
Direct solvent	349. 00	853. 05	509. 95	178	1, 890
Prepress solvent	356. 00	853. 05	502. 95	178	1, 890
MILL AREA III					
Hydraulic	320. 80	890. 65	514. 55	178	1, 904
Screw press	329. 00	890. 65	506. 35	178	1, 904
Direct solvent	356. 00	890. 65	479. 35	178	1, 904
Prepress solvent	363. 00	890. 65	472. 35	178	1, 904
MILL AREA IV					
Hydraulic	300. 80	940. 00	513. 20	178	1, 932
Screw press	309. 00	940. 00	505. 00	178	1, 932
Direct solvent	336. 00	940. 00	478. 00	178	1, 932
Prepress solvent	343. 00	940. 00	471. 00	178	1, 932
MILL AREA V					
Hydraulic	304. 80	947. 05	524. 15	178	1, 954
Screw press	313. 00	947. 05	515. 95	178	1, 954
Direct solvent	340. 00	947. 05	488. 95	178	1, 954
Prepress solvent	347. 00	947. 05	481. 95	178	1, 954
MILL AREA VI					
Hydraulic	321. 80	930. 60	543. 60	178	1, 974
Screw press	330. 00	930. 60	535. 40	178	1, 974
Direct solvent	357. 00	930. 60	508. 40	178	1, 974
Prepress solvent	364. 00	930. 60	501. 40	178	1, 974

[1] The difference between this total and 2,000 pounds is owing to working loss per ton of seed which varies with the moisture content of the cottonseed.

the oil yield per ton of seed would be 348.8 pounds (343+5.8), as this rate of crushing has an oil gain of 5.8 pounds. In like manner, the yield by the normal prepress-solvent rate would be 391 pounds (343+48) as this extraction rate has an oil gain of 48 pounds. The same principle applies for any other rate of each type of mill.

COTTONSEED MEAL YIELDS

All mills were considered as producing 41 percent protein meal or 8 percent ammonia cake, which is the usual percentage. To produce such meal, 94 percent of the ammonia content of seed must be left in the cake. Therefore, the formula for 8-percent ammonia cake yield is:

$$\frac{\text{Percent of ammonia in seed} \times 0.94 \times 2{,}000}{8 \text{ percent}}$$

Although independent of the type of mill or operating rate, cake yield varies from area to area as the ammonia content of seed varies. For example, the 1944–48 average ammonia content of seed in mill area II was 3.63 percent; hence, meal yield for any mill in area II was 853.05 pounds per ton of seed $\left(\frac{3.63\times0.94\times2{,}000}{8}\right)$.

COTTONSEED LINTERS YIELDS

Yields of linters for different operating rates of linter machines were calculated on the basis of the experience of 17 mills in Texas, Oklahoma, Arkansas, and Mississippi during the 1949–50 season. For that season, these mills reported an average linters cut of 178 pounds per ton of seed for an average linter machine rate of 5 tons of seed per 24 hours. The average linters yield per linter machine was, therefore, 5×178, or 890 pounds per 24 hours. From these data determinations of yields were obtained, as follows:

$$\text{Pounds of linters cut per ton of seed} = \frac{890}{\text{Tons of seed per linter machine per 24 hours}}$$

Although linters yield per ton of seed varies with the linter machine rate, total linters per linter machine per 24 hours were thus considered to be the same for different rates. (The linter machine rate for any given mill was obtained by dividing its daily seed crushing rate (or rates) by the number of linter machines.)

COTTONSEED HULL YIELDS

The formula used in computing hull yields was: 2,000 pounds of seed−(oil yield+cake yield+linters yield+working loss per ton of seed).

"Working loss" is moisture lost in working the seed. In calculating this loss it was assumed that on the average 7 percent of the weight of all cottonseed products would be moisture. The analysis of cottonseed, on which the grade is determined, is based on seed containing 1 percent or less of dirt and trash. Dirt and trash in excess of 1 percent is deducted from the weight of the shipment at the time of settlement. If dirt and trash of less than 1 percent is ignored or assumed to find its way into the products eventually, calculating working loss resolves itself into calculating the moisture loss in working the seed. Therefore, determinations of working loss were obtained, as follows:

$$\text{Pounds of moisture lost in working seed} = \left(\frac{\text{Percent original moisture} - 7\%}{100}\right)\times 2{,}000$$

For example, the 1944–48 average moisture content of area II seed was 12.5 percent. Hence, the pounds of moisture per ton of seed lost in working this seed was:

$$\left(\frac{12.5-7}{100}\right)\times 2{,}000 = 110$$

III. PLANT AND INVESTMENT REQUIREMENTS

As means of placing alternative mills on a comparable basis, property layouts were designed for each mill, department by department and machine by machine. These designs were then used in calculating mill investment requirements on the basis of manufacturers' prices for machinery, equipment, and building materials, freight costs on materials and equipment, and installation charges. In this way, investment requirements were developed for five different pricing points—Memphis, Tenn., Atlanta, Ga., Dallas, Tex., Phoenix, Ariz., and Bakersfield, Calif.—and then used as a basis for calculating certain fixed costs by applying appropriate depreciation, property tax, interest, and insurance rates.

Standard items of machinery and equipment were used throughout all mill departments. In a few cases, when standard items, such as bins, were not readily available, the items were especially designed and their cost estimated on the basis of labor and materials.

The selection of specific equipment for pricing was influenced by several factors. In addition to the judgment of those making the selection, the two most important factors were the degree of cooperation of manufacturers in supplying prices and other information, and the adaptability of the equipment to the unit method (described later) of compiling costs.

The designs are not presented as necessary models to be followed because others might be better under certain conditions. Special operating conditions and alternate assumptions of different engineers might lead to some variations in designs. However, this would probably not greatly change the comparative costs of different types of mills of comparable capacities.

OVERALL FEATURES OF PROPERTY LAYOUTS

General features of property layouts are illustrated in figures 3 through 7. Figures 3, 4, and 5 illustrate the design principles for any hydraulic mill, although the particular mills actually used in these illustrations were:

- 10-press mill operating at 10 tons per press for a 10-month season (220 working days).
- 22-press mill operating at 10 tons per press for a 10-month season.
- 40-press mill operating at 10 tons per press for a 10-month season.

Except for seed houses, the number of buildings in the property layout is the same for any mill. As a protection against fire hazards, the maximum-size seed house was limited to 240 x 90 feet, representing a storage capacity of approximately 10,000 tons. Owing to this limitation, the number as well as the dimensions of seed houses varied by size of mill.

The size of each layout was determined by (1) the number of presses, (2) the daily extraction rate per press, and (3) the length of the operating season. If the operating season of a given mill were 6 instead of 10 months, the number and size of seed houses would be appreciably different.

As the same property layouts were used for both hydraulic and screw press mills, no drawings of layouts for the latter were included.

Figures 6 and 7 illustrate property layouts for prepress-solvent and direct-solvent mills. In these illustrations, the prepress-solvent mill was designed to operate at 240 tons per 24 hours for a 10-month season, and the solvent mill at 200 tons per day for the same length of season.

The solvent extraction unit (or units) for both prepress- and direct-solvent processes was unhoused. However, the screw-press phase of the prepress-solvent process was housed in the principal mill building, hereinafter called the "mill building." Outside this building were located a water main encircling the building for fire protection, a road on one side and across both ends, a concrete-lined drainage ditch along one side to carry away rainwater, a powerline and poles running alongside the building, fire hydrants spaced not more than 200 feet apart, and loading docks opposite some of the doors on the railroad track side of the building.

FIGURE 2.—Mill building of cottonseed oil plant.

METHOD OF CALCULATING CAPITAL COSTS

At the outset of this study a formidable task was that of devising a workable method for developing capital cost data in such a way that they could be readily combined into investment requirements for an indefinitely large number of mills, department by department. The main technique finally evolved for this purpose was called the "cost-unit" method of estimating. In terms of this method, the investment requirements for any mill were built up from the requirements for different departments, which in turn were built up from "cost-units." The development of the cost-units involved five main steps (the degree of detail included in these steps is substantially the same as that described by Nichols (*8*) after this study was begun):

First, drawings were made for a whole department with equipment layouts which could be expanded or contracted for different sizes of mills. Then the layouts were developed in sufficient detail to insure that an accurate determination of the machinery and a reasonably accurate determination of needed materials could be made.

Second, as the amounts of machinery and materials were listed from the drawings and calculation sheets, the items were grouped into units according to the central purpose they served. (For example, all equipment required for each screw press, in a line of several screw presses, was grouped into a cost-unit, called a screw press and auxiliary equipment unit. This unit included the screw press, the conveyor running over and under the press, the motors, starters, and wiring necessary for each press, the foundation concrete, and the like.) As many separate groupings as necessary were made to give the maximum amount of flexibility in the use of the units. As shown in the numerous tables throughout this chapter, this method of grouping physical items into small cost-units was used on machinery, equipment, buildings, and facilities of all kinds.

Third, the f. o. b. factory costs for five pricing points were modified by taking into consideration trade discounts, waste in fabrication, delivery charges, and other factors, so as to approximate as closely as possible the delivered cost at the mill site. Freight charges were based on the weights and freight rates for any items in the units to which freight charges would apply. Freight on specialized equipment such as linters, screw presses, and the like, was about the only item for which freight charges had to be calculated individually. Many items, such as the screw conveyor and most electrical equipment, are customarily priced with freight included to destination. In this connection, weights, shown in various tables in this chapter, are only approximate as the weight for all items in a given machine or equipment unit is seldom included. For example, the weights of concrete, brick, sand, lumber, and similar materials associated with a unit were not recorded on calculation sheets because they did not contribute to the problem of cost estimating. Also, for some items such as steel buildings and steel storage tanks, the weight information was not available, as the manufacturer supplied the price information on an installed cost basis. For most items for which weights were not readily available from the manufacturers, the weights were estimated, but for lightweight items the weights were ignored. Most of the buildings and tanks were priced on an installed basis.

The fourth step in the cost-unit estimating method consisted in adding an installation charge to delivered cost of each machinery and equipment unit. The principal item in this charge was labor,

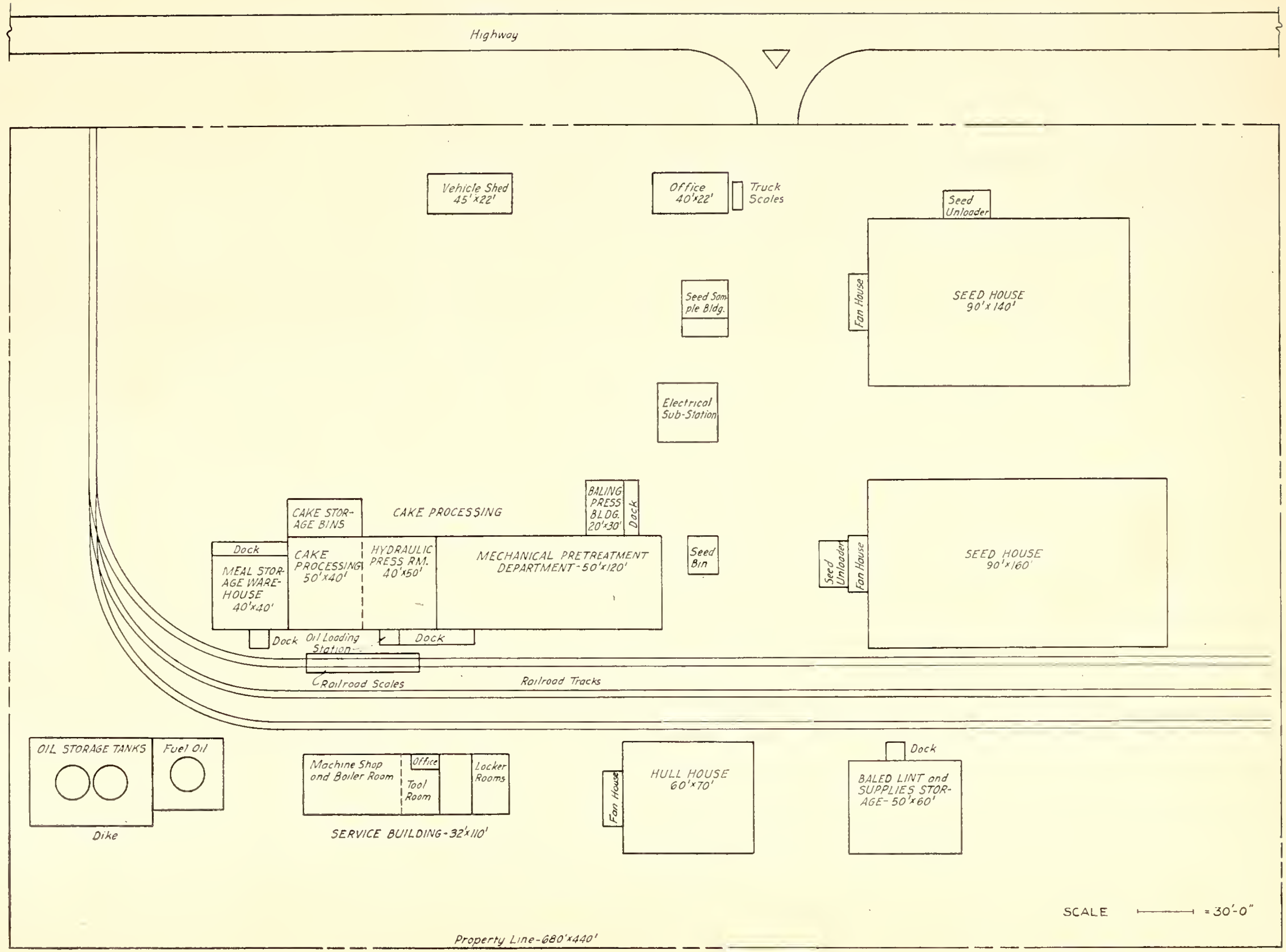


FIGURE 3.—Property layout for a 10-press hydraulic cottonseed oil mill designed to operate at 10 tons per press per day and a 10-month season (220 working days). Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

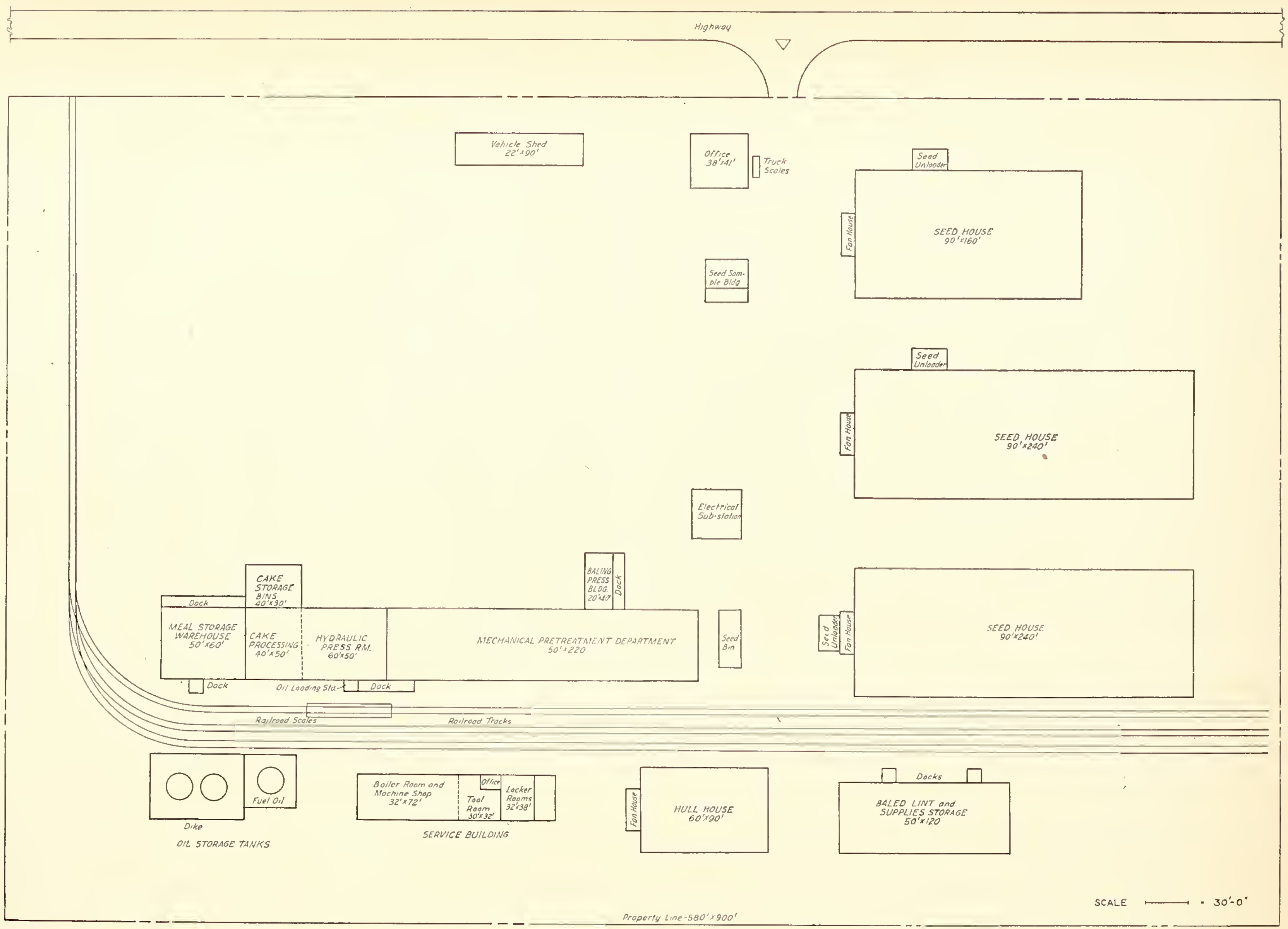
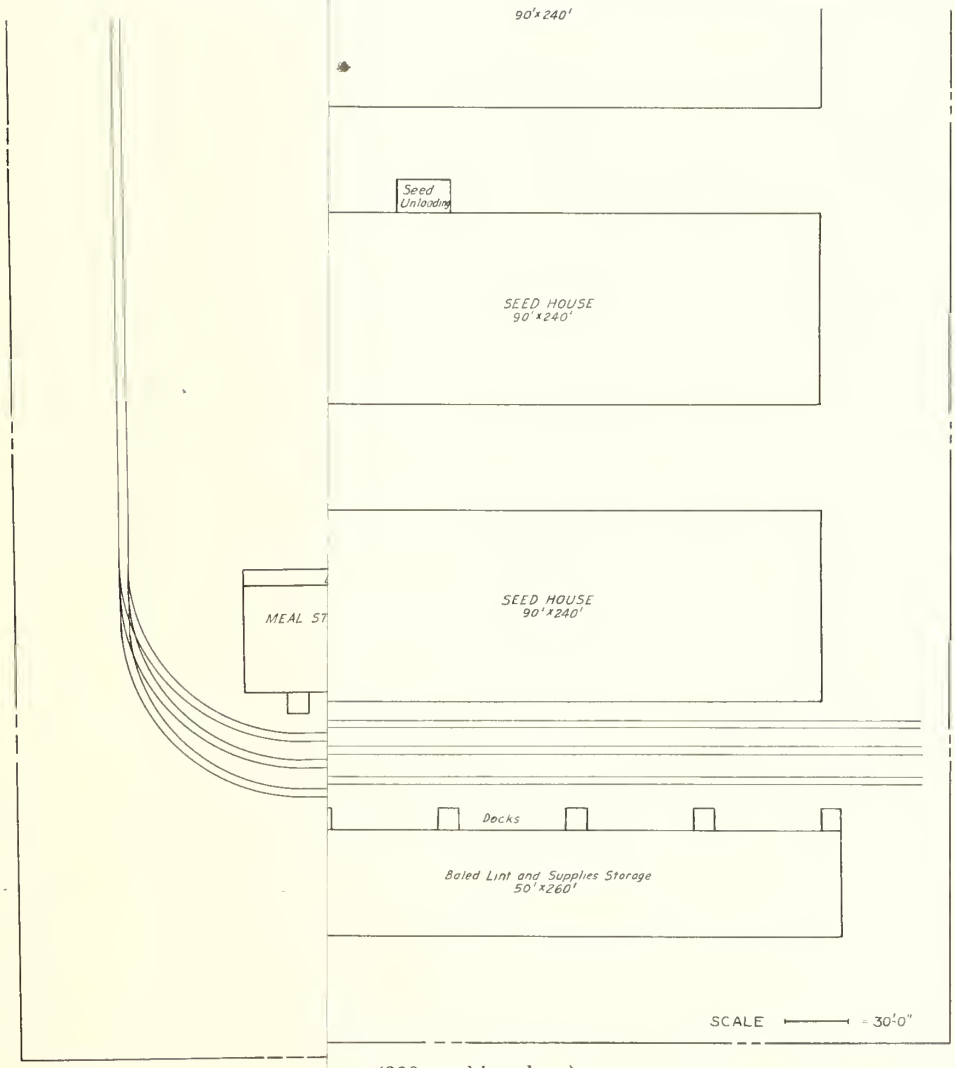


FIGURE 4.—Property layout for a 22-press hydraulic cottonseed oil mill designed to operate at 10 tons per press per day and a 10-month season (220 working days). Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).



son (220 working days).

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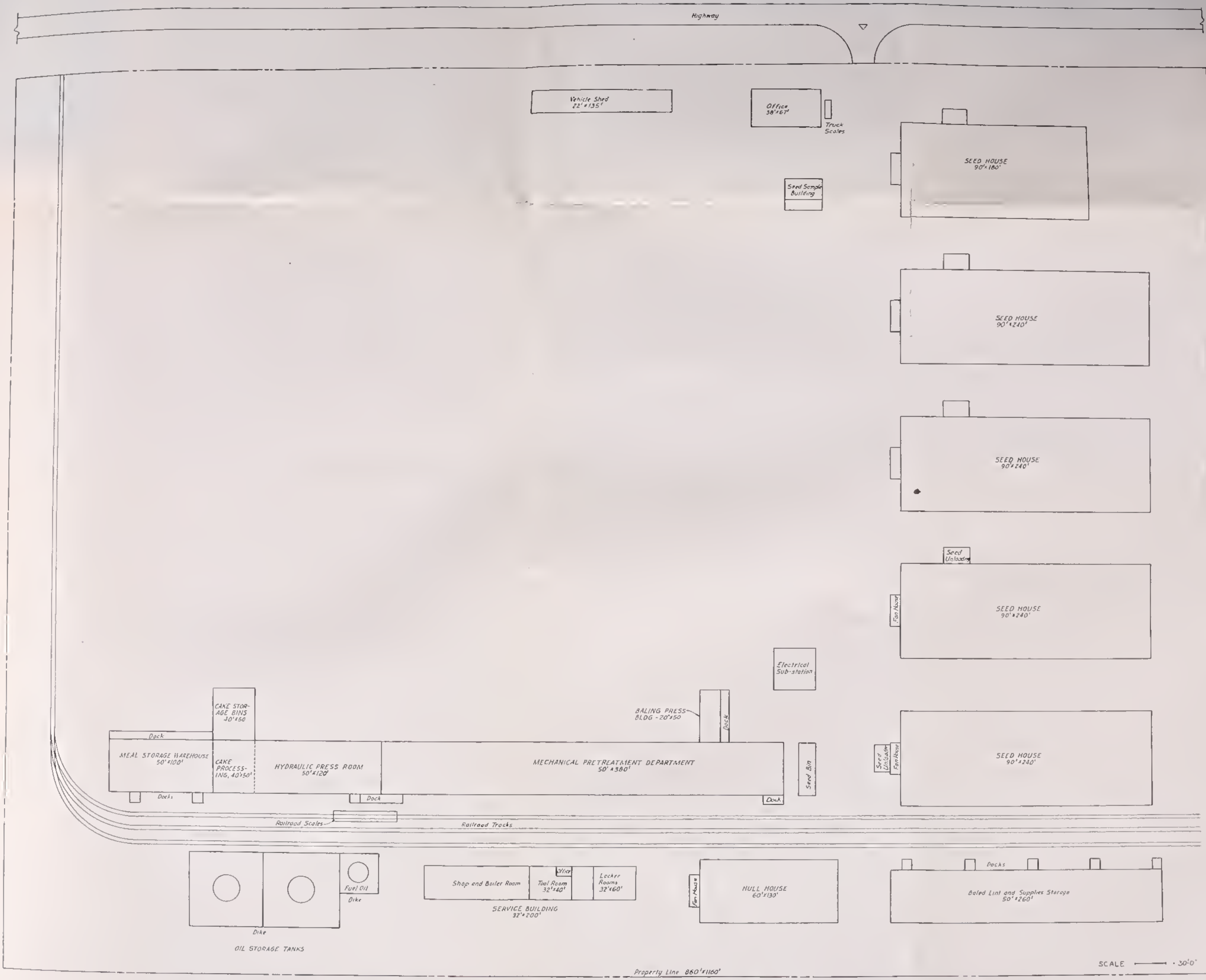

FIGURE 5.—Property layout for a 40-press hydraulic cottonseed oil mill designed to operate at 10 tons per press per day and a 10-month season (220 working days).

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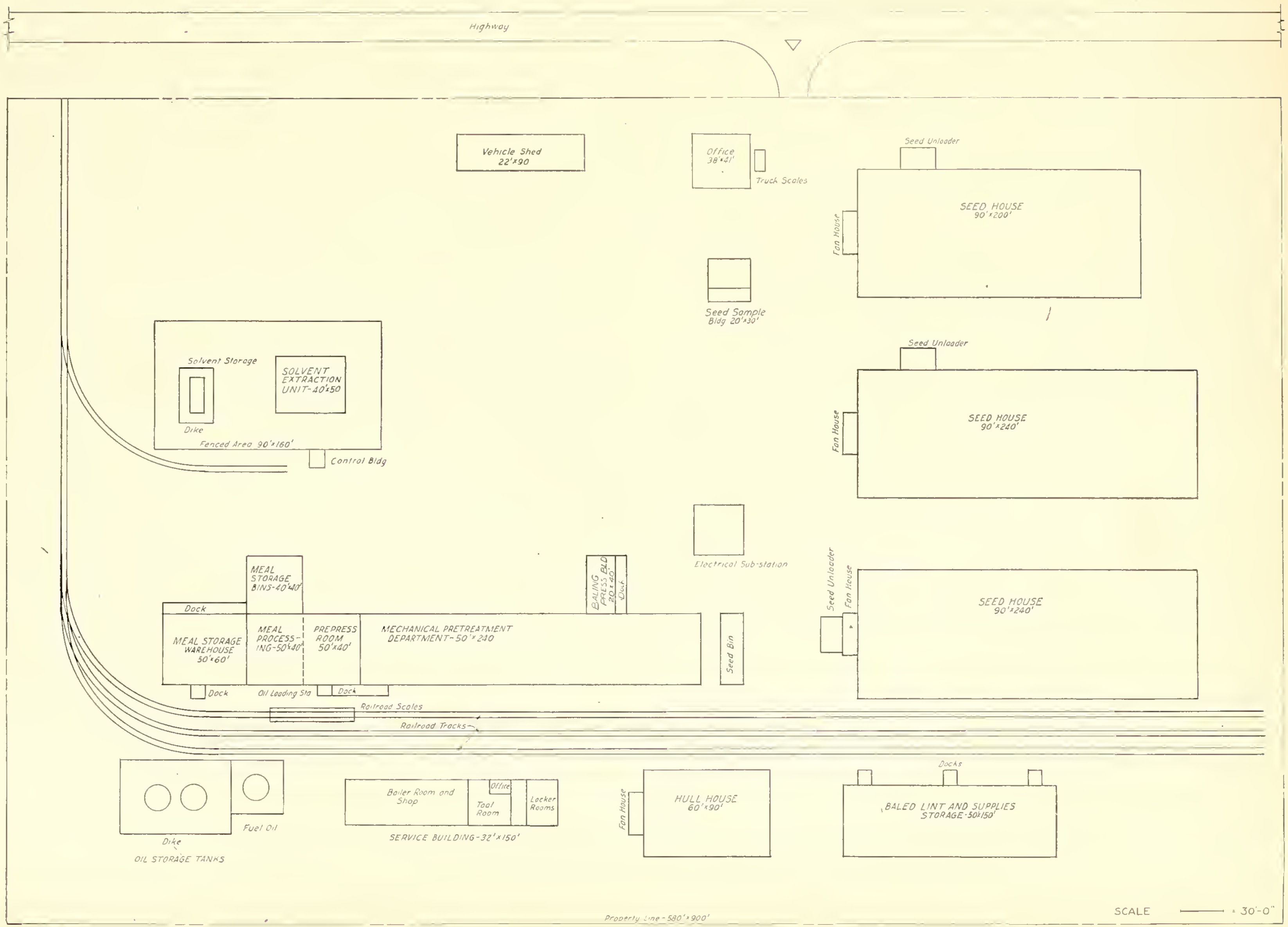


FIGURE 6.—Property layout for prepress-solvent cottonseed oil mill designed to operate at 240 tons per day for a 10-month season (220 working days). Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA Tilte II).

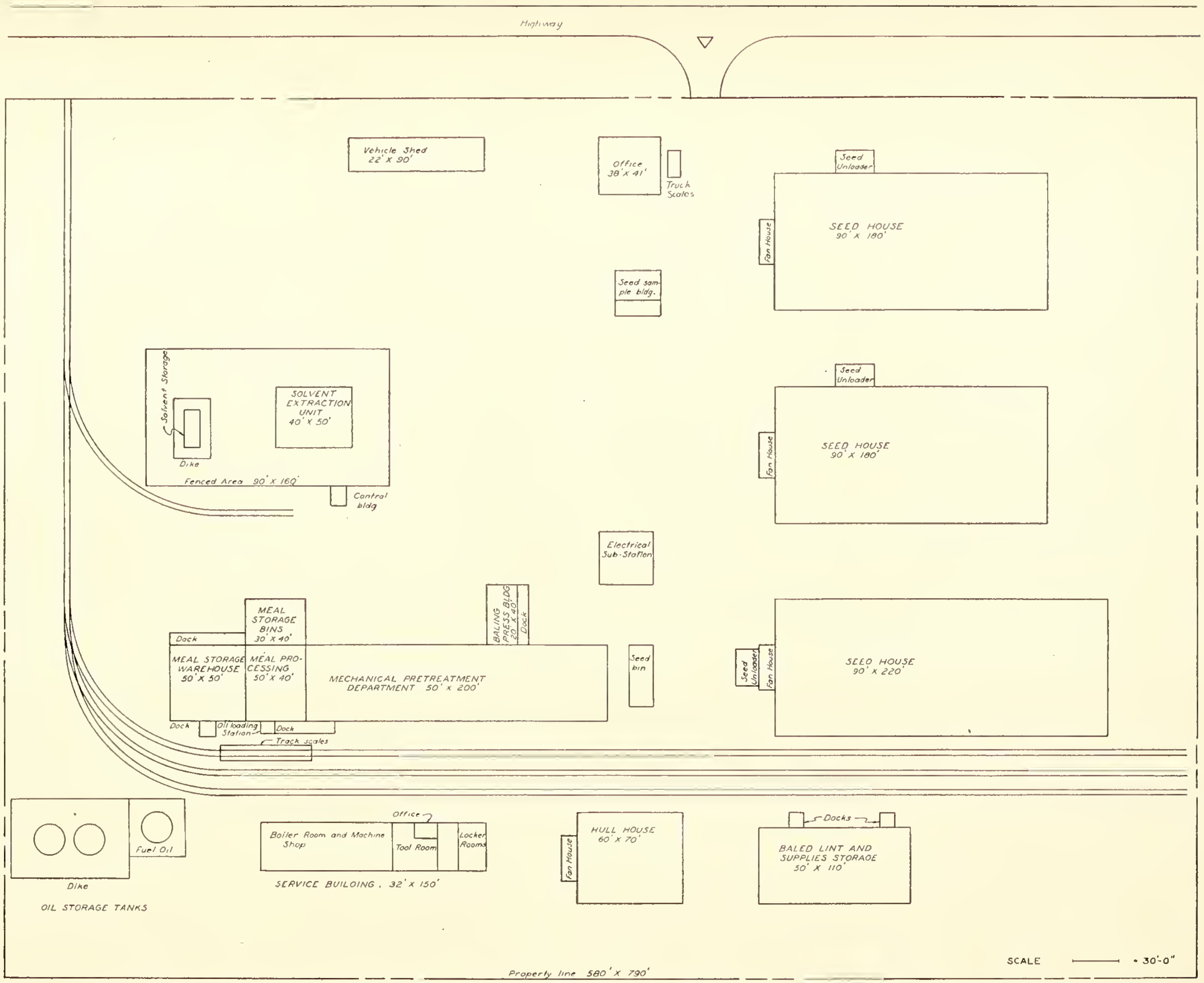


Figure 7.—Property layout for direct-solvent cottonseed oil mill designed to operate at 200 tons per day for a 10-month season (220 working days).
Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

although it was assumed to include also rental charges on any tools required in making the installation, and minor items such as foundation bolts. In developing this charge, it was not practical to use prices from the five pricing points for labor and materials. Instead, wage rates, used for the different crafts, were the averages of the rates for the cities in or near the Cotton Belt (*4*), and College Station, Tex., prices were used for most common building materials, on the assumption that costs calculated with these prices would average about the same as they would if prices from the five pricing points had been used.

As a means of reducing the work of estimating installation or construction labor costs, "unit-costs" were developed for many items, which included materials, fabrication or installation labor, overhead for administration of labor, delivery charges, and any other costs. Developing these unit-costs required many assumptions as to job conditions and sometimes as to amounts of materials needed, but the use of such unit-costs considerably reduced the work of estimating. The unit cost for concrete was expressed in terms of dollars per cubic yard, but included all material and labor items involved in concrete construction. A "lighting outlet" unit-cost was used to calculate the cost of lighting fixtures in a building instead of listing and pricing all fixtures, wire, and conduit separately for each building. Although unit-costs of this type were used to make up the cost-units shown in the tables of this chapter, they are not listed separately in the tables.

Whenever the installation cost was not known, or could not be estimated with reasonable accuracy, it was assumed to be 20 percent of the net cost of the item. The figure of 20 percent was obtained from published figures on installation costs which ranged from 20 to 40 percent of the factory price of the equipment. However, the items covered by such costs were seldom specified. The higher figures may have included some items such as electrical wiring, which were calculated separately in this study. The lower percentage figure for installation costs was used because installation of much of the oil-mill machinery would be facilitated by its light weight and its placement in single-story buildings.

A fifth step was included in the cost-unit estimating method when the purpose of an equipment unit, such as a flue system, was to service several other units. This step consisted of apportioning the installed cost of the servicing unit among the units served, as when the per linter cost of the flue system, serving the linters, was obtained by dividing the cost of the flue system serving 44 linters by the number of linters. This step had the advantage of substantially reducing the total number of units to be tabulated and otherwise simplifying the procedure for combining the cost-units into totals for entire departments.

This cost estimating step was used more for the mechanical pretreatment department, which was more difficult to divide into a reasonable number of units, than for any other department. Besides the costs of the flue system, the costs of the drives, the cross conveyors, and the elevators serving the conveyors over and under the linters, and the costs of linter cleaners were divided into costs per linter which were added to the linter cost-unit. In the screw-press department, the cost of the system serving to cool the screw presses was divided into a cost per press which was added to the screw press cost-unit.

To estimate costs in some instances where cost data were available on one or more sizes of equipment but not on others, a graph of the available data was constructed and the unknown data were read from the graph. When the costs of different sizes of equipment were plotted on log-log paper against capacity or another characteristic of the equipment the graph was a straight line or nearly so. The slope of the graph has been demonstrated by Williams (*14*) to be about 0.6 for many types of equipment. An example of the use of this method was that of estimating the cost of hull houses 40 feet wide from known costs and surface areas of houses 60 and 90 feet wide.

PROCESSING DEPARTMENTS

Processing departments of a mill change the form of materials. The mechanical pretreatment department separates cottonseed into seed and linters and further separates delinted seed into meats and hulls. The baling-press department compresses linters into bales. The oil-extraction department separates the meats into oil and cake or meal. Cake and meal bins receive cracked cake from the oil-extraction department of hydraulic or screw-press mills or extracted meal from solvent processes and store it for further processing or later shipment. The cake-processing department grinds slab cake into bulk meal, and sacks or pellets bulk meal. Bulk meal may or may not be pelleted or sacked.

MECHANICAL PRETREATMENT DEPARTMENT

The mechanical pretreatment department is described in terms of (1) the flow of materials, (2) machinery and equipment units, (3) linter room design, (4) machine rates, (5) number of machines by size of mill, (6) building requirements, and (7) department investment requirements by type and size of mill.

Flow of Materials

The flow of materials through the mechanical pretreatment department operations is illustrated in figure 8. The alternative use of crushing or flaking rolls is shown on this flow-sheet, and the processing is seen to be the same for all four types of mills up to the preparation of the separated meats for extraction.

The seed are first cleaned of trash and dirt by means of a boll reel and seed cleaners. Also, large

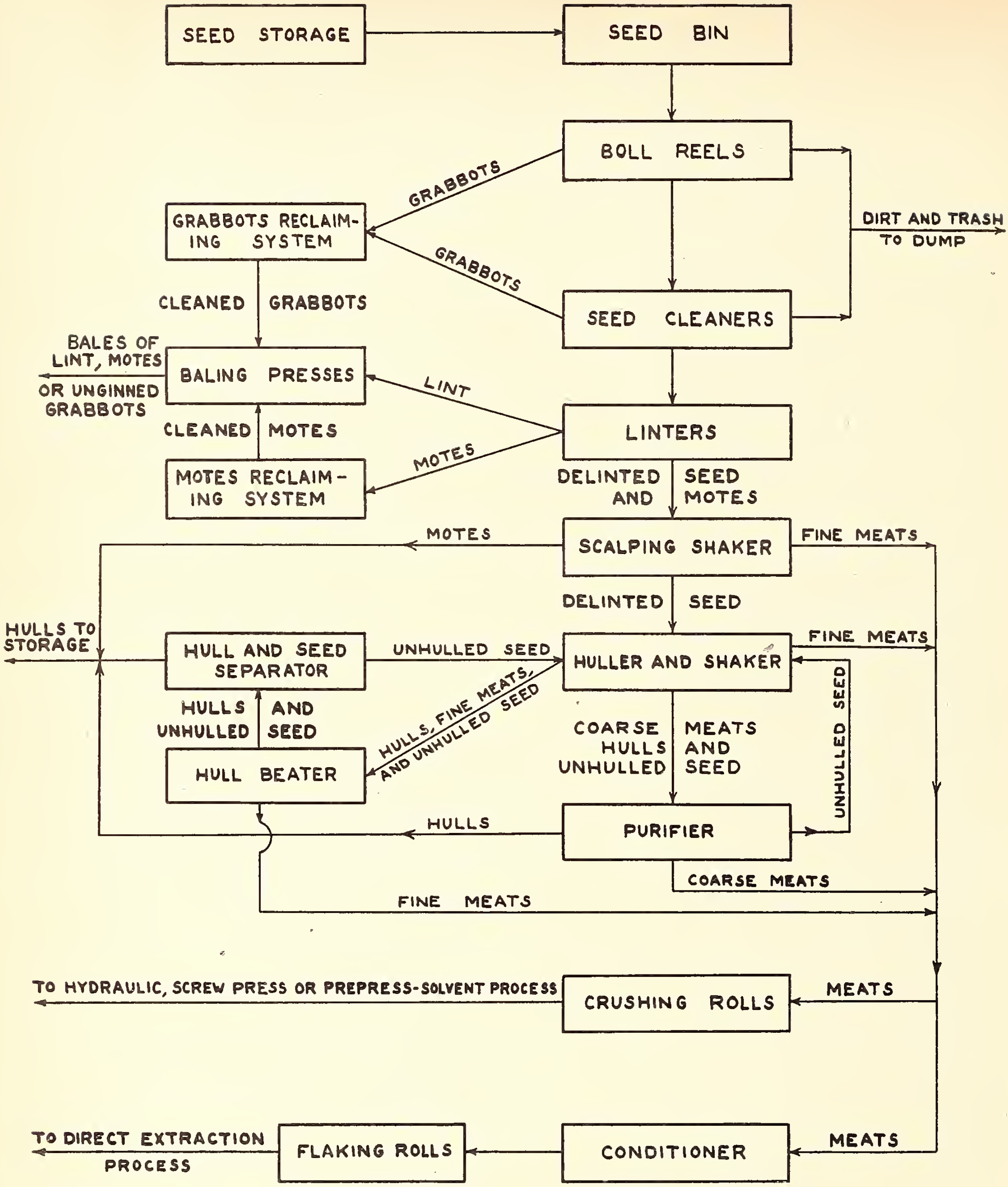


Figure 8.—Flowsheet of mechanical pretreatment department of cottonseed oil mills. Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

locks of cotton, called grabbots, are reclaimed and sent on to the baling press. The cleaned seed are then passed through a series of delinting machines (commonly called linters) which remove the short fibers or linters from the seed, and send them on to the baling-press room for baling.

After being separated from their linter fibers, the seed are next divided into hulls and meats; then the hulls are sent to the hull house for storage, except for such portions as may be loaded directly into trucks or cars for shipment.

In hydraulic, screw-press, and prepress-solvent mills, meats are passed through a rolling operation which prepares them for cooking and pressing in the press room. In direct-solvent mills, the meats pass directly from this rolling operation in the linter room to the oil-extraction unit, located outside the mill building; and, as the meats are separated into oil and meal, the meal is carried to the meal-processing department, located adjacent to the linter room. The principles of this arrangement are shown in figures 25 and 27.

Machinery and Equipment Units

Characteristics of mechanical pretreatment equipment units may be described in the order of the operations they perform, beginning with the seed bin.

Seed Bins. The main purpose of the seed bin is to save seed-handling labor by receiving seed either from the unloading of incoming seed or from storage, whichever is most convenient at a particular time. The bin also provides a supply of seed from which the seed flow to the processing machinery can be regulated.

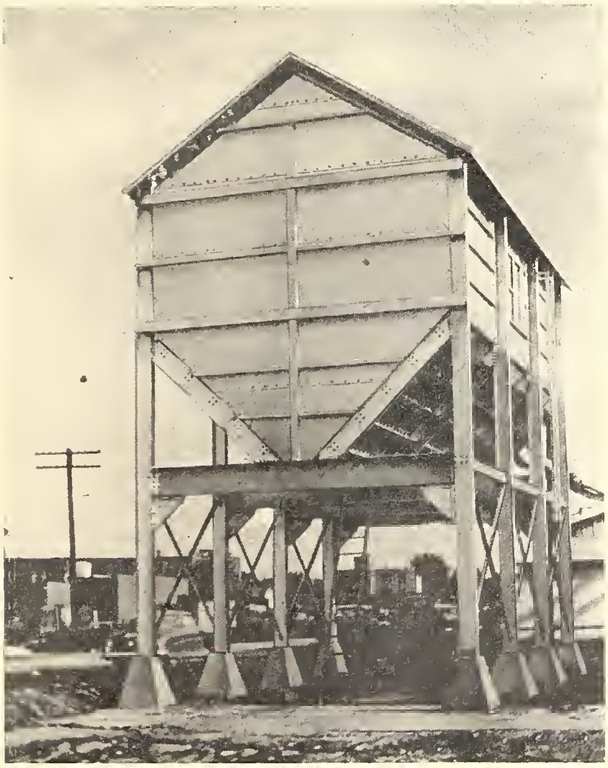


Figure 9.—Outside seed bin.

The seed bin is constructed of steel and rectangularly shaped, with a hopper bottom, and is supported off the ground on legs. It stands outdoors, and is covered with a peaked roof. Additions to its length are made by increments 10 feet long, which include only 2 sides and 2 legs.

Boll Reel. The boll reel separates coarse foreign material from the seed. Essentially, it consists of a hollow cylinder formed of perforated sheet metal, open at both ends, and revolving on a central shaft which is inclined slightly from the horizontal. The seeds drop out of the cylinder through the perforations while the foreign material remains within the cylinder to be dropped out of the open discharge end.

Although the reel is not used in all sections of the Cotton Belt, it is necessary where seed from the gin contains considerable amounts of loose and immature cotton. Without boll reels, the bale deck of the seed cleaner may become plugged frequently.

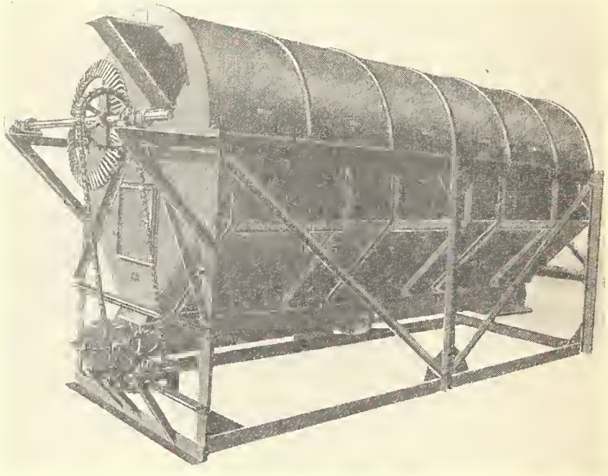


Figure 10.—Boll reel.

Seed Cleaner. The seed cleaner removes smaller sizes of foreign material from the seed than can be removed by the boll reel. The cleaner is composed of a shaker screen, fan, and

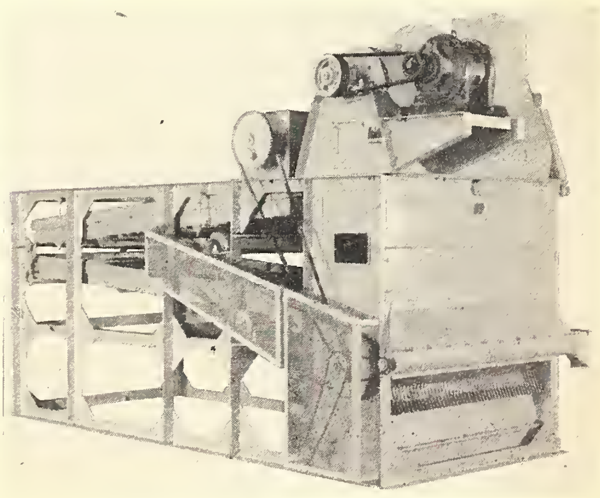


Figure 11.—Cottonseed cleaner.

draft chamber. Separation of seed and foreign matter is accomplished by a combination of mechanical screening and air separation.

LINTER. The linter consists of revolving circular saws whose teeth remove the short fibers that grow out of the hull of the cottonseed by catching and pulling them away from the seed. The fibers are removed from the saw teeth by a revolving cylindrical brush or by an air blast that suspends them in an air stream in which they are conveyed through pipes to collecting equipment.

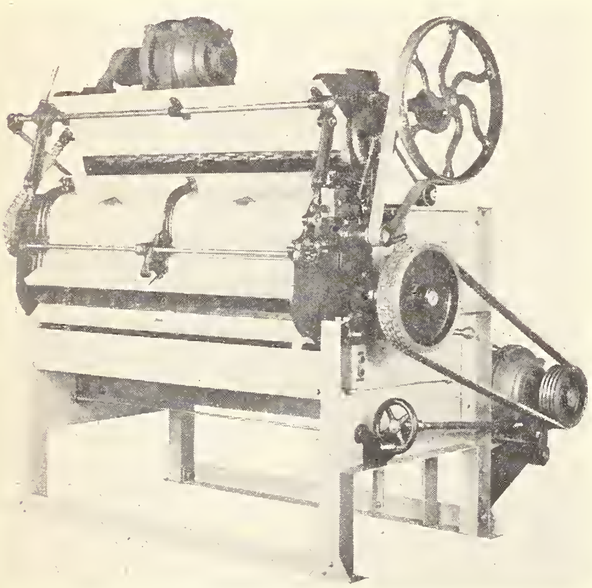


FIGURE 12.—Machine for delinting cottonseed.

LINTER SAW SHARPENER. The linter saw sharpener renews the shape of the teeth on the linter saws and sharpens them after they have become worn.

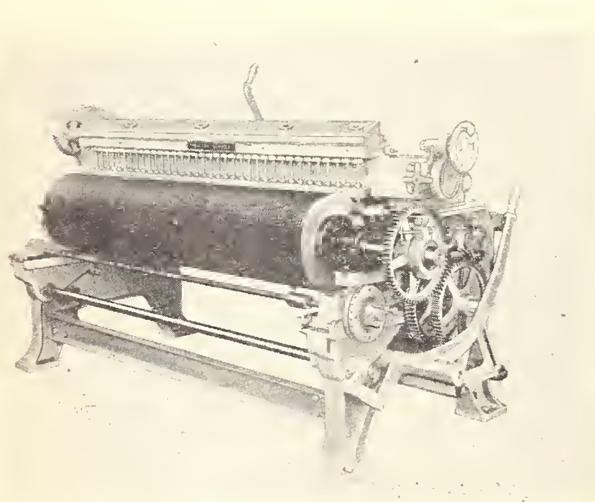


FIGURE 13.—Delinter-saw sharpening machine.

GRABBOTS-RECLAIMING SYSTEM. Grabbots are locks of cotton which escape ginning and get into the seed at the gin. At cottonseed mills, they are separated from the seed by the boll reel and seed cleaner. In the mills designed for this project, a drag belt was provided to convey the heavy foreign material cleaned from the seed by the reel and cleaner. The grabbots-reclaiming system included the equipment to pick up the grabbots from the drag belt with an air stream, convey them to a grabbot cleaner, and convey the cleaned grabbots to a bin in the baling press building. A grabbots-reclaiming system was provided on the basis of 1 system for a single layout of linters and 2 systems for a dual layout. Grabbots handled in this manner still contain cottonseed. The baled unginned grabbots are either sold in this form or are reginned in a cotton gin, rebaled, and sold as reginned grabbots.

MOTES-RECLAIMING SYSTEM. During the delinting process, material consisting of underdeveloped seed, hull particles, and other material to which linter fibers are attached, are pulled from the seed by the saws along with the linters. This heavy material is separated in the linter machine from the air stream and dropped out of the bottom of the linter. When this material contains sufficient fiber to justify reprocessing, it is put through a beater which separates some of the heavy nonfibrous material. The cleaned fiber is baled and sold as motes, whereas the heavy nonfibrous material passes into the hulling and separating machinery. When the material dropped out of the linter machines contains a low percentage of fiber, it is not reprocessed but is added to the delinted seed and passed into the hulling and separating machinery or conveyed directly to the stream of hulls. A motes-reclaiming system was provided on the basis of 1 system for a single layout of linters and 2 systems for a dual layout.

SCALPING SHAKER. The scalping shaker is a shaker screen situated ahead of the huller to remove unprocessed motes which come from the second cut linters, or other foreign material, such as bolts, which might damage the huller.

HULLER AND SHAKER. The huller cracks or cuts the hulls of the cottonseed so that the shaker, which is directly underneath the huller, can separate the meats from the hulls. A bar-type huller consists of a cylinder to which are fastened knives running the length of the cylinder. The cylinder revolves rapidly inside a concave to which stationary knives are attached. The clearance between the revolving and stationary knives determines the degree of cracking of the seed.

The shaker is a mechanical screen, having two decks, that separates the cracked cottonseed into fine meats, coarse meats containing some hulls, and hulls and uncut seeds.

HULL BEATER. The hull beater recovers fine meat particles from the hulls. The beater consists of a horizontal revolving drum formed of

FIGURE 14.—Functional drawing of a huller for decorticating cottonseed.

FIGURE 15.—Shaker screen for separating meats and hulls.

perforated sheet metal and having a spike-arm inside which revolves at a greater speed than the drum. The meat particles pass through the perforations in the drum while the hulls pass along the drum to spill out at the discharge end.

PURIFIER. The purifier is another shaker screen, equipped with aspirator hoods, which further fractionates the coarse meats containing some hulls from the shaker into meats and hulls by a combination of mechanical screening

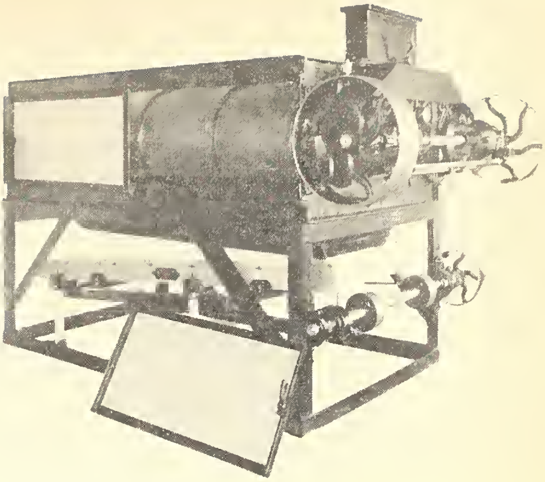


FIGURE 16.—Double-drum hull beater.

and air separation. Also, it removes some uncracked seeds from the meats and returns them to the huller. Included in the auxiliary equipment for each purifier is a tailings beater, much like the hull beater, which operates on the material aspirated from the purifier to refine the separation between meats and hulls. The meats from the purifier and from the tailings beater go to the rolls while the hulls from the tailings beater pass into the hulls stream.

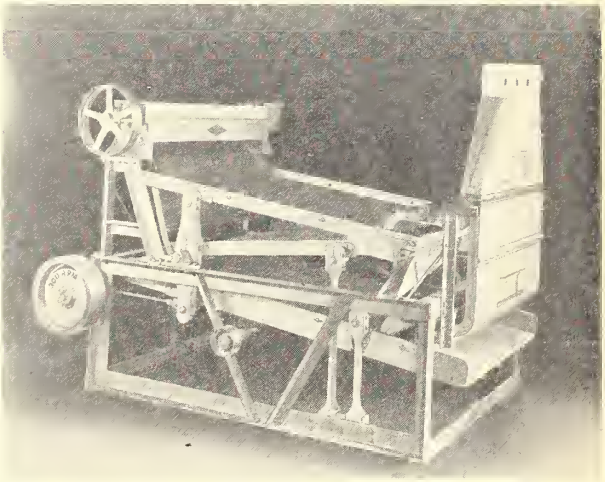


FIGURE 17.—Purifier for separating meats and hulls.

The purifier is important in regulating the protein content of the press cake, as it controls the quantity of hulls separated from the meats.

HULL AND SEED SEPARATOR. The hull and seed separator divides hulls and uncracked seed (received from the huller shaker) by means of an air stream, the hulls going to hull storage while the uncracked seeds return to the huller.

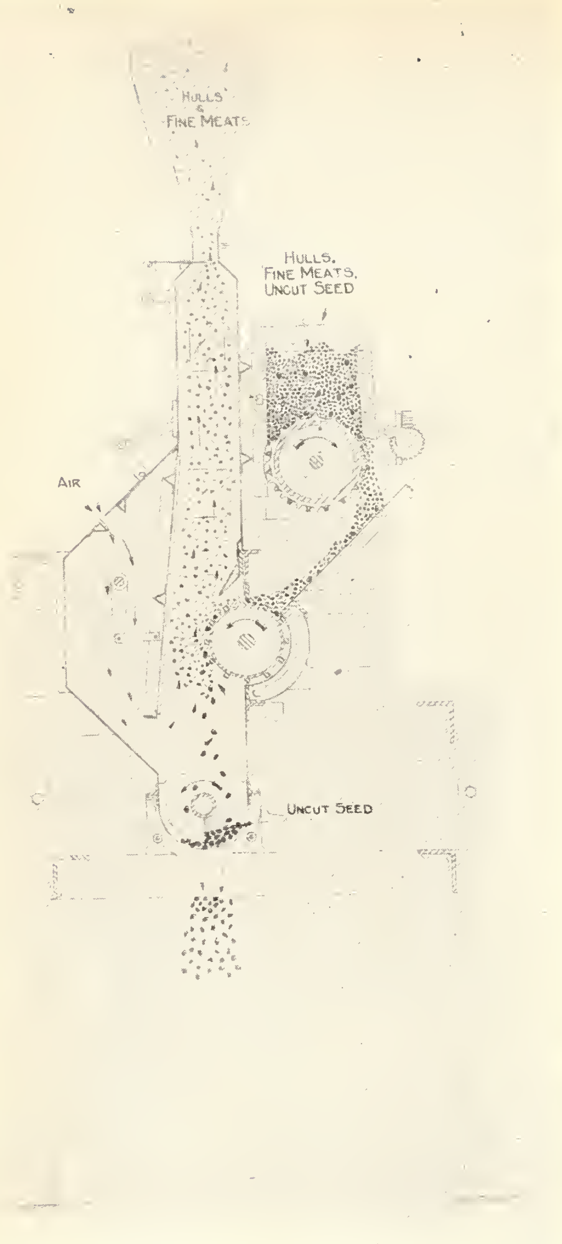


FIGURE 18.—Functional drawing of a hull and seed separator.

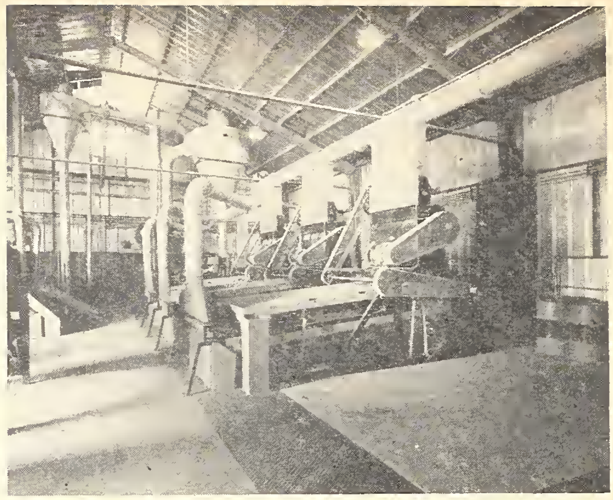


FIGURE 19.—Hulling and separating machinery

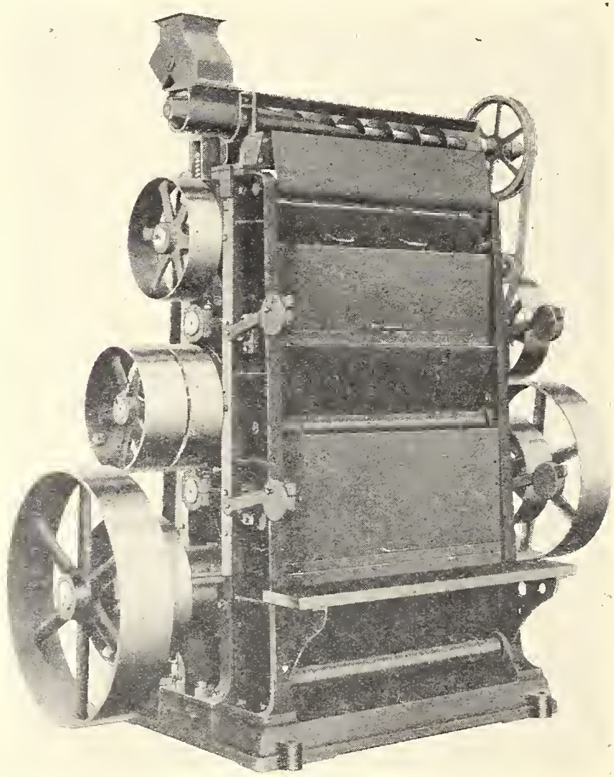


FIGURE 20.—Five-high crushing rolls.

CRUSHING ROLLS. Rolling the meats prior to extraction is common to all 4 types of mills. This operation is done by 5-high crushing rolls in hydraulic mills and to a large extent in screw-press and prepress-solvent mills.

The crushing roll unit consists of 5 solid steel rolls arranged 1 on top of the other with the full weight of the 4 top rolls bearing on the bottom roll. When the rolls are turning, the meats are directed by cant boards so as to pass between the rolls until they reach the bottom.

FLAKING ROLLS. The flaking roll machine rolls the meats prior to extraction in direct solvent mills. It consists of two solid steel rolls arranged side by side in a horizontal plane. The rolls are usually about 20 to 24 inches in diameter and of various lengths up to about 4 feet. The rolls run together and turn toward each other at the top.

The thickness of the rolled material, which comes out underneath, is controlled by regulating the amount of material fed between the rolls and by adjusting the compression on springs holding the rolls together.

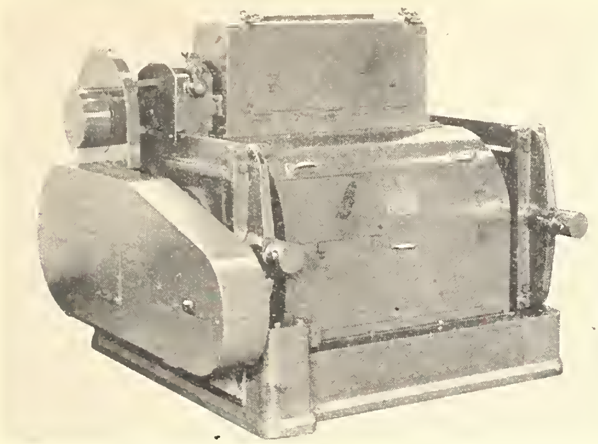


FIGURE 21.—Flaking roll.

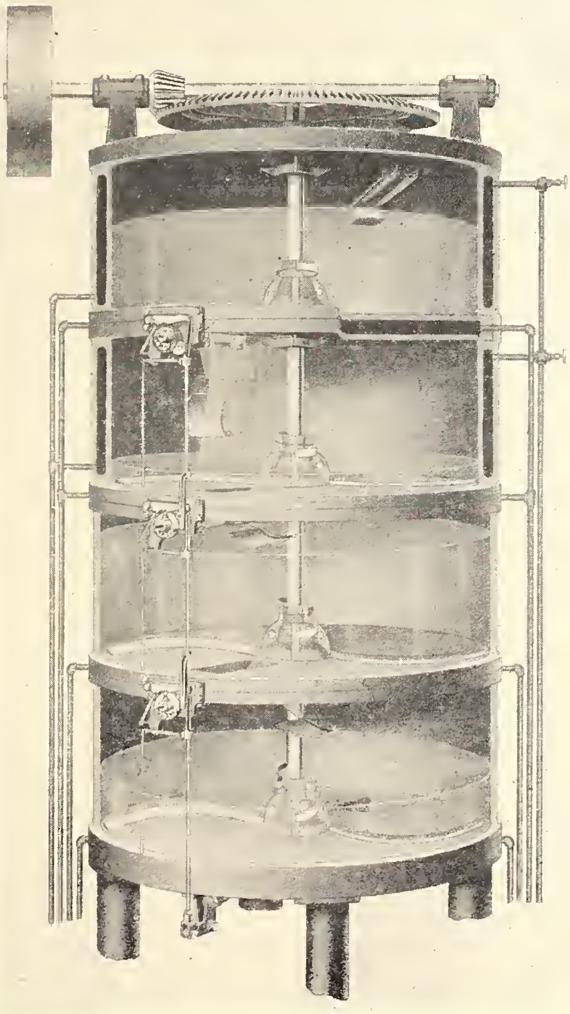


FIGURE 22.—Phantom view of stack cooker or conditioner.

Capacities of the flaking rolls, rolling unpressed meats, were calculated according to Wamble's formulas (*12*). This calculation assumed (1) that the size of the small roll was 24 inches in diameter and 24 inches long, and the large roll was 20 inches in diameter and 42 inches long; (2) that the speeds of both sizes of rolls were 275 r. p. m.; (3) that the flake thickness was 0.010 inch; and (4) that the rolls operated at 67 percent of theoretical efficiency.

CONDITIONERS. The conditioner selected for direct-solvent mills for heating the meats, consists of steam-jacketed kettles stacked one on top of the other with an opening in the bottom of each through which the material being heated can fall from kettle to kettle. A gate, operated by the level of material in each kettle, automatically admits more material from the kettle above to maintain a constant level in each kettle. In each kettle, the material is agitated by a sweep that is fastened to a central vertical shaft passing through all of the kettles.

Capacities of conditioners were calculated on the basis of cooker capacities and on analogous relationships between soybean and cottonseed operations.

Linter-Room Design

Change in the size of mills was associated at certain points with important changes in principles of linter-room design. To a much lesser extent, the same was true of change in type of mill.

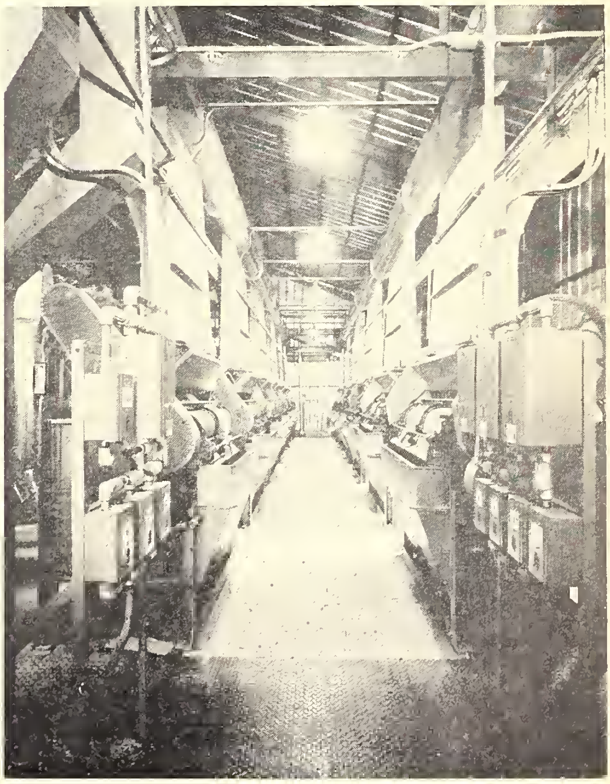


FIGURE 23.—View of a modern linter room.

Most important of these changes was a shift from a single to a double layout of linters as mills grew larger. A single layout was employed for all mills up to but not including 56 linters in size (equivalent to a 28-press hydraulic mill) as shown in figure 24. Beginning with the 56-linter mill, a double seed-stream layout was provided because, at this point, four cookers were required in the extraction department of hydraulic mills. The second pair of cookers was arranged to operate independently of the first pair and a similar arrangement of the mechanical pretreatment machinery was a logical consequence. The principles of design of this dual layout of linters are illustrated in figure 25.

Down to the rolling operation, the same equipment and linter-room design were employed in all four types of mills. In hydraulic, screw-press, and prepress-solvent mills, crushing rolls were used, whereas flaking rolls were employed in direct-solvent mills.

Figure 27 illustrates the principles of design by which flaking rolls were connected with a single-linter layout, whereas figure 28 shows the same connection for a dual layout.

Machine Rates

Three operating rates were used in determining the number of machinery and equipment units required for each mill. First is the *normal rate*—approximately the rate at which a given machine is customarily run in a well-operated mill, and mainly used by engineers in designing a plant. Second is the *maximum rate*—the rate above which a machine probably would not be run. Third is the *minimum rate*—the rate below which the machine would not be utilized to best advantage, or, as in the case of a huller and shaker, would not function properly.

For individual machines these rates were determined, in many cases, by setting the maximum rate on the basis of practical operating experience and the machine manufacturer's rating, and then considering the normal and minimum rates to be 80 and 60 percent of the maximum, respectively. This principle was applied to the boll reel, seed cleaner, hullers and shakers, purifiers, hull beaters, and hull and seed separator.

The rates for other machines were calculated as follows:

Saw-Sharpening Machines. In line with good operating practice, it was assumed that each mill should be equipped so that, if necessary, each saw cylinder might be filed or gummed every 8 hours, 45 minutes being required per cylinder for filing. It is not assumed that saws should always be filed this often, but this is the fastest filing schedule which a mill should be prepared to meet. Under this condition, each saw sharpener will serve 10.7 linters per 24 hours. The maximum linter rate is 7 tons; hence, the maximum rate of a saw filer is approximately 75 tons of cottonseed per 24 hours. Its normal rate is 53 tons per day, as the normal linter rate is 5 tons per day. Its minimum rate is 43 tons per day, as the minimum linter rate is 4 tons per day.

Crushing Rolls. The capacities of crushing rolls were calculated, as were the capacities of flaking rolls. This calculation assumed that: (1) Meats are rolled to a flake thickness of 0.008 inch; (2) the operating efficiency of the rolls is 50 percent of the theoretical flake-producing capacity; (3) the meats, ready for rolling, represent 62 percent of the weight of the delinted seed; (4) for all sizes of rolls except the largest, the roll speeds are: Maximum, 270 r. p. m., normal, 205 r. p. m., minimum, 140 r. p. m.; and (5) for the largest roll the speeds are: Maximum, 300 r. p. m., normal, 220 r. p. m., and minimum, 140 r. p. m. The higher speed was used for the largest roll to give it greater capacity as calculated by the Wamble (*12*) formula.

Number of Machines by Size of Plant

The number of machines of a given type required by any mill was first approximated by dividing the normal plant rates (table 3) by the normal rates of the individual machine. For example, the number of linters required by a 20-press hydraulic mill is:

$$\frac{(10\text{ tons per press per day}\times 20\text{ presses})}{5\text{ tons per linter}}=\frac{200}{5}=40$$

However, exclusive use of the relationship of normal plant rates and the normal rates of individual machines sometimes resulted in bottlenecks when a mill was run at its maximum processing rate. To avoid such bottlenecks, enough machines were always provided so that no machine would be exceeding its maximum rate when the mill was run at its maximum rate. For example, the normal and maximum rates for a 12-press hydraulic mill are 120 and 168 tons per day, respectively. The normal and maximum operating rates for a double drum hull beater are 115 and 143 tons per day, respectively. If only the normal mill rate were considered, only 1 beater would be required. However, when the maximum rates of both the beater and the mill were considered, the number of hull beaters was increased to 2.

Building Requirements

As previously stated, the mechanical pretreatment department was housed in a section of the mill building. The building as a whole was steel frame, iron clad. It was 50 feet wide, 16 feet clear under the trusses, and 20 feet between trusses, and had a continuous monitor 6 feet high by 18 feet wide running lengthwise. The building section for the smallest mechanical pretreatment department was 60 feet long. The cost of any larger section (as shown in table 10), required for various sizes and types of plants, was obtained by adding the costs of 20-foot increments to this minimum section. (The costs of the mill building as a whole included the costs of the outside items mentioned on page 16.)

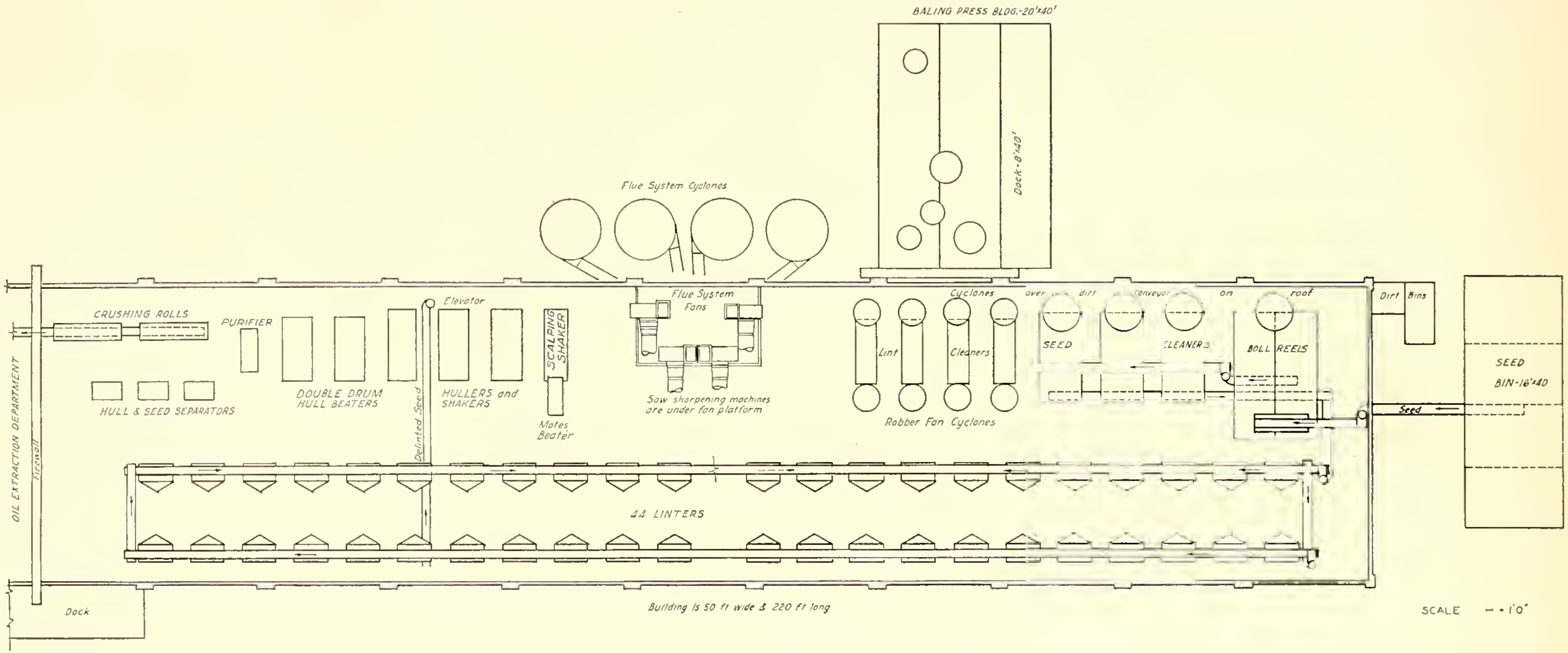


FIGURE 24.—Mechanical pretreatment department of a hydraulic cottonseed oil mill designed to process 220 tons of seed per day.

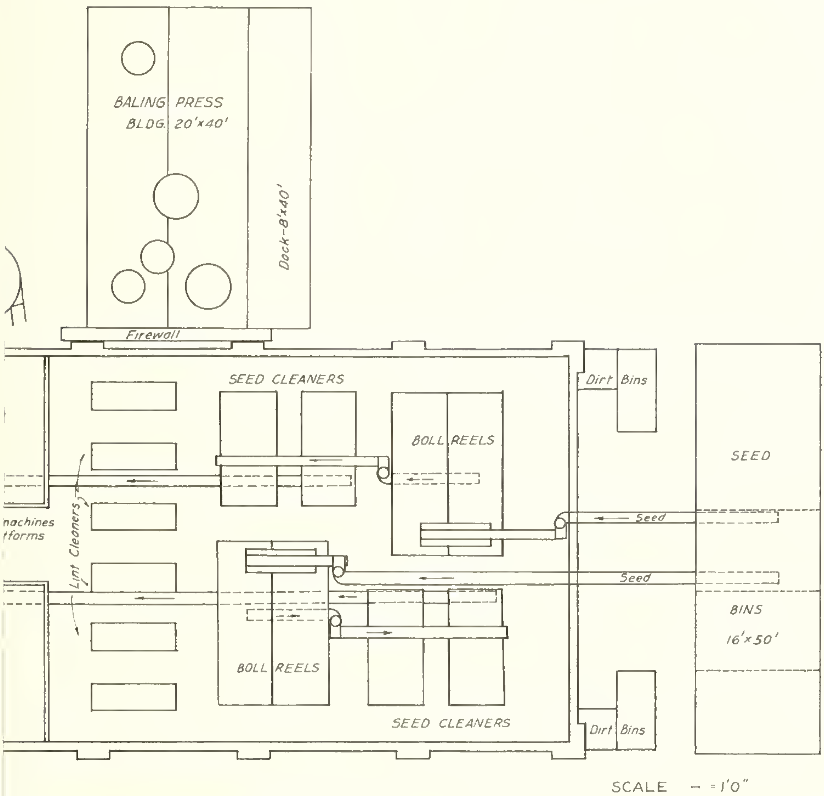
Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 9.—*Descriptions and costs of machinery and equipment units in mechanical pretreatment departments of cottonseed oil mills, 1949–50*

Machinery and equipment	Physical description					Cost [1]		
	Approximate weight	Allocated building space	Capacity (operating rates per 24 hours)			Delivered	Installation	Total
			Minimum	Normal	Maximum			
	Pounds	*Sq. ft.*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*
Seed bin—end unit (36-ton capacity)	16, 512		43	54	108	2, 050	413	2, 463
Auxiliary equipment	6, 419					3, 736	1, 056	4, 792
Seed bin—center unit (36-ton capacity)	7, 966		43	54	108	977	199	1, 176
Auxiliary equipment	1, 926					726	182	908
Boll reel (5′ diam. by 16′ long)	9, 000	280	83	110	138	2, 713	500	3, 213
Initial auxiliary equipment	10, 552					4, 558	1, 172	5, 730
Auxiliary equipment for each reel	2, 863					1, 030	275	1, 305
Seed cleaner (60″ wide)	8, 500	291	60	80	100	3, 327	630	3, 957
Initial auxiliary equipment	3, 632					2, 246	590	2, 836
Auxiliary equipment for each cleaner	3, 991					1, 498	363	1, 861
Linter (176 saw)	3, 500	133	4	5	7	1, 694	326	2, 020
Initial auxiliary equipment	4, 715					671	240	911
Auxiliary equipment, for each linter	3, 446					1, 591	587	2, 178
Saw-sharpening machine	2, 846	109	43	53	75	3, 567	361	3, 928
Motes-reclaiming system	2, 881				336	1, 275	519	1, 794
Initial auxiliary equipment	4, 981					1, 169	507	1, 676
Grabbots-reclaiming system	6, 148				336	2, 740	985	3, 725
Initial auxiliary equipment	2, 454					346	132	478
Scalping shaker (2 tray):								
48″ wide	2, 160	232	168	224	280	1, 116	216	1, 332
54″ wide	2, 530	232	189	252	315	1, 123	216	1, 339
Auxiliary equipment for each shaker	5, 459					2, 786	783	3, 569
Huller and shaker:								
36″ wide huller and 48″ wide shaker	6, 060	232	46	62	77	3, 482	675	4, 157
48″ wide huller and 54″ wide shaker	7, 930	232	63	84	105	3, 723	716	4, 439
Initial auxiliary equipment	1, 169					678	75	753
Auxiliary equipment for each huller and shaker	4, 933					1, 799	589	2, 388
Hull beater:								
Single drum	1, 200	232	35	46	58	979	192	1, 171
Double drum	4, 700	232	86	115	143	2, 445	472	2, 917
Initial auxiliary equipment	593					502	104	606
Auxiliary equipment for each beater	3, 159					1, 037	226	1, 263
Purifier:								
36″	3, 400	232	129	168	210	1, 601	308	1, 909
54″	3, 800	232	189	252	315	1, 680	323	2, 003
Auxiliary equipment for each purifier	6, 029					2, 236	671	2, 907
Hull and seed separator (66″ wide)	1, 800	102	63	84	105	1, 110	215	1, 325
Initial auxiliary equipment	2, 131					1, 797	375	2, 172
Auxiliary equipment for each separator	4, 075					980	404	1, 384
Drive for hulling and separating machinery:								
75 horsepower	3, 407					2, 546	398	2, 944
100 horsepower	3, 957					3, 338	521	3, 859
125 horsepower	4, 984					3, 900	621	4, 521
150 horsepower	5, 667					4, 331	674	5, 005
Crushing rolls and auxiliary equipment:								
Four 14″ and one 16″ diam., 36″ long	20, 153	191	34	51	66	10, 766	2, 127	12, 893
Four 16″ and one 18″ diam., 48″ long	26, 908	191	52	76	100	14, 527	2, 870	17, 397
Four 16″ and one 18″ diam., 60″ long	31, 368	191	65	95	125	15, 878	3, 297	19, 175
One 16″ and four 20″ diam., 60″ long	44, 197	191	72	113	153	21, 636	4, 258	25, 894
Flaking roll:								
Small	15, 196	120	65	85	110	9, 503	1, 915	11, 418
Large	20, 601	120	95	125	155	13, 582	2, 690	16, 272
Conditioner:								
3-ring high, 56″ diameter	23, 372	71	60	80	100	9, 649	2, 406	12, 055
3-ring high, 72″ diameter	28, 370	71	115	155	195	11, 289	2, 724	14, 013
4-ring high, 72″ diameter	33, 708	142	155	210	260	12, 505	2, 977	15, 482
6-ring high, 72″ diameter	41, 834	142	235	310	390	15, 279	3, 588	18, 867
6-ring high, 85″ diameter	48, 929	284	330	440	550	17, 442	4, 015	21, 457

[1] Memphis, Tenn., was used as the price basing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).



from 280 to 320 tons of seed per day.

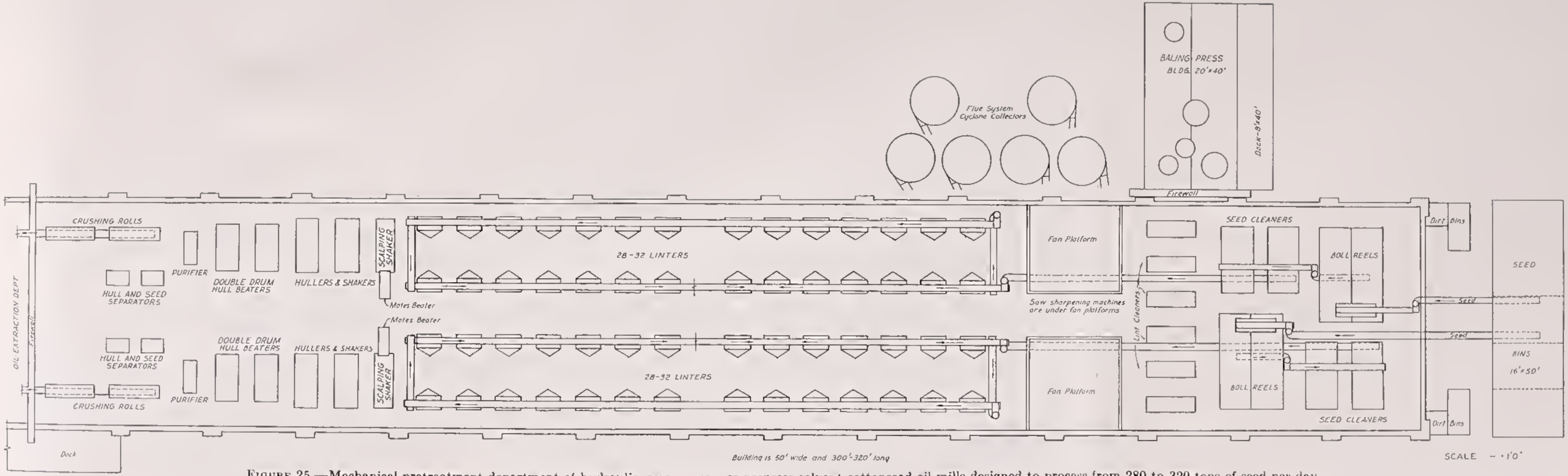


FIGURE 25.—Mechanical pretreatment department of hydraulic, screw-press, or prepress-solvent cottonseed oil mills designed to process from 280 to 320 tons of seed per day.

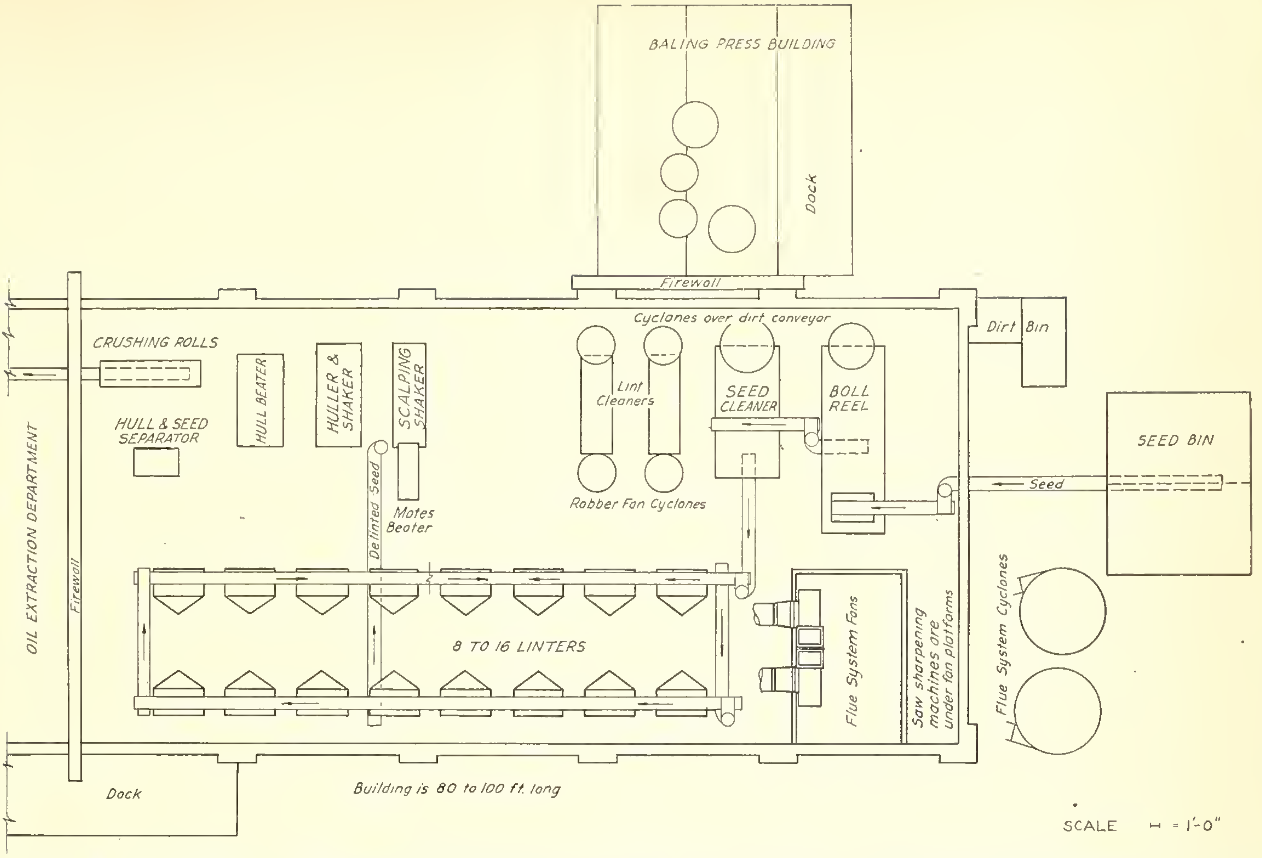


FIGURE 26.—Mechanical pretreatment department of hydraulic, screw-press, or prepress-solvent cottonseed oil mills designed to process from 40 to 80 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Each machine requiring floor space was assigned an area based on the dimensions of the machine plus the clearance necessary on all sides of it. Following this principle, the total area of each building was divided into two parts; the part assigned to individual machines was called allocated and the remainder was called unallocated. This procedure afforded a useful check on the efficiency with which machine layouts in mills of different sizes could utilize the necessary total floor space.

Investment Requirements

Machinery and equipment units, involved in the mechanical pretreatment department of any cottonseed oil mill, are described in table 9 in terms of their weight, operating rates, allocated floor space, and delivered and installation cost (at Memphis).

Table 10 describes and gives the costs of the housing section of the mill building for corresponding types and sizes of mills.

By combining this information, table 11 shows total investment requirements for the mechanical pretreatment department of hydraulic, screw-press, and prepress-solvent mills by size of mill. Table 12 does the same for the various sizes of direct-solvent mills. The mechanical pretreatment department of direct-solvent mills includes flaking rolls and conditioners, whereas in other types of mills this department includes crushing rolls instead of flaking rolls.

TABLE 10.—*Description and cost of mechanical pretreatment sections of cottonseed oil mill buildings, 1949–50*

Building section and corresponding mills	Area		Total cost
	Total	Allocated to machine	
	Sq. ft.	*Percent*	*Dollars*
50 by 60-foot section	3, 000		19, 693
1-press screw press		67	
50 by 80-foot section	4, 000		23, 823
4-press hydraulic		68	
Prepress solvent, plant 1		68	
2-press screw press		75	
Direct solvent, plant 1		75	
6-press hydraulic		82	
50 by 100-foot section	5, 000		28, 544
8-press hydraulic		78	
3-press screw press		78	
Prepress solvent, plant 2		78	
50 by 120-foot section	6, 000		32, 781
10-press hydraulic		88	
4-press screw press		88	
Direct solvent, plant 2		88	

TABLE 10.—*Description and cost of mechanical pretreatment sections of cottonseed oil mill buildings, 1949–50*—Continued

Building section and corresponding mills	Area: Total	Area: Allocated to machine	Total cost
	Sq. ft.	*Percent*	*Dollars*
50 by 140-foot section	7, 000		37, 595
12-press hydraulic		93	
5-press screw press		93	
50 by 160-foot section	8, 000		41, 974
14-press hydraulic		90	
6-press screw press		93	
16-press hydraulic		96	
Prepress solvent, plant 3		96	
50 by 180-foot section	9, 000		46, 234
18-press hydraulic		99	
7-press screw press		99	
50 by 200-foot section	10, 000		50, 738
20-press hydraulic		95	
8-press screw press		95	
Direct solvent, plant 3		95	
50 by 220-foot section	11, 000		55, 181
22-press hydraulic		92	
50 by 240-foot section	12, 000		59, 459
24-press hydraulic		95	
Prepress solvent, plant 4		95	
50 by 260-foot section	13, 000		63, 735
10-press screw press		96	
50 by 300-foot section	15, 000		73, 463
28-press hydraulic		96	
50 by 320-foot section	16, 000		78, 272
Direct solvent, plant 4		91	
30-press hydraulic		93	
12-press screw press		93	
32-press hydraulic		96	
50 by 360-foot section	18, 000		87, 368
36-press hydraulic		99	
14-press screw press		99	
50 by 380-foot section	19, 000		92, 150
40-press hydraulic		100	
16-press screw press		100	
Direct solvent, plant 5		100	
Prepress solvent, plant 5		100	

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

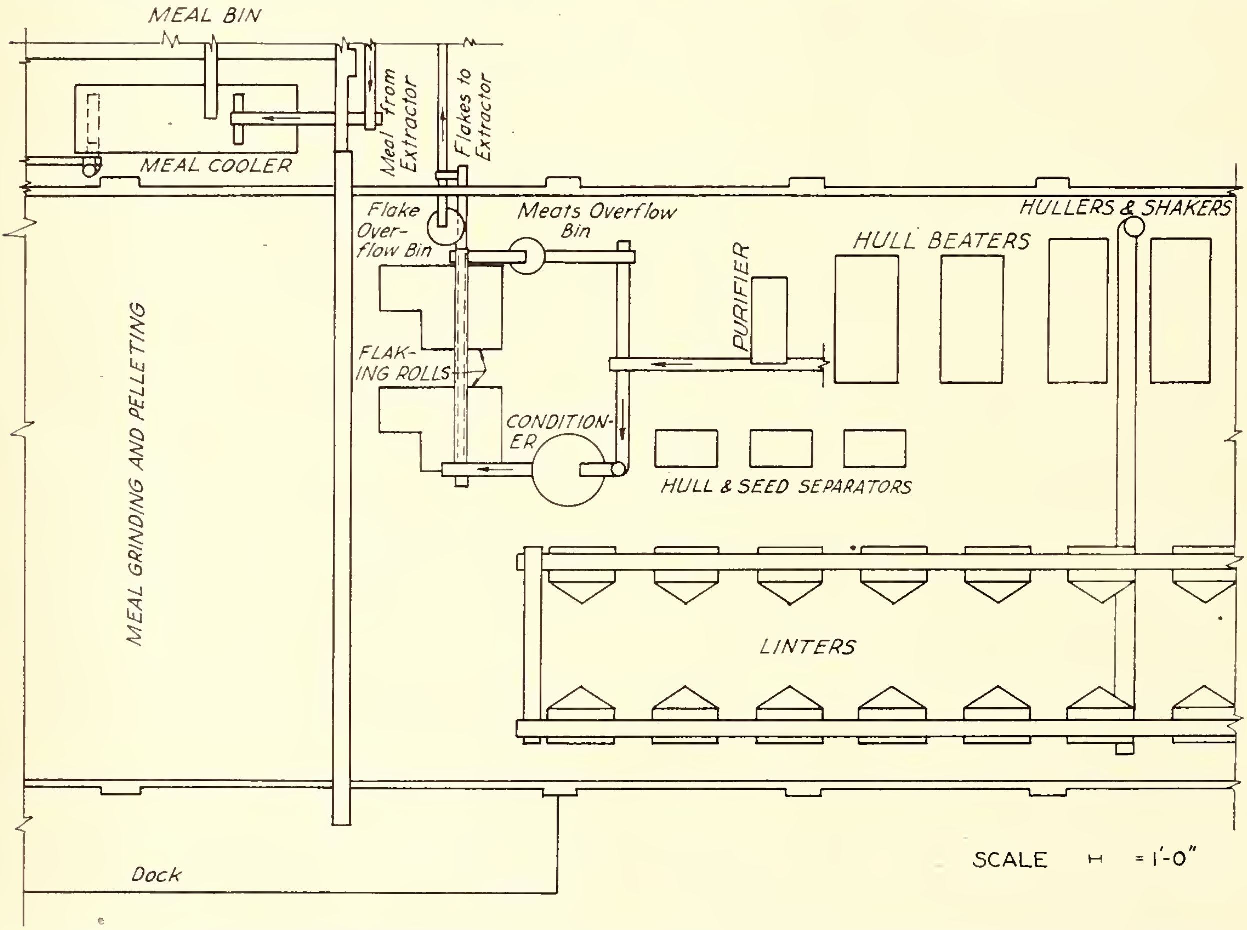


FIGURE 27.—Part of mechanical pretreatment department of a direct-solvent cottonseed oil mill designed to process 200 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

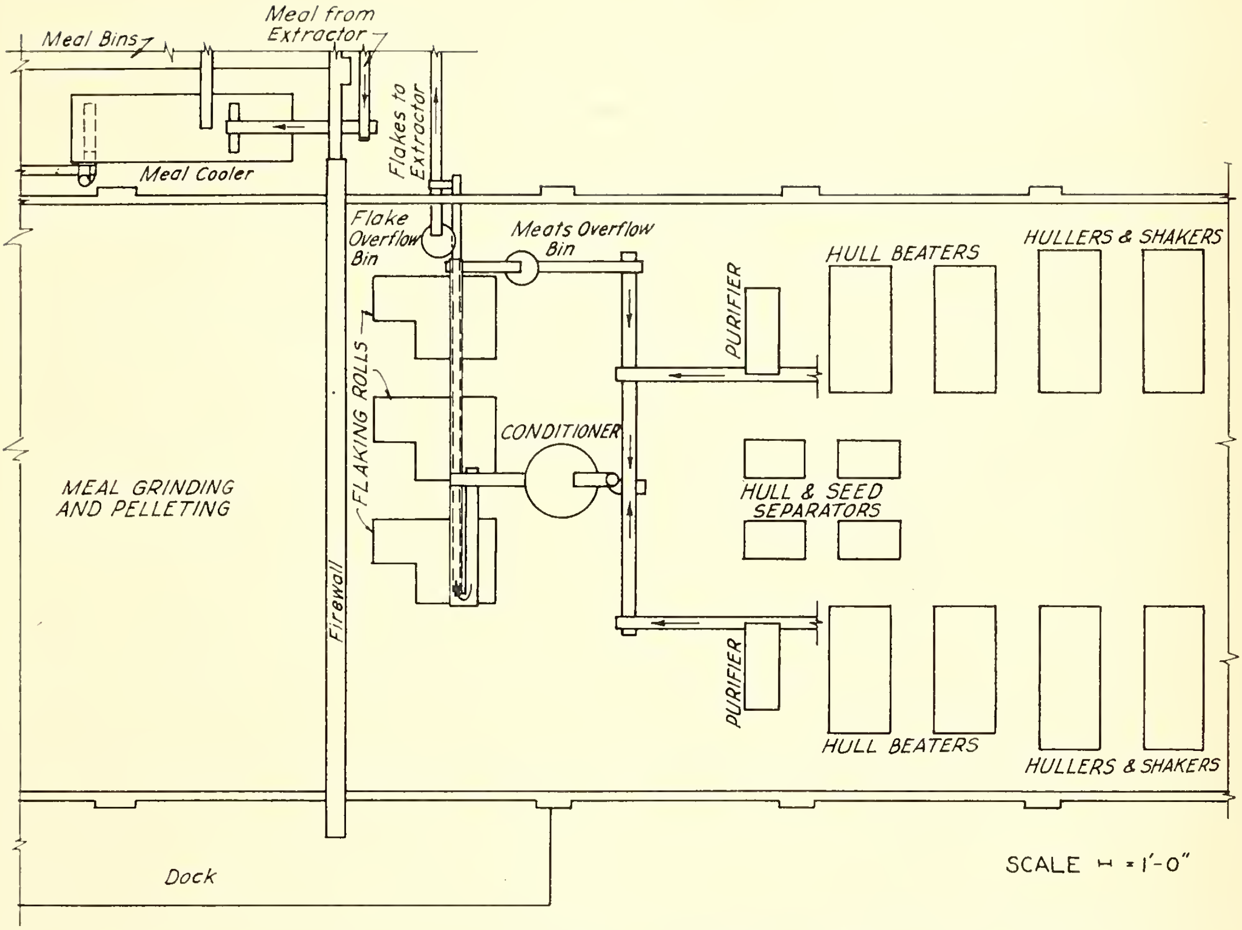


FIGURE 28.—Part of mechanical pretreatment department of a direct-solvent cottonseed oil mill designed to process 300 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 11.—*Investment requirements for mechanical pretreatment departments for different sizes of hydraulic, screw-press, and prepress-solvent cottonseed oil mills, 1949–50*

Item	Cost of machinery unit [1]	1-press screw press plant		Prepress sol., plant 1 [2] or 4-press hyd. plant		2-press screw press plant		6-press hydraulic plant		Prepress sol., plant 2 [2] or 3-press screw press plant or 8-press hyd. plant		4-press screw press plant or 10-press hyd. plant		5-press screw press plant or 12-press hyd. plant		14-press hydraulic plant		6-press screw press plant		Prepress sol., plant 3 [2] or 16-press hyd. plant	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Seed bin—end unit	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	2	2,463	1	2,463	1	2,463	1	2,463	1	2,463
Auxiliary equipment	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792
Seed bin—center unit	1,176							1	1,176	1	1,176	1	1,176	2	2,352	2	2,352	2	2,352	2	2,352
Auxiliary equipment	908							1	908	1	908	1	908	2	1,816	2	1,816	2	1,816	2	1,816
Boll reel	3,213			1	3,213	1	3,213	1	3,213	1	3,213	1	3,213	2	6,426	2	6,426	2	6,426	2	6,426
Initial auxiliary equipment	5,730			1	5,730	1	5,730	1	5,730	1	5,730	1	5,730	1	5,730	1	5,730	1	5,730	1	5,730
Auxiliary equipment for each reel	1,305			1	1,305	1	1,305	1	1,305	1	1,305	1	1,305	2	2,610	2	2,610	2	2,610	2	2,610
Seed cleaner	3,957	1	3,957	1	3,957	1	3,957	1	3,957	1	3,957	2	7,914	2	7,914	2	7,914	2	7,914	2	7,914
Initial auxiliary equipment	2,836	1	2,836	1	2,836	1	2,836	1	2,836	2	2,836	1	2,836	1	2,836	1	2,836	1	2,836	1	2,836
Auxiliary equipment for each cleaner	1,861	1	1,861	1	1,861	1	1,861	1	1,861	1	1,861	2	3,722	2	3,722	2	3,722	2	3,722	2	3,722
Linter	2,020	5	10,100	8	16,160	10	20,200	12	24,240	16	32,320	20	40,400	24	48,480	28	56,560	30	60,600	32	64,640
Initial auxiliary equipment	911	1	911	1	911	1	911	1	911	1	911	1	911	1	911	1	911	1	911	1	911
Auxiliary equipment for each linter	2,178	5	10,890	8	17,424	10	21,780	12	26,136	16	34,848	20	43,560	24	52,272	28	60,984	30	65,340	32	69,696
Saw-sharpening machine	3,928	1	3,928	1	3,928	1	3,928	1	3,928	2	7,856	2	7,856	2	7,856	3	11,784	3	11,784	3	11,784
Motes-reclaiming system	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,794
Initial auxiliary equipment	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676
Grabbots-reclaiming system	3,725											1	3,725	1	3,725	1	3,725	1	3,725	1	3,725
Initial auxiliary equipment	478											1	478	1	478	1	478	1	478	1	478
Scalping shaker (2 tray):																					
48 inches wide	1,332	1	1,332	1	1,332	1	1,332	1	1,332	1	1,332	1	1,332								
54 inches wide	1,339													1	1,339	1	1,339	1	1,339	1	1,339
Auxiliary equipment for each shaker	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569
Huller and shaker:																					
36 inches wide huller and 48 inches wide shaker	4,157	1	4,157	1	4,157	1	4,157					2	8,314								
48 inches wide huller and 54 inches wide shaker	4,439							1	4,439	1	4,439			2	8,878	2	8,878	2	8,878	2	8,878
Initial auxiliary equipment	753	1	753	1	753	1	753	1	753	1	753	1	753	1	753	1	753	1	753	1	753
Auxiliary equipment for each huller and shaker	2,388	1	2,388	1	2,388	1	2,388	1	2,388	1	2,388	2	4,776	2	4,776	2	4,776	2	4,776	2	4,776
Hull beater:																					
Single drum	1,171	1	1,171	1	1,171																
Double drum	2,917					1	2,917	1	2,917	1	2,917	1	2,917	2	5,834	2	5,834	2	5,834	2	5,834
Initial auxiliary equipment	606	1	606	1	606	1	606	1	606	1	606	1	606	1	606	1	606	1	606	1	606
Auxiliary equipment for each beater	1,263	1	1,263	1	2,263	1	1,263	1	1,263	1	1,263	1	1,263	2	2,526	2	2,526	2	2,526	2	2,526
Purifier:																					
36 inches	1,909											1	1,909	1	1,909	1	1,909	1	1,909		
54 inches	2,003																			1	2,003
Auxiliary equipment for each purifier	2,907											1	2,907	1	2,907	1	2,907	1	2,907	1	2,907
Hull and seed separator	1,325	1	1,325	1	1,325	1	1,325	1	1,325	1	1,325	2	2,650	2	2,650	2	2,650	2	2,650	2	2,650
Initial auxiliary equipment	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172
Auxiliary equipment for each separator	1,384	1	1,384	1	1,384	1	1,384	1	1,384	1	1,384	1	2,768	2	2,768	2	2,768	2	2,768	2	2,768
Drive for hulling and separating machinery:																					
75 horsepower	2,944	1	2,944	1	2,944	1	2,944	1	2,944												
100 horsepower	3,859									1	3,859										
125 horsepower	4,521											1	4,521	1	4,521	1	4,521	1	4,521	1	4,521
150 horsepower	5,005																				

Crushing rolls and auxiliary equipment:																					
Four 14 inches and one 16 inches diameter, 36 inches long	12, 893	1	12, 893	1	12, 893																
Four 16 inches and one 18 inches diameter, 48 inches long	17, 397					1	17, 397	1	17, 397	1	17, 397			2	34, 794	2	34, 794	2	34, 794		
Four 16 inches and one 18 inches diameter, 60 inches long	19, 175																			2	38, 350
One 16 inches and four 20 inches diameter, 60 inches long	25, 894											1	25, 894								
Cost of machinery and equipment (total)			81, 165		104, 007		118, 653		129, 415		151, 050		200, 810		237, 855		258, 575		266, 971		279, 017
Delivered [3]			65, 542		83, 698		95, 495		104, 008		121, 507		161, 196		191, 171		207, 878		214, 448		223, 799
Installation			15, 623		20, 309		23, 158		25, 407		29, 543		39, 614		46, 684		50, 697		52, 523		55, 218
Cost of building (total)			19, 693		23, 823		23, 823		23, 823		28, 544		32, 781		37, 595		41, 974		41, 974		41, 974
Delivered materials			14, 619		17, 899		17, 899		17, 899		21, 712		25, 092		28, 955		32, 476		32, 476		32, 476
Construction			5, 074		5, 924		5, 924		5, 924		6, 832		7, 689		8, 640		9, 498		9, 498		9, 498
Automatic sprinkler			4, 858		5, 382		5, 432		5, 481		6, 167		6, 706		7, 168		7, 588		7, 629		7, 670
Total cost of building, machinery, and equipment:																					
Memphis, Tenn.[4]			105, 716		133, 212		147, 908		158, 719		185, 761		240, 297		282, 618		308, 137		316, 574		328, 661
Atlanta, Ga			105, 920		133, 472		148, 204		159, 042		186, 138		240, 797		282, 810		308, 343		316, 788		328, 883
Dallas, Tex			105, 775		133, 287		147, 994		158, 812		185, 871		240, 441		283, 612		309, 216		317, 689		329, 824
Phoenix, Ariz			107, 478		135, 463		150, 476		161, 516		189, 030		244, 632		288, 908		314, 975		323, 628		336, 023
Bakersfield, Calif			107, 886		135, 983		151, 069		162, 162		189, 782		245, 632		289, 653		315, 786		324, 465		336, 895

See footnotes at end of table.

TABLE 11.—*Investment requirements for mechanical pretreatment departments for different sizes of hydraulic, screw-press, and prepress-solvent cottonseed oil mills, 1949–50*—Continued

Item	Cost of machinery unit [1]	7-press screw press plant or 18-press hyd. plant		8-press screw press plant or 20-press hyd. plant		22-press hydraulic plant		Prepress sol., plant 4 [2] or 24-press hyd. plant		10-press screw press plant		28-press hydraulic plant		12-press screw press plant or 30-press hyd. plant		32-press hydraulic plant		14-press screw press plant or 36-press hyd. plant		Prepress sol., plant 5 [2] or 16-press screw press plant or 40-press hyd. plant	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Seed bin—end unit	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463	1	2,463
Auxiliary equipment	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792	1	4,792
Seed bin—center unit	1,176	3	3,528	3	3,528	3	3,528	4	4,704	4	4,704	4	4,704	4	4,704	4	4,704	4	4,704	4	4,704
Auxiliary equipment	908	3	2,724	3	2,724	3	3,724	4	3,632	4	3,632	4	3,632	4	3,632	4	3,632	4	3,632	4	3,632
Boll reel	3,213	2	6,426	2	6,426	2	6,426	3	9,639	3	9,639	4	12,852	4	12,852	4	12,852	4	12,852	4	12,852
Initial auxiliary equipment	5,730	1	5,730	1	5,730	1	5,730	1	5,730	1	5,730	2	11,460	2	11,460	2	11,460	2	11,460	2	11,460
Auxiliary equipment for each reel	1,305	2	2,610	2	2,610	2	2,610	3	3,915	3	3,915	4	5,220	4	5,220	4	5,220	4	5,220	4	5,220
Seed cleaner	3,957	3	11,871	3	11,871	3	11,871	3	11,871	4	15,828	4	15,828	4	15,828	4	15,828	6	23,742	6	23,742
Initial auxiliary equipment	2,836	1	2,836	1	2,836	1	2,836	1	2,836	1	2,836	2	5,672	2	5,672	2	5,672	2	5,672	2	5,672
Auxiliary equipment for each cleaner	1,861	3	5,583	3	5,583	3	5,583	3	5,583	4	7,444	4	7,444	4	7,444	4	7,444	6	11,166	6	11,166
Linter	2,020	36	72,720	40	80,800	44	88,880	48	96,960	50	101,000	56	113,120	60	121,200	64	129,280	72	145,440	80	161,600
Initial auxiliary equipment	911	1	911	1	911	1	911	1	911	1	911	2	1,822	2	1,822	2	1,822	2	1,822	2	1,822
Auxiliary equipment for each linter	2,178	36	78,408	40	87,120	44	95,832	48	104,544	50	108,900	56	121,968	60	130,680	64	139,392	72	156,816	80	174,240
Saw-sharpening machine	3,928	4	15,712	4	15,712	5	19,640	5	19,640	5	19,640	6	23,568	6	23,568	6	23,568	7	27,496	8	31,424
Motes-reclaiming system	1,794	1	1,794	1	1,794	1	1,794	1	1,794	1	1,749	2	3,588	2	3,588	2	3,588	2	3,588	2	3,588
Initial auxiliary equipment	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676	1	1,676
Grabbots-reclaiming system	3,725	1	3,725	1	3,725	1	3,725	1	3,725	1	3,725	2	7,450	2	7,450	2	7,450	2	7,450	2	7,450
Initial auxiliary equipment	478	1	478	1	478	1	478	1	478	1	478	1	478	1	478	1	478	1	478	1	478
Scalping shaker (2 tray):																					
48 inches wide	1,332	--	--	--	--	--	--	--	--	--	--	--	--	2	2,664	--	--	--	--	--	--
54 inches wide	1,339	1	1,339	1	1,339	1	1,339	1	1,339	1	1,339	2	2,678	--	--	2	2,678	2	2,678	2	2,678
Auxiliary equipment for each shaker	3,569	1	3,569	1	3,569	1	3,569	1	3,569	1	3,569	2	7,138	2	7,138	2	7,138	2	7,138	2	7,138
Huller and shaker:																					
36 inches wide huller and 48 inches wide shaker	4,157	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
48 inches wide huller and 54 inches wide shaker	4,439	3	13,317	3	13,317	3	13,317	3	13,317	4	17,756	4	17,756	4	17,756	4	17,756	6	26,634	6	26,634
Initial auxiliary equipment	753	1	753	1	753	1	753	1	753	1	753	2	1,506	2	1,506	2	1,506	2	1,506	2	1,506
Auxiliary equipment for each huller and shaker	2,388	3	7,164	3	7,164	3	7,164	3	7,164	4	9,552	4	9,552	4	9,552	4	9,552	6	14,328	6	14,328
Hull beater:																					
Single drum	1,171	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Double drum	2,917	2	5,834	2	5,834	2	5,834	3	8,751	3	8,751	4	11,668	4	11,668	4	11,668	4	11,668	4	11,668
Initial auxiliary equipment	606	1	606	1	606	1	606	1	606	1	606	2	1,212	2	1,212	2	1,212	2	1,212	2	1,212
Auxiliary equipment for each beater	1,263	2	2,526	2	2,526	2	2,526	3	3,789	3	3,789	4	5,052	4	5,052	4	5,052	4	5,052	4	5,052
Purifier:																					
36 inches	1,909	--	--	--	--	--	--	--	--	2	3,818	2	3,818	2	3,818	2	3,818	--	--	--	--
54 inches	2,003	1	2,003	1	2,003	1	2,003	1	2,003	--	--	--	--	--	--	--	--	2	4,006	2	4,006
Auxiliary equipment for each purifier	2,907	1	2,907	1	2,907	1	2,907	1	2,907	2	5,814	2	5,814	2	5,814	2	5,814	2	5,814	2	5,814
Hull and seed separator	1,325	3	3,975	3	3,975	3	3,975	3	3,975	4	5,300	4	5,300	4	5,300	4	5,300	6	7,950	6	7,950
Initial auxiliary equipment	2,172	1	2,172	1	2,172	1	2,172	1	2,172	1	2,172	2	4,344	2	4,344	2	4,344	2	4,344	2	4,344
Auxiliary equipment for each separator	1,384	3	4,152	3	4,152	3	4,152	3	4,152	4	5,536	4	5,536	4	5,536	4	5,536	6	8,304	6	8,304
Drive for hulling and separating machinery:																					
75 horsepower	2,944	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100 horsepower	3,859	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
125 horsepower	4,521	--	--	--	--	--	--	--	--	--	--	2	9,042	2	9,042	2	9,042	--	--	--	--
150 horsepower	5,005	1	5,005	1	5,005	1	5,005	1	5,005	1	5,005	--	--	--	--	--	--	2	10,010	2	10,010

Crushing rolls and auxiliary equipment:																					
Four 14 inches and one 16 inches diameter, 36 inches long	12,893																				
Four 16 inches and one 18 inches diameter, 48 inches long	17,397											4	69,588	4	69,588						
Four 16 inches and one 18 inches diameter, 60 inches long	19,175	2	38,350					3	57,525	3	57,525					4	76,700	4	76,700		
One 16 inches and four 20 inches diameter, 60 inches long	25,894			2	51,788	2	51,788													4	103,576
Cost of machinery and equipment (total)			317,659		347,889		368,609		401,920		430,392		507,741		524,519		548,437		617,813		682,201
Delivered [3]			255,077		279,733		296,440		322,870		345,635		408,455		421,581		440,139		495,880		548,759
Installation			62,582		68,156		72,169		79,050		84,757		99,286		102,938		108,298		121,933		133,442
Cost of building (total)			46,234		50,738		55,181		59,459		63,735		73,463		78,272		78,272		87,368		92,150
Delivered materials			35,878		39,479		43,021		46,444		49,863		57,400		61,296		61,296		68,618		72,424
Construction			10,356		11,259		12,160		13,015		13,872		16,063		16,976		16,976		18,750		19,726
Automatic sprinkler			8,338		8,694		9,163		9,929		10,459		11,342		11,625		11,907		13,095		13,634
Total cost of building, machinery, and equipment:																					
Memphis, Tenn.[4]			372,231		407,321		432,953		471,308		504,586		592,546		614,416		638,616		718,276		787,985
Atlanta, Ga			372,486		407,600		433,249		471,631		504,941		592,791		614,669		638,879		718,574		788,315
Dallas, Tex			373,558		408,776		434,495		472,987		506,371		594,915		616,862		641,168		721,152		791,167
Phoenix, Ariz			380,622		416,523		442,705		481,928		515,939		606,311		628,624		653,455		734,987		806,479
Bakersfield, Calif			381,618		417,616		443,862		483,189		517,299		607,700		630,057		654,945		736,673		808,344

[1] From table 9.

[2] For size of mill in tons crushed per 24 hours for prepress solvent plants, see table 1.

[3] Memphis, Tenn.

[4] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 12.—*Investment requirements for mechanical pretreatment departments for different sizes (TPD)*[1] *of direct-solvent cottonseed oil mills, 1949–50*

Item	Cost of machinery unit [2]	Plant 1 (40–65 TPD)		Plant 2 (75–125 TPD)		Plant 3 (150–250 TPD)		Plant 4 (225–375 TPD)		Plant 5 (300–500 TPD)	
		Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Seed bin—end unit	2, 463	1	2, 463	1	2, 463	1	2, 463	1	2, 463	1	2, 463
Auxiliary equipment	4, 792	1	4, 792	1	4, 792	1	4, 792	1	4, 792	1	4, 792
Seed bin—center unit	1, 176			1	1, 176	3	3, 528	4	4, 704	4	4, 704
Auxiliary equipment	908			1	908	3	2, 724	4	3, 632	4	3, 632
Boll reel	3, 213	1	3, 213	1	3, 213	2	6, 426	4	12, 852	4	12, 852
Initial auxiliary equipment	5, 730	1	5, 730	1	5, 730	1	5, 730	2	11, 460	2	11, 460
Auxiliary equipment for each reel	1, 305	1	1, 305	1	1, 305	2	2, 610	4	5, 220	4	5, 220
Seed cleaner	3, 957	1	3, 957	2	7, 914	3	11, 871	4	15, 828	6	23, 742
Initial auxiliary equipment	2, 836	1	2, 836	1	2, 836	1	2, 836	2	5, 672	2	5, 672
Auxiliary equipment for each cleaner	1, 861	1	1, 861	2	3, 722	3	5, 583	4	7, 444	6	11, 166
Linter	2, 020	10	20, 200	20	40, 400	40	80, 800	60	121, 200	80	161, 600
Initial auxiliary equipment	911	1	911	1	911	1	911	2	1, 822	2	1, 822
Auxiliary equipment for each linter	2, 178	10	21, 780	20	43, 560	40	87, 120	60	130, 680	80	174, 240
Saw-sharpening machine	3, 928	1	3, 928	2	7, 856	4	15, 712	6	23, 568	8	31, 424
Motes-reclaiming system	1, 794	1	1, 794	1	1, 794	1	1, 794	2	3, 588	2	3, 588
Initial auxiliary equipment	1, 676	1	1, 676	1	1, 676	1	1, 676	1	1, 676	1	1, 676
Grabbots-reclaiming system	3, 725			1	3, 725	1	3, 725	2	7, 450	2	7, 450
Initial auxiliary equipment	478			1	478	1	478	1	478	1	478
Scalping shaker (2 tray):											
48 inches wide	1, 332	1	1, 332	1	1, 332	1	1, 332	2	2, 664	2	2, 664
Auxiliary equipment for each shaker	3, 569	1	3, 569	1	3, 569	1	3, 569	2	7, 138	2	7, 138
Huller and shaker:											
36-inch wide huller and 48-inch wide shaker	4, 157	1	4, 157	2	8, 314						
48-inch wide huller and 54-inch wide shaker	4, 439					3	13, 317	4	17, 756	6	26, 634
Initial auxiliary equipment	753	1	753	1	753	1	753	2	1, 506	2	1, 506
Auxiliary equipment for each huller and shaker	2, 388	1	2, 388	2	4, 776	3	7, 164	4	9, 552	6	14, 328
Hull beater—double drum	2, 917	1	2, 917	1	2, 917	2	5, 834	4	11, 668	4	11, 668
Initial auxiliary equipment	606	1	606	1	606	1	606	2	1, 212	2	1, 212
Auxiliary equipment for each beater	1, 263	1	1, 263	1	1, 263	2	2, 526	4	5, 052	4	5, 052
Purifier:											
36 inch	1, 909			1	1, 909			2	3, 818		
54 inches	2, 003					1	2, 003			2	4, 006
Auxiliary equipment for each purifier	2, 907			1	2, 907	1	2, 907	2	5, 814	2	5, 814
Hull and seed separator	1, 325	1	1, 325	2	2, 650	3	3, 975	4	5, 300	6	7, 950
Initial auxiliary equipment	2, 172	1	2, 172	1	2, 172	1	2, 172	2	4, 344	2	4, 344
Auxiliary equipment for each separator	1, 384	1	1, 384	2	2, 768	3	4, 152	4	5, 536	6	8, 304
Drive for hulling and separating machinery:											
75 horseprower	2, 944	1	2, 944								
100 horsepower	3, 859										
125 horsepower	4, 521			1	4, 521			2	9, 042		
150 horsepower	5, 005					1	5, 005			2	10, 010
Flaking roll:											
Small	11, 418	1	11, 418								
Large	16, 272			1	16, 272	2	32, 544	3	48, 816	4	65, 088
Conditioner:											
3-ring high, 56-inch diameter	12, 055	1	12, 055								
3-ring high, 72-inch diameter	14, 013			1	14, 013						
4-ring high, 72-inch diameter	15, 482					1	15, 482				
6-ring high, 72-inch diameter	18, 867							1	18, 867		
6-ring high, 85-inch diameter	21, 457									1	21, 457
Cost of machinery and equipment (total)			124, 729		205, 201		344, 120		522, 614		665, 156

See footnotes at end of table.

Table 12.—*Investment requirements for mechanical pretreatment departments for different sizes (TPD)*[1] *of direct-solvent cottonseed oil mills, 1949-50*—Continued

Item	Cost of machinery unit [2]	Plant 1 (40–65 TPD)		Plant 2 (75–125 TPD)		Plant 3 (150–250 TPD)		Plant 4 (225–375 TPD)		Plant 5 (300–500 TPD)	
		Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Delivered	--------	----	100, 120	----	164, 432	----	276, 124	----	419, 500	----	533, 973
Installation	--------	----	24, 609	----	40, 769	----	67, 996	----	103, 114	----	131, 183
Cost of building (total)	--------	----	23, 823	----	32, 781	----	50, 738	----	78, 272	----	92, 150
Materials	--------	----	17, 899	----	25, 092	----	39, 479	----	61, 296	----	72, 424
Construction	--------	----	5, 924	----	7, 689	----	11, 259	----	16, 976	----	19, 726
Automatic sprinkler	--------	----	5, 432	----	6, 706	----	8, 694	----	11, 625	----	13, 634
Total cost of building and machinery at:											
Memphis, Tenn	--------	----	153, 984	----	244, 688	----	403, 552	----	612, 511	----	770, 940
Atlanta, Ga	--------	----	154, 295	----	245, 198	----	403, 828	----	612, 763	----	771, 261
Dallas, Tex	--------	----	154, 074	----	244, 835	----	404, 988	----	614, 945	----	774, 037
Phoenix, Ariz	--------	----	156, 676	----	249, 110	----	412, 636	----	626, 648	----	788, 935
Bakersfield, Calif	--------	----	157, 298	----	250, 130	----	413, 714	----	628, 074	----	790, 750

[1] Tons per day.
[2] From table 9.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

BALING-PRESS ROOM

The baling-press department presses into bales three types of fibrous materials (grabbots, linters, and motes) which are received simultaneously from the mechanical pretreatment department.

Equipment Units

This department includes the baling press, and linters bins.

Baling Press. This machine compresses the linters into bales which can be conveniently handled and stored. While linters are being packed into 1 of the 2 boxes of a double box press, the linters in the other box are being compressed and fitted with burlap wrapping and metal ties to form a bale.

In calculating the operating rates of the baling press, the following yields of linters products per ton of seed were assumed: First-cut linters, 40 pounds; second-cut linters, 160 pounds; motes and grabbots, 10 pounds. The normal rate for the baling press was assumed to be 2.5 bales per hour, which then gave a maximum of 3.1 bales per hour and a minimum of 1.5 bales. The average weight of linters products per bale was assumed to be 625 pounds.

Under these assumptions the maximum baling rate is 46,500 ($625 \times 3.1 \times 24$) pounds per day and this rate in terms of seed processed is 222 tons per day $\left(\frac{46,500}{210}\right)$. The normal rate is 178 tons of seed per day and the minimum rate is 133 tons.

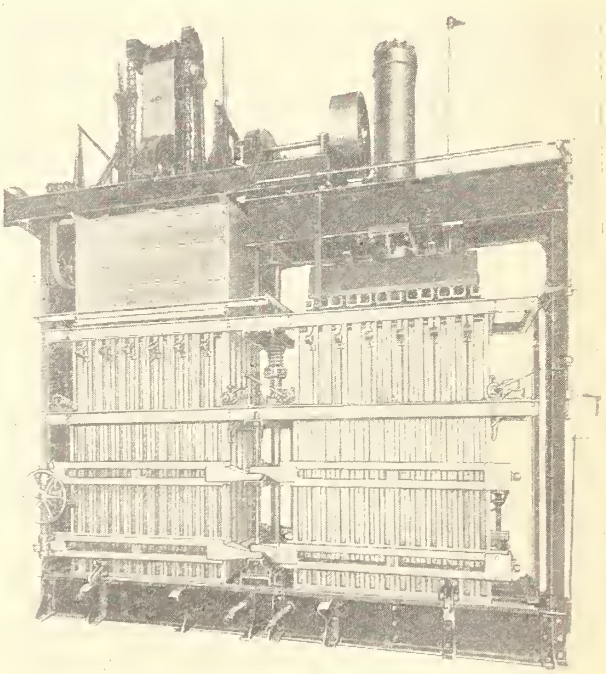


Figure 29.—Double-box linter-baling press.

Linters Bins. Two types of linters are received from the linter room—first cut and second cut. Each cut must be deposited in a different bin. As a consequence, 2 types of linters bins are commonly used in mills, one a single product linters bin and the other a dual product linters bin. The dual

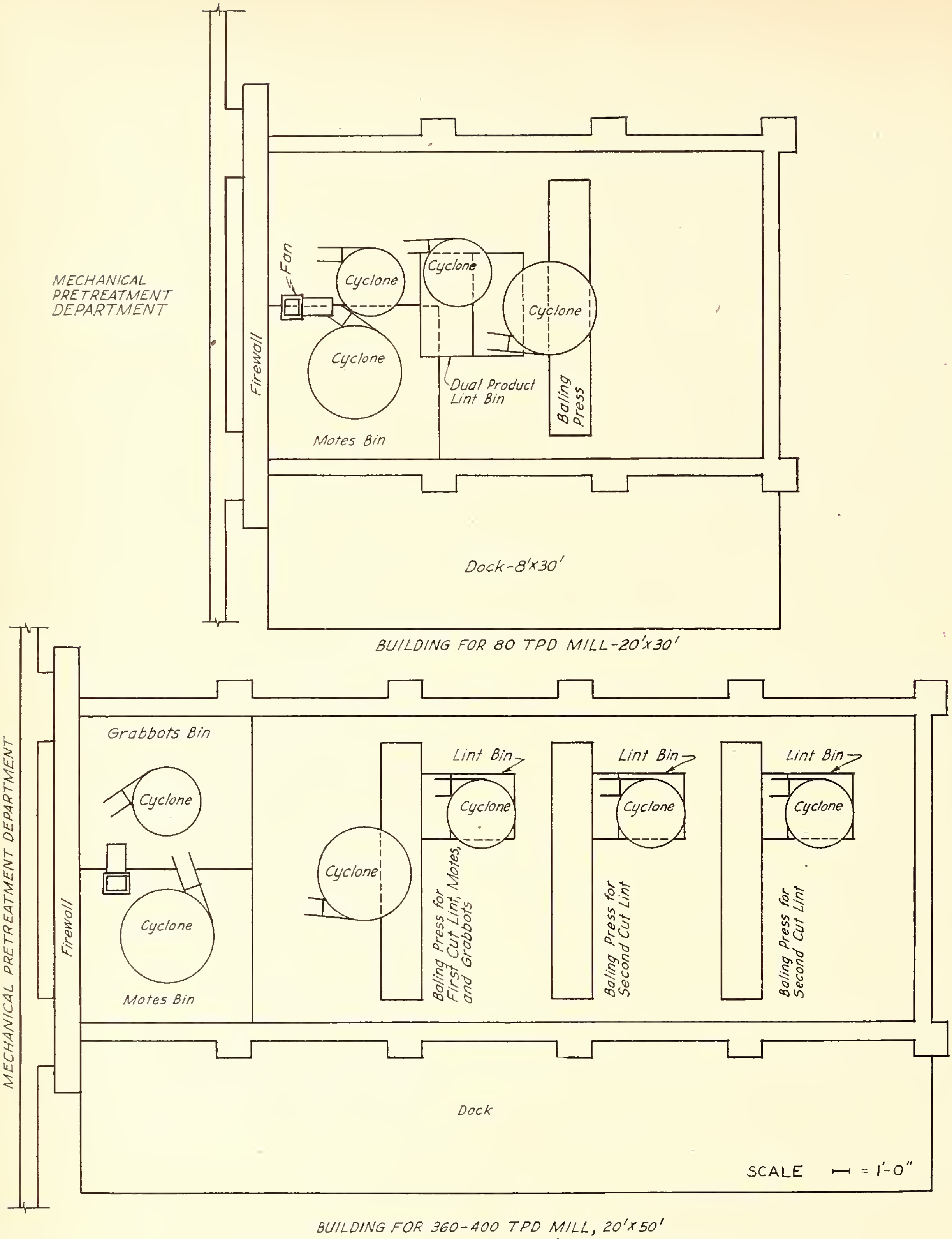


FIGURE 30.—Baling-press department of cottonseed oil mills.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

product bin makes it possible to operate with only 1 baling press in some mills where otherwise 2 would be required. It was designed with a vertical partition dividing the bin into 2 compartments—1 for first-cut and 1 for second-cut linters. The linters are conveyed from the compartments to the baling press by screw conveyors, running lengthwise of the bin underneath horizontal slide gates which form the bottoms of the compartments. The linters from one of the compartments at a time can be conveyed into the baling press.

The dual-product bin unit appearing as an item in table 13 was the smallest bin considered, 6 feet wide, 7 feet deep, and 6 feet long. An auxiliary unit provided for increasing the length of the bin by increments of 1 foot. Thus, the size of the bin was increased to take care of the increased linters-holding capacity required as the sizes of the mills increased.

TABLE 13.—*Description and costs of machinery and equipment units in baling-press departments of cottonseed oil mills, 1949–50*

Machinery and equipment	Physical description					Unit cost [1]		
	Approximate shipping weight	Allocated building space	Capacity (operating rates in tons of seed crushed per 24 hours)			Delivered	Installation	Total
			Minimum	Normal	Maximum			
	Pounds	*Sq. ft.*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*
Baling press—double box	24, 600	200	133	178	222	7, 879	1, 480	9, 359
Auxiliary equipment for first press	3, 541	400				2, 166	679	2, 845
Auxiliary equipment for second press	1, 613					654	575	1, 229
Auxiliary equipment for third press	4, 433					2, 235	883	3, 118
Dual product linters bin (6 x 6 x 7 feet)	7, 698					2, 988	489	3, 477
Additional foot in length	314					63	12	75
Single product linters bin	892					68	205	273

[1] Memphis, Tenn., was used as the price basing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Baling-Press Room Design

As illustrated in figures 24, 25, and 26, the baling-press room was located alongside the linters room, only a firewall separating the two buildings. Figure 30 illustrates the floor design and machine arrangements in relatively small mills where only one baling press and a dual product linters bin were required. The same figure illustrates the principles of design of larger mills where more than one baling press was required. All changes in design were due entirely to changes in size of plant, the type of plant having no effect in this respect.

Investment Requirements

Machinery and equipment units and investment requirements of baling-press departments of various cottonseed mills are summarized in tables 13 through 15.

TABLE 14.—*Description and costs of different sizes of baling-press buildings for cottonseed oil mills, 1949–50*

Building size and corresponding mills	Area	Cost [1]
	Sq. ft.	*Dollars*
20- by 30-foot building (4 to 16 press hydraulic plants, 1 to 6 press screw press plants, direct solvent, plants 1 and 2, prepress solvent, plants 1, 2, and 3.)	600	7, 010
20- by 40-foot building (18 to 32 press hydraulic plants, 7 to 12 press screw press plants, direct solvent, plants 3 and 4, prepress solvent, plant 4.)	800	8, 390
20- by 50-foot building (36 to 40 press hydraulic plants, 14 to 16 press screw press plants, direct solvent, plant 5, prepress solvent, plant 5.)	1, 000	9, 770

[1] Memphis, Tenn., was used as the price basing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 15.—*Investment requirements for baling-press departments of different sizes of cottonseed oil mills, 1949–50*

Cost item	Cost of mach. unit [1]	4 to 6 press hyd. plant or 1 to 2 press screw press plant or direct sol.-plant 1 or prepress sol.-plant 1		8 press hyd. plant or 3 press screw press plant or prepress sol.-plant 2		10 press hyd. plant or 4 press screw press plant or direct sol.-plant 2		12 press hyd. plant or 5 press screw press plant		14 press hydraulic plant		6 press screw press plant		16 press hyd. plant or prepress sol.-plant 3	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Baling press—double box	9, 359	1	9, 359	1	9, 359	1	9, 359	1	9, 359	1	9, 359	1	9, 359	1	9, 359
Auxiliary equipment for 1st press	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845
Auxiliary equipment for 2d press	1, 229														
Auxiliary equipment for 3d press	3, 118														
Dual product linters bin	3, 477	1	3, 477	1	3, 477	1	3, 477	1	3, 477	1	3, 477	1	3, 477	1	3, 477
Additional foot in length	75			2	150	5	375	7	525	9	675	10	750	11	825
Single product linters bin	273														
Cost of machinery and equipment (total)			15, 681		15, 831		16, 056		16, 206		16, 356		16, 431		16, 506
Delivered [2]			13, 033		13, 159		13, 346		13, 474		13, 596		13, 663		13, 721
Installation			2, 648		2, 672		2, 710		2, 732		2, 760		2, 768		2, 785
Cost of building (total)			7, 010		7, 010		7, 010		7, 010		7, 010		7, 010		7, 010
Delivered materials			4, 099		4, 099		4, 099		4, 099		4, 099		4, 099		4, 099
Construction			2, 911		2, 911		2, 911		2, 911		2, 911		2, 911		2, 911
Total cost of building, machinery, and equipment:															
Memphis, Tenn. [3]			22, 691		22, 841		23, 066		23, 216		23, 366		23, 441		23, 516
Atlanta, Ga			22, 731		22, 881		23, 107		23, 229		23, 380		23, 455		23, 530
Dallas, Tex			22, 703		22, 852		23, 078		23, 286		23, 437		23, 512		23, 587
Phoenix, Ariz			23, 042		23, 195		23, 425		23, 659		23, 813		23, 891		23, 967
Bakersfield, Calif			23, 122		23, 277		23, 508		23, 712		23, 866		23, 944		24, 021

Cost item	Cost of mach. unit [1]	18 to 22 press hyd. plant or 7 to 8 press screw press plant or direct sol.-plant 3		24 press hyd. plant or prepress sol.-plant 4		28 press hyd. plant or 10 press screw press plant		30 press hyd. plant or 12 press screw press plant or direct sol.-plant 4		32 press hydraulic plant		36 to 40 press hyd. plant or 14 to 16 press screw press plant or direct sol.-plant 5 or prepress sol.-plant 5	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Baling press—double box	9, 359	2	18, 718	2	18, 718	2	18, 718	2	18, 718	2	18, 718	3	28, 077
Auxiliary equipment for 1st press	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845	1	2, 845
Auxiliary equipment for 2d press	1, 229	1	1, 229	1	1, 229	1	1, 229	1	1, 229	1	1, 229	1	1, 229
Auxiliary equipment for 3d press	3, 118											1	3, 118
Dual product linters bin	3, 477			1	3, 477	1	3, 477	1	3, 477	1	3, 477		
Additional foot in length	75			10	750	11	825	14	1, 050	16	1, 200		
Single product linters bin	273	1	273									1	273
Cost of machinery and equipment (total)			23, 065		27, 019		27, 094		27, 319		27, 469		35, 542
Delivered [2]			18, 649		22, 191		22, 254		22, 448		22, 567		28, 760
Installation			4, 416		4, 828		4, 840		4, 871		4, 902		6, 782
Cost of building (total)			8, 390		8, 390		8, 390		8, 390		8, 390		9, 770
Delivered materials			4, 917		4, 917		4, 917		4, 917		4, 917		5, 730
Construction			3, 473		3, 473		3, 473		3, 473		3, 473		4, 040
Total cost of building, machinery, and equipment:													
Memphis, Tenn. [3]			31, 455		35, 409		35, 484		35, 709		35, 859		45, 312
Atlanta, Ga			31, 474		35, 431		35, 497		35, 722		35, 873		45, 329
Dallas, Tex			31, 552		35, 524		35, 613		35, 839		35, 990		45, 479
Phoenix, Ariz			32, 069		36, 139		36, 234		36, 465		36, 620		46, 281
Bakersfield, Calif			32, 141		36, 226		36, 310		36, 542		36, 696		46, 379

[1] From table 13.

[3] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

[2] Memphis, Tenn.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

OIL-EXTRACTION DEPARTMENT

The oil-extraction departments of different types of mills differed radically in the extent to which they could be broken down into small cost-units. Mainly for this reason, it was most convenient to consider screw-press mills first, hydraulic mills second, prepress-solvent mills third, and direct-solvent mills last. For the same reason, a somewhat different order of subtopics was used in analyzing the extraction department of each type of mill.

Screw-Press Mills

The extraction departments of screw-press mills may be described most readily in terms of the flow of materials, equipment units, principles of design, building requirements, and investment.

Flow of Materials. In screw-press mills, rolled meats enter the press room by screw conveyor from the mechanical pretreatment department. An elevator lifts them into another conveyor running over the tops of the cookers and feeding into them. The cookers may be in the form of a stack of kettles like the conditioner or they may be in the form of a number of cylindrical vessels with their axes in horizontal planes, and situated one over the other so that material passes through the group in a series. Agitation is accomplished by mixers mounted on shafts passing through the axes of the cylinders. After cooking, the meats are fed into the screw presses. Individual cookers are often provided with each screw press, and this design was followed for this study, as it fitted in with the unit system of combining the costs.

Cooked meats are fed into the screw press, which conveys the material from the inlet to the discharge of the press while subjecting the meats to high pressure which squeezes the oil out through the openings between the bars.

The extracted oil flows into a screw conveyor running along the backs of the presses, which carries the oil and any solid particles which might have been squeezed out by the presses along with the oil. The oil conveyor discharges into a screenings tank which is set into a pit in the floor to allow oil to flow into it without being pumped. In the screenings tank, the coarse solids settle out of the oil and are lifted mechanically onto a screen which allows excess oil to drain from the solids. Such solids are discharged into the meats going to the cookers and are thus re-pressed. The oil is pumped through a filter press and into a holding tank from which it is periodically pumped to the storage tanks. The solids, filtered out in the filter press, are also fed back into the flow of meats to the presses and are re-pressed.

The cake from the presses is conveyed to a cake breaker, which reduces it in size. It is then conveyed to the cake bins. On the way, it may have water sprayed on it in the conveyor to increase its moisture content and cool it. If water is sprayed on it, the vapor generated is aspirated off with a fan.

Equipment Units. Oil-extraction machinery and equipment of screw-press mills were grouped into four main units: screw press, oil-handling equipment, filter press, and auxiliary equipment.

Screw-press unit. A screw press is a machine with either a horizontal and a vertical screw or merely a horizontal screw moving within cages made of closely spaced steel bars. Besides the press itself, the screw-press unit includes the cooker, foundation concrete and supporting steel for the press and its accessories, screw conveyor associated with each press for carrying meats, oil, and cake, piping, and miscellaneous small items.

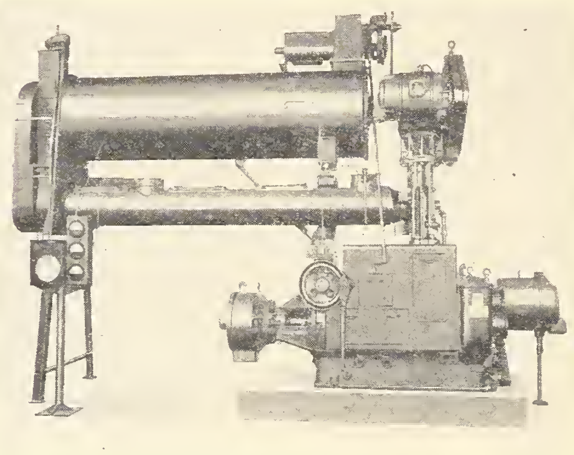


Figure 31.—Screw press.

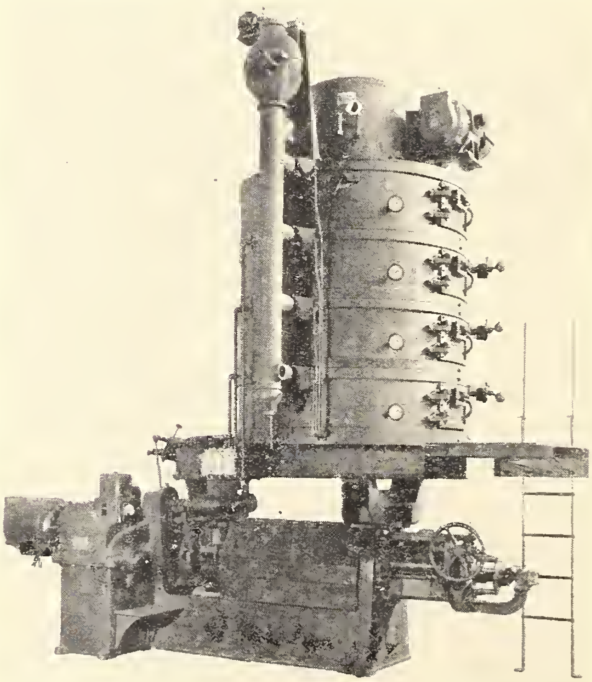


Figure 32.—Screw press.

A great deal of frictional heat is developed in a screw press, some of which must be removed by a cooling system. To effect economy in the use of water, cooling towers were provided in all mills to dissipate the heat removed from the presses by the cooling system. The cooling system and cooling tower costs were divided into a cost per press and a base cost which was added to the cost of auxiliary equipment units.

Oil-handling equipment. The oil-handling equipment unit includes a screenings tank, pit, holding tanks for unfiltered and filtered oil, pumps for transferring oil through all its various treatments, including filtering and final pumping to storage, motors, and electrical accessories to operate all of the equipment.

Filter-press units. The principal items in the filter-press unit are the filter press and the cake hopper, with a feeder mechanism for feeding cake into the meats conveyor.

Auxiliary equipment. Auxiliary equipment includes bucket elevators to lift cake into the cake breaker, cake breaker, cake conveyor to storage bins, aspiration system for cracked-cake conveyor, meats runaround bin and feeder, condensate tank, and all miscellaneous items which would not fit into the other units.

Because of the large electrical power requirements of the screw-press department, the cost of wiring and poles to carry the power from the substation is shown as a separate item in footnote 3 of table 18.

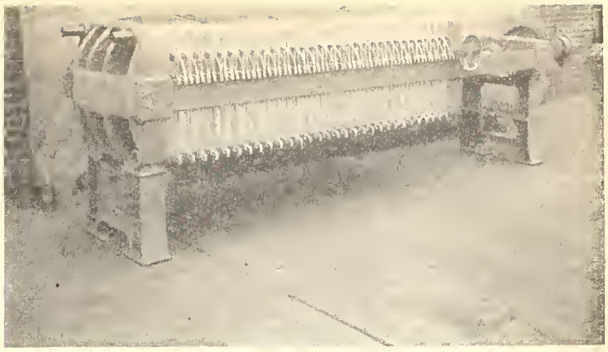


FIGURE 33.—Filter press for filtering oil.

PRINCIPLES OF DESIGN. As indicated by figures 35 and 36, a radical change in press-room design was made, beginning with four-press mills. Only a single line of presses was used for smaller mills and a double line for four-press and larger mills. This change in design made possible the better utilization of floor space.

The connecting conveyor was different for a single- and a double-line press layout, the double line requiring two conveyor units. Also, mills with less than four presses received meats from a

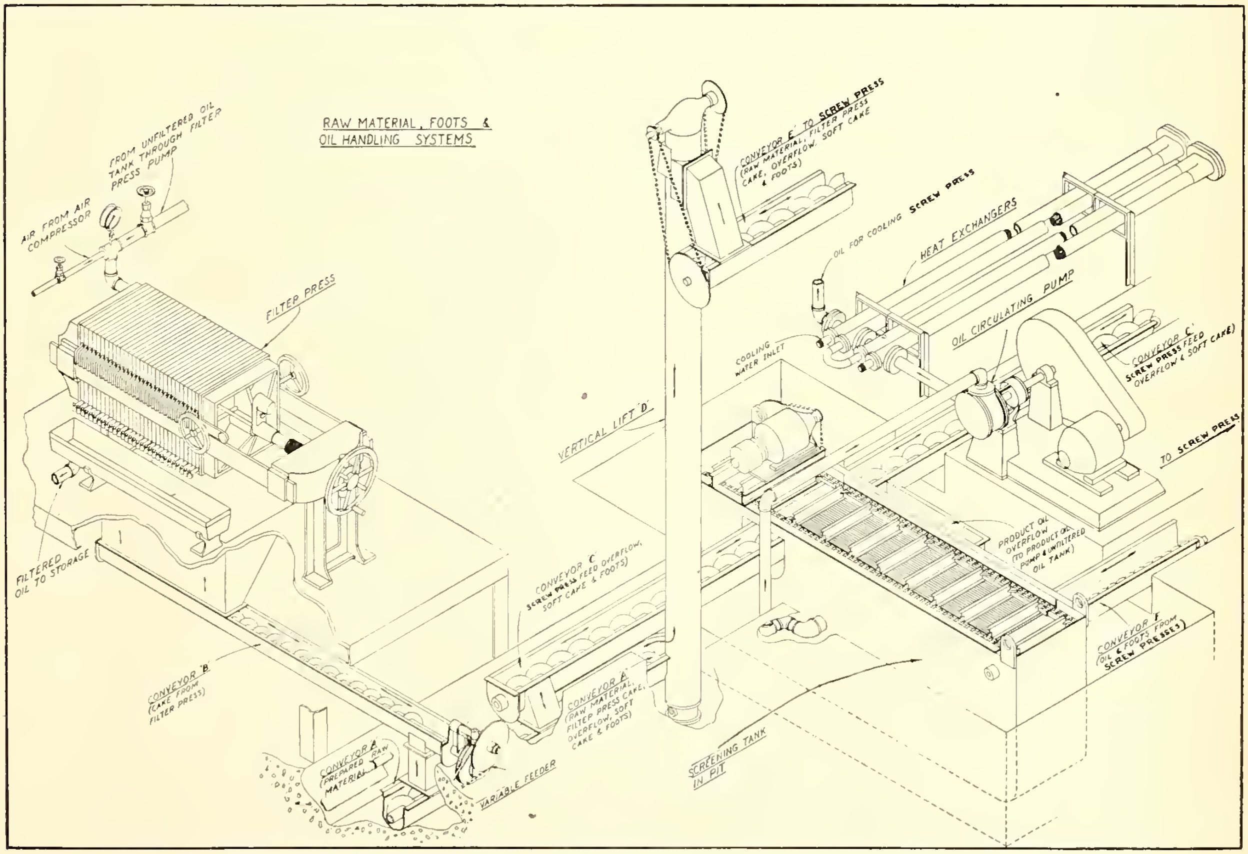


FIGURE 34.—Sketch of conveyors, screenings tank, and filter press for screw-press oil-extraction process.

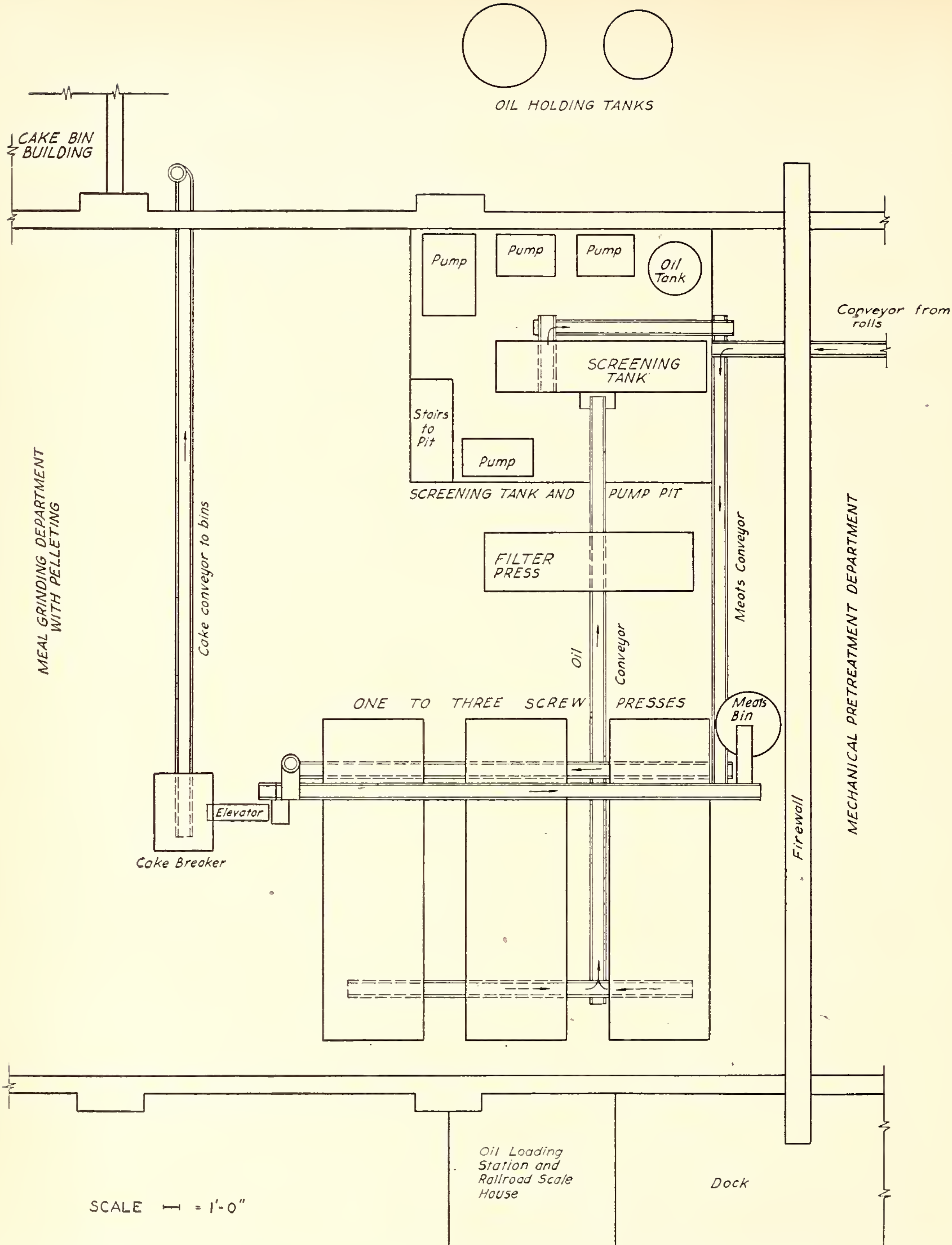


FIGURE 35.—Oil-extraction department of a screw-press cottonseed oil mill designed to process from 25 to 75 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

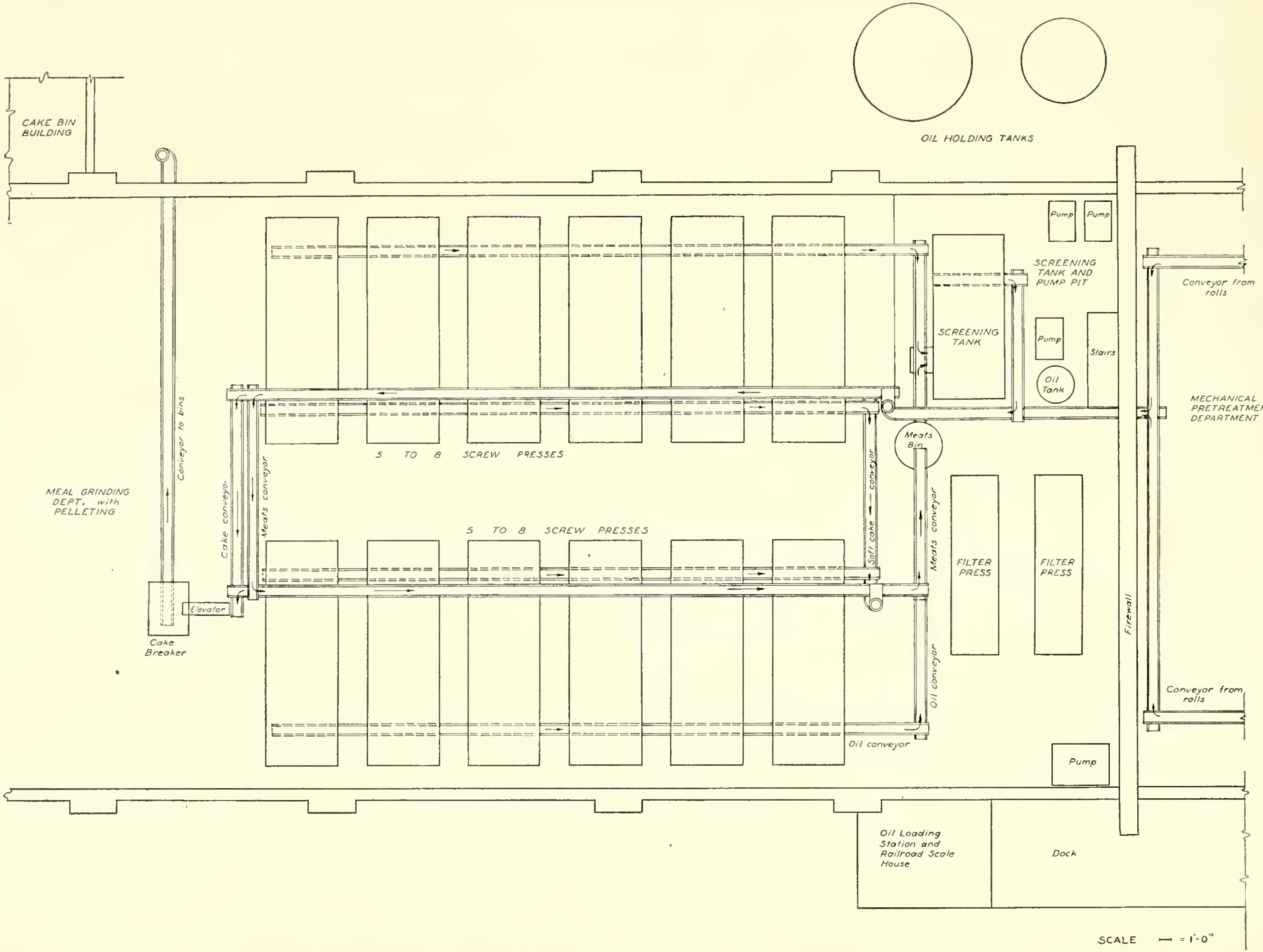


FIGURE 36.—Oil-extraction department of a screw-press cottonseed oil mill designed to process from 250 to 400 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 16.—*Description and cost of machinery and equipment units in oil-extraction departments of screw-press cottonseed oil mills, at specified locations, 1949–50*

Machinery and equipment	Physical description: Approximate weight	Physical description: Allocated building space	Unit cost: Delivered [1]	Unit cost: Installation	Total at— Memphis, Tenn.[2]	Total at— Atlanta, Ga.	Total at— Dallas, Tex.	Total at— Phoenix, Ariz.	Total at— Bakersfield, Calif.
	Pounds	*Sq. ft.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Screw press and auxiliary equipment [3]	48, 324	213	23, 464	5, 098	28, 562	28, 527	28, 899	29, 472	29, 472
Connecting conveyor for—									
1 to 3 presses	6, 160		3, 594	1, 023	4, 617	4, 617	4, 617	4, 617	4, 617
4 to 16 presses	14, 536		8, 487	2, 304	10, 791	10, 791	10, 791	10, 791	10, 791
Auxiliary equipment for—									
1 to 4 screw presses	13, 027	450	6, 567	2, 423	8, 990	9, 002	9, 045	9, 166	9, 178
5 to 8 screw presses	13, 911	450	6, 817	2, 575	9, 392	9, 403	9, 447	9, 568	9, 580
9 to 16 screw presses	15, 217	450	7, 970	2, 821	10, 791	10, 803	10, 852	10, 980	10, 992
Filter press:									
24 inch	9, 660	65	2, 062	534	2, 596	2, 651	2, 707	2, 896	2, 910
36 inch	25, 771	160	4, 139	954	5, 093	5, 259	5, 429	5, 991	6, 024
42 inch	37, 340	200	5, 503	1, 289	6, 792	6, 920	7, 071	7, 681	7, 703
Oil handling equipment for—									
1 to 3 screw presses	12, 749	270	7, 414	1, 786	9, 200	9, 206	9, 243	9, 325	9, 325
4 to 8 screw presses	15, 895	270	9, 965	2, 319	12, 284	12, 290	12, 345	12, 458	12, 458
9 to 16 screw presses	24, 054	342	13, 843	3, 240	17, 083	17, 088	17, 193	17, 390	17, 390

[1] Memphis, Tenn.

[2] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

[3] Capacity (operating rates in seed crushed per 24 hours): Minimum, 20 tons; normal, 25 tons; maximum, 35 tons.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 17.—*Description and costs of building requirements in oil-extraction departments of different sizes of screw-press cottonseed oil mills, 1949–50*

Size of mill (number of presses)	Description: Length	Description: Width	Area: Total	Area: Allocated to machines	Total Cost
	Feet	*Feet*	*Sq. ft.*	*Percent*	*Dollars*
1	20	50	1, 000	99	9, 139
2	40	50	2, 000	65	13, 271
3	40	50	2, 000	76	13, 274
4	40	50	2, 000	87	13, 277
5	40	50	2, 000	97	12, 769
6	60	50	3, 000	73	16, 904
7	60	50	3, 000	80	16, 906
8	60	50	3, 000	87	17, 420
10	80	50	4, 000	81	21, 558
12	80	50	4, 000	94	21, 568
14	100	50	5, 000	83	25, 195
16	100	50	5, 000	92	25, 709

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

single instead of a dual layout of hulling, separating, and rolling machinery in the mechanical pretreatment department. Moreover, such mills have 1 instead of 2 filter presses, a smaller screening tank, and fewer pumps than mills with from 4 to 10 presses. Otherwise, the same machinery layouts were used in mills with 1 to 3 presses as in those with 4 to 10 presses.

Building Requirements. The oil-extraction department of a screw-press mill was housed in a section of the mill building. These housing requirements for different sizes of screw-press mills are shown in table 17.

Investment Requirements. Description and costs of machinery and equipment units for screw-press mills are shown in table 16.

Similar descriptions and costs of the oil-extraction sections of the mill building are shown in table 17. By combining this information, table 18 shows the 1949–50 investment requirements for the oil-extraction departments of different sizes of screw-press mills.

Hydraulic Mills

Except for a special section on building requirements, the same order of topics is used in describing the oil-extraction departments of hydraulic mills as for screw-press mills.

TABLE 18.—*Investment requirements for oil-extraction departments of different sizes of screw-press cottonseed oil mills, 1949–50*

Cost item	Cost of mach. unit [1]	Size of mill by number of presses											
		1 press		2 presses		3 presses		4 presses		5 presses		6 presses	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Screw press and auxiliary equipment	28, 562	1	28, 562	2	57, 124	3	85, 686	4	114, 248	5	142, 810	6	171, 372
Connecting conveyor for:													
1 to 3 screw presses	4, 617	1	4, 617	1	4, 617	1	4, 617						
4 to 16 screw presses	10, 791							1	10, 791	1	10, 791	1	10, 791
Auxiliary equipment for:													
1 to 4 screw presses	8, 990	1	8, 990	1	8, 990	1	8, 990	1	8, 990				
5 to 8 screw presses	9, 392									1	9, 392	1	9, 392
9 to 16 screw presses	10, 791												
Filter press:													
24-inch	2, 596	1	2, 596										
36-inch	5, 093			1	5, 093	1	5, 093	1	5, 093	1	5, 093		
42-inch	6, 792											1	6, 792
Oil handling equipment for:													
1 to 3 screw presses	9, 200	1	9, 200	1	9, 200	1	9, 200						
4 to 8 screw presses	12, 284							1	12, 284	1	12, 284	1	12, 284
9 to 16 screw presses	17, 083												
Cost of machinery and equipment (total)			53, 965		85, 024		113, 586		151, 406		180, 370		210, 631
Delivered [2]			43, 101		68, 642		92, 106		123, 014		146, 728		171, 556
Installation			10, 864		16, 382		21, 480		28, 392		33, 642		39, 075
Cost of building [3]			9, 199		13, 376		13, 445		13, 534		13, 122		17, 394
Automatic sprinkler			547		962		962		962		962		1, 351
Total cost of building, machinery, and equipment:													
Memphis, Tenn. [4]			63, 711		99, 362		127, 993		165, 902		194, 454		229, 376
Atlanta, Ga			63, 748		99, 474		128, 070		165, 944		194, 461		229, 311
Dallas, Tex			64, 256		100, 468		129, 436		167, 700		196, 590		231, 793
Phoenix, Ariz			65, 221		102, 379		131, 920		170, 788		200, 251		236, 075
Bakersfield, Calif			65, 247		102, 424		131, 965		170, 833		200, 296		236, 109

See footnotes at end of table.

TABLE 18.—*Investment requirements for oil-extraction departments of different sizes of screw-press cottonseed oil mills, 1949–50*—Continued

Cost item	Cost of mach. unit [1]	Size of mill by number of presses											
		7 presses		8 presses		10 presses		12 presses		14 presses		16 presses	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Screw press and auxiliary equipment	28, 562	7	199, 934	8	228, 496	10	285, 620	12	342, 744	14	399, 868	16	456, 992
Connecting conveyor for:													
1 to 3 screw presses	4, 617												
4 to 16 screw presses	10, 791	1	10, 791	1	10, 791	1	10, 791	1	10, 791	1	10, 791	1	10, 791
Auxiliary equipment for:													
1 to 4 screw presses	8, 990												
5 to 8 screw presses	9, 392	1	9, 392	1	9, 392								
9 to 16 screw presses	10, 791					1	10, 791	1	10, 791	1	10, 791	1	10, 791
Filter press:													
24-inch	2, 596												
36-inch	5, 093					2	10, 186						
42-inch	6, 792	1	6, 792	1	6, 792			2	13, 584	2	13, 584	2	13, 584
Oil handling equipment for:													
1 to 3 screw presses	9, 200												
4 to 8 screw presses	12, 284	1	12, 284	1	12, 284								
9 to 16 screw presses	17, 083					1	17, 083	1	17, 083	1	17, 083	1	17, 083
Cost of machinery and equipment (total)			239, 193		267, 755		334, 471		394, 993		452, 117		509, 241
Delivered [2]			195, 020		218, 484		273, 218		322, 874		369, 802		416, 730
Installation			44, 173		49, 271		61, 253		72, 119		82, 315		92, 511
Cost of building [3]			17, 526		18, 186		22, 764		23, 387		27, 575		28, 528
Automatic sprinkler			1, 351		1, 351		1, 730		1, 730		2, 103		2, 103
Total cost of building, machinery, and equipment:													
Memphis, Tenn.[4]			258, 070		287, 292		358, 965		420, 110		481, 795		539, 872
Atlanta, Ga			257, 970		287, 157		358, 962		419, 963		481, 578		539, 585
Dallas, Tex			260, 824		290, 383		363, 176		424, 883		487, 242		545, 993
Phoenix, Ariz			265, 679		295, 811		370, 355		433, 304		496, 809		556, 706
Bakersfield, Calif			265, 713		295, 845		370, 433		433, 360		496, 865		556, 762

[1] From table 16.
[2] Memphis, Tenn.
[3] Cost of electric wiring and poles included in cost of building for the different sizes of mills in the order listed above, was: \$59, \$103, \$169, \$255, \$352, \$490, \$620, \$766, \$1,204, \$1,819, \$2,380, and \$2,819.
[4] Memphis, Tenn., was used as the price basing point for individual items.

Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Flow of Materials. In the hydraulic mills, the rolled meats are conveyed from the mechanical pretreatment department to a cooker in the oil-extraction department where they are heated and dried for approximately 90 minutes. After cooking, a cake former shapes the meats into flat, rectangular cakes which are wrapped with heavy hair, wool, or nylon cloths over both flat sides and 2 of the 4 edges. The cakes are then placed in hydraulic presses which squeeze out the oil, leaving hard cakes from which the cloths are stripped by a stripper. The soft, oily ends of the cake may then be cut off in a trimmer or the cakes may go directly to the cake department for further processing. If the cakes are trimmed, the trimmed material is returned to the cooker for reprocessing to increase the overall recovery of oil. Trimmed or untrimmed hard cake may be stored as such or broken into small pieces in a cake breaker, which enables the cake to be conveyed by screw conveyors to storage bins, and later to grinding mills. Both cake formers and presses are operated by mechanisms with hydraulic pumps and accumulators supplying oil under pressure.

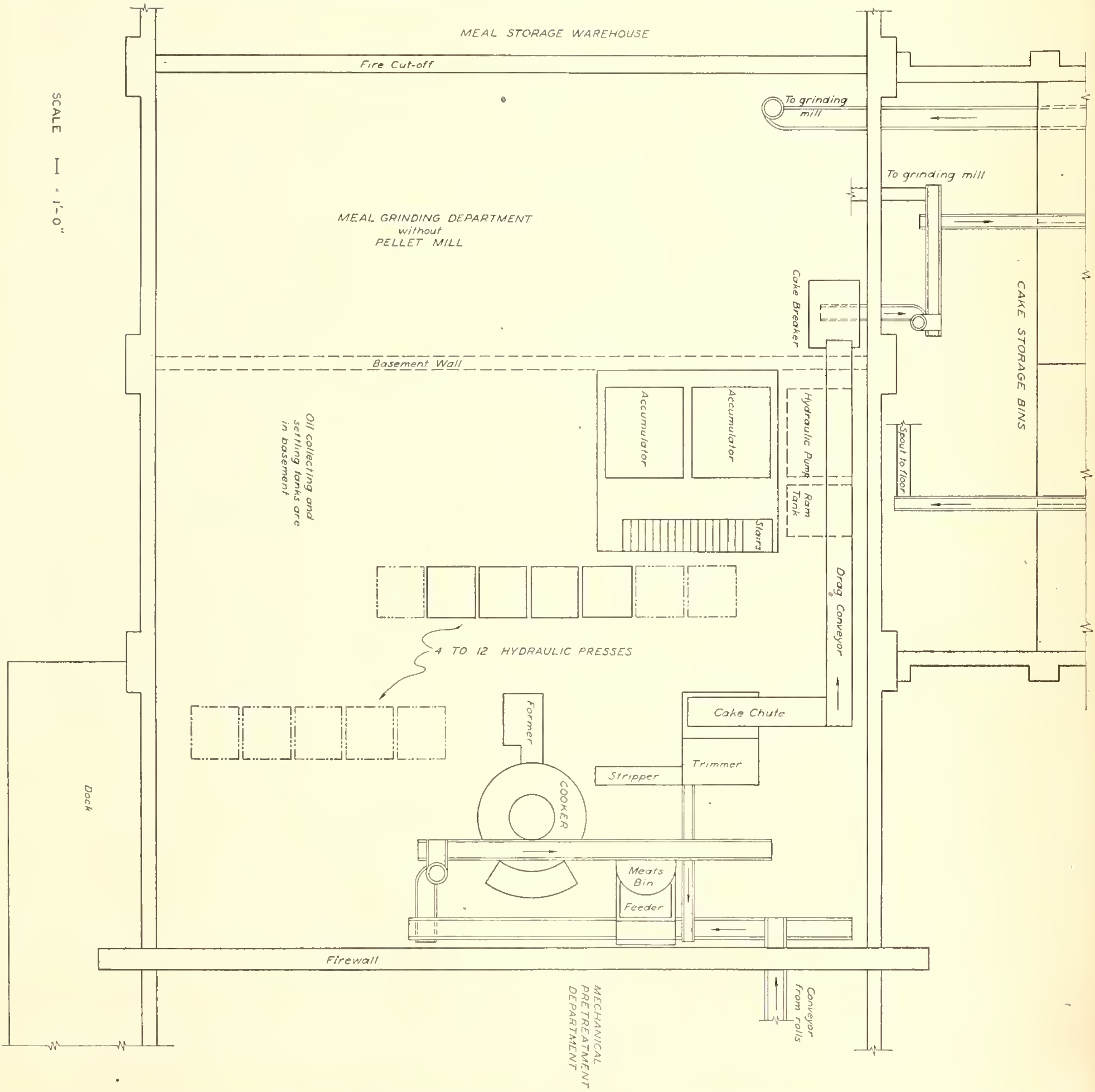


Figure 37.—Oil extraction department of a hydraulic cottonseed oil mill designed to process from 40 to 100 tons of seed per day. Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

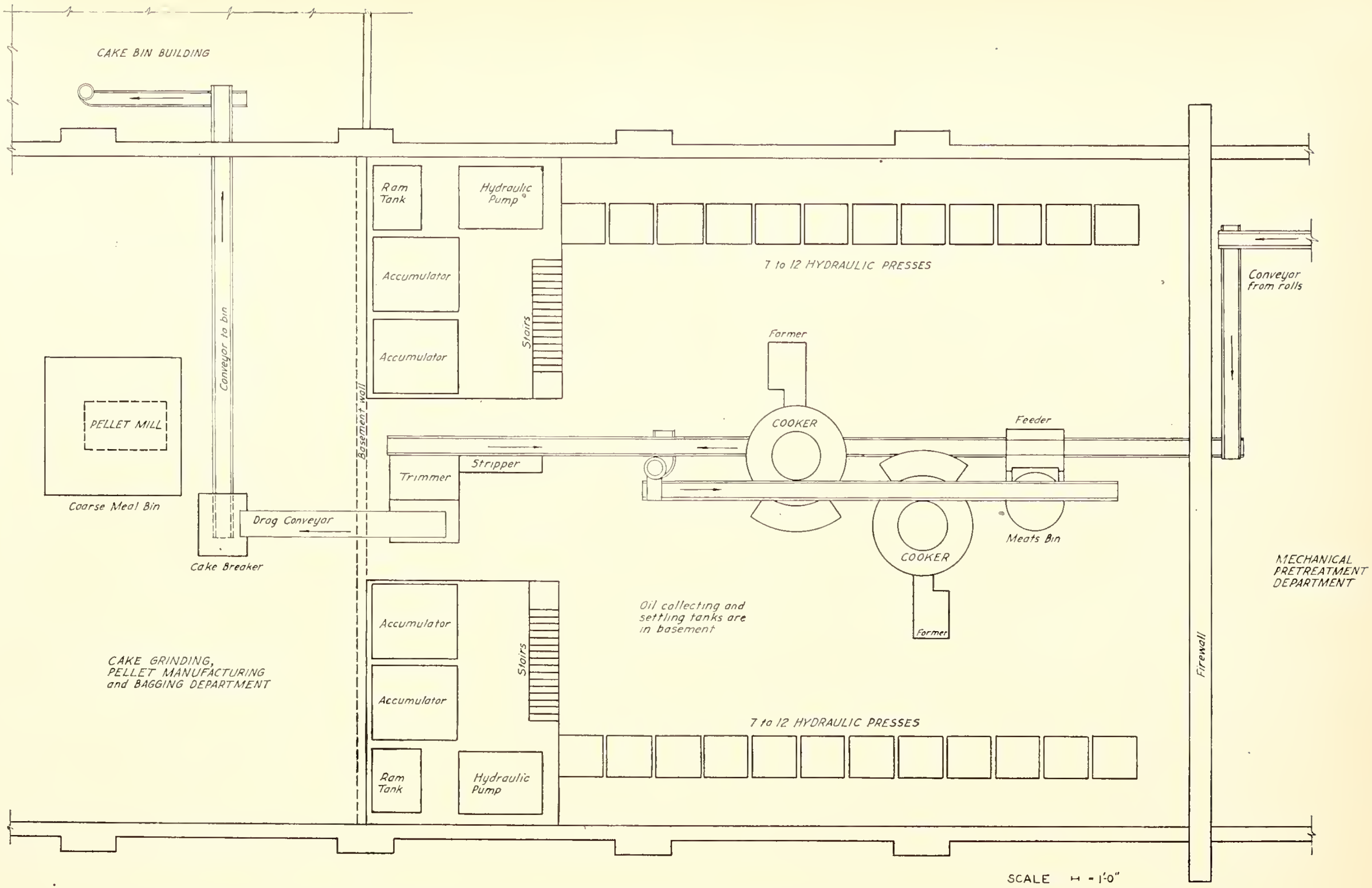
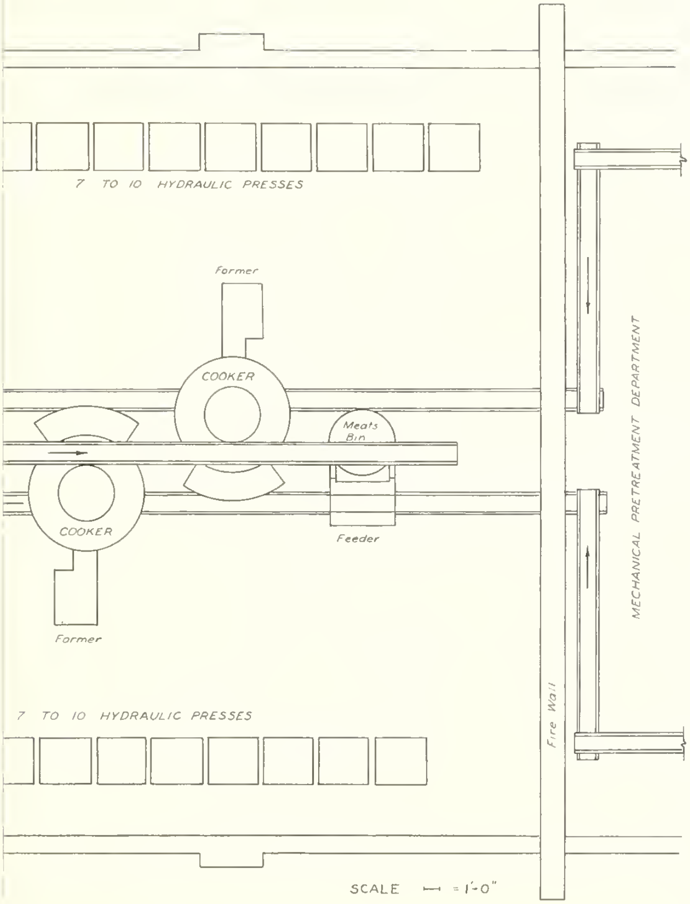


Figure 38.—Oil-extraction department of a hydraulic cottonseed oil mill designed to process from 140 to 240 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).



seed per day

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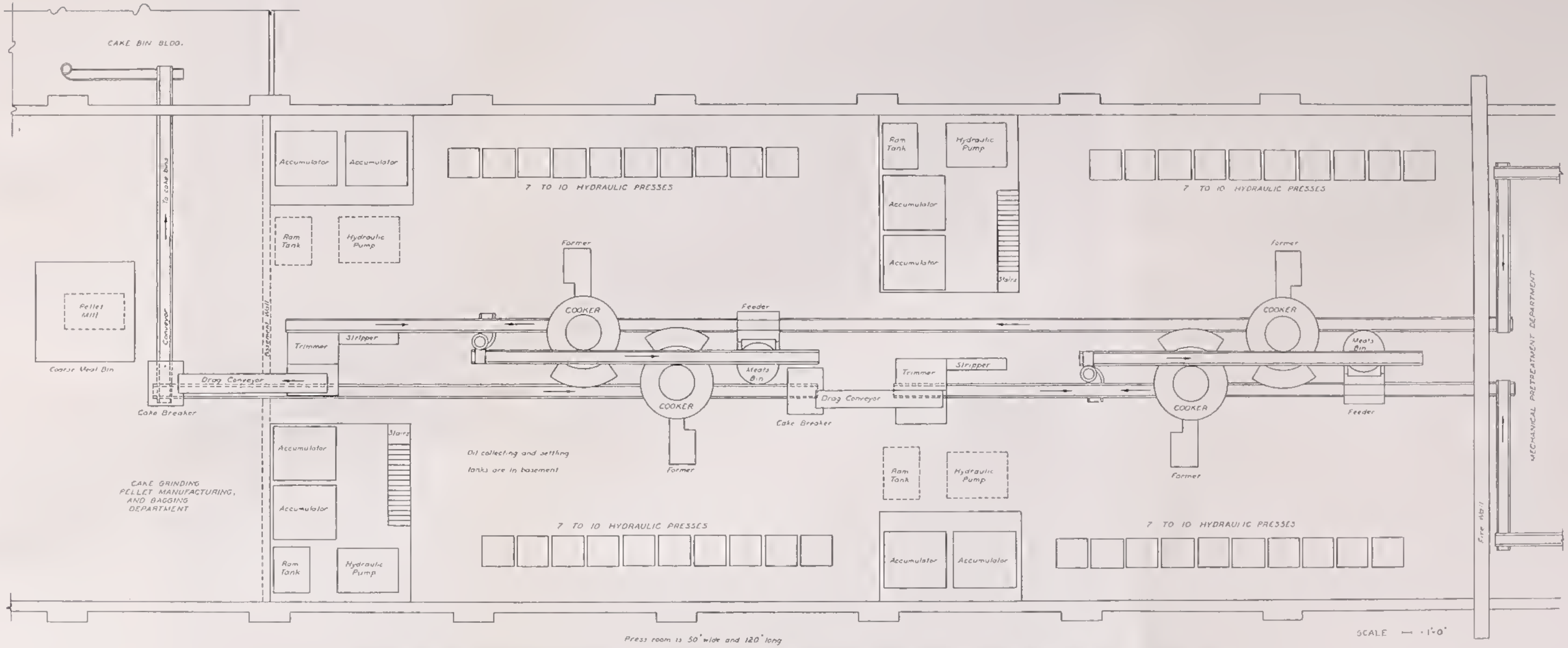

FIGURE 39.—Oil extraction department of a hydraulic cottonseed oil mill designed to process from 280 to 400 tons of seed per day

Principles of Design. The general layout of all hydraulic press-room equipment units was controlled by the number of cookers used. A single cooker unit accommodated from 4 to 12 presses. Where only 4 presses were used, they were located in a row to the left of the cake former, as indicated in figure 37. As additional presses were added, they were placed in a row directly in front of the cooker.

Where two cookers were used, they were placed in a line, as indicated in figure 38 and the presses were placed in a double line, one on each side of the row of cookers. The four-cooker press room was designed by extending the single line of cookers, with the double line of presses on each side, as shown in figure 39.

Investment Requirements. The principal items of equipment in a hydraulic press room are the cookers and the presses. The cooker is essentially the same as the conditioner, described in connection with the mechanical pretreatment department.

The hydraulic press is a machine with about 15 boxes or spaces to hold wrapped cakes of cooked meats, arranged in a vertical stack. The bottom of one box is the top of the box underneath it. The bottoms of the boxes move up when oil from the hydraulic system is admitted to the hydraulic ram of the press. Thus, the stack of 15 cakes is pressed together and the oil runs out of the cakes.

Because hydraulic oil-extraction equipment did not lend itself to grouping into small items as in the mechanical pretreatment department, cost units were developed for (1) 9 complete press rooms, based on different numbers and sizes of cookers, and (2) 1 "additional press," as shown in table 19. The press room units included all of the machinery required to serve the different numbers of cookers and the minimum even number of hydraulic presses which would be necessary to provide a uniform increase in capacity without increasing the size of the press room. For example, 16 presses operating at 14 tons per press are the maximum even number that can be served by two 4-high, 85-inch cookers. Consequently, 18 presses would require the next larger press room having two 5-high, 85-inch cookers.

The press room required even bays in the building because the basement costs were made up to fit complete bays. However, as inspection of figures 37, 38, and 39 shows, the equipment arranged itself to fill complete bays satisfactorily. No building space was assigned to hydraulic presses because the building requirements of the various press rooms were determined by the numbers of cookers and the necessity of using complete building bays, rather than by the number of presses.

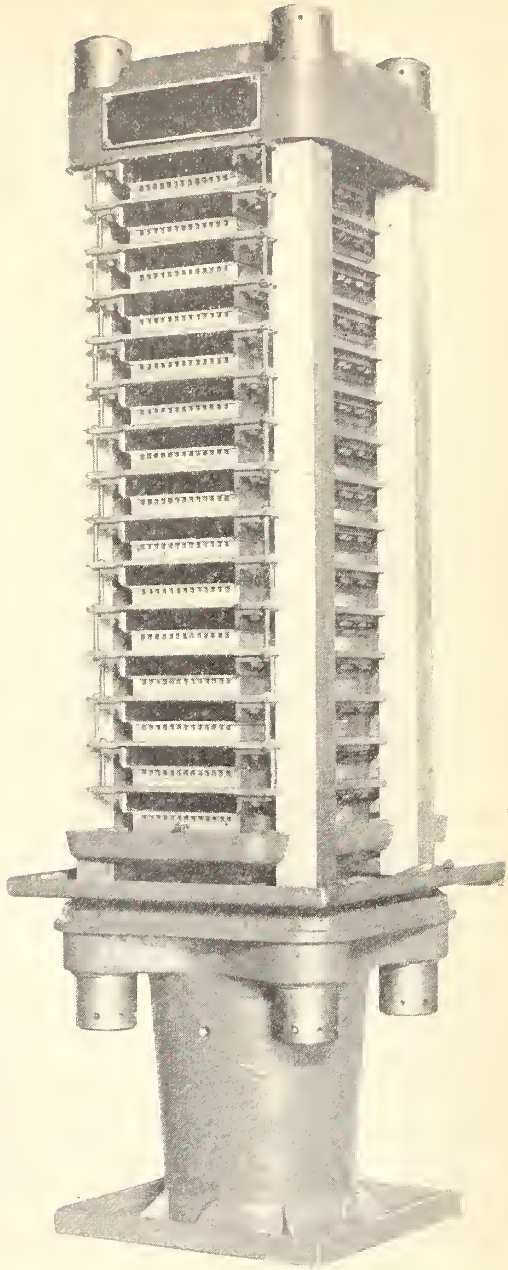

Figure 40.—15-box hydraulic press.

As shown in table 20, the investment requirement of the oil-extraction department of any hydraulic mill may be derived from appropriate combinations of the press room units and "one additional press," shown in table 19. For example, the investment requirement of the extraction department of a 16-press mill (table 20) is the cost of a 14-press unit plus the cost of 2 additional presses as shown in table 19.

Table 19.—*Description and costs of specified cooker-press combinations and building requirements for oil-extraction departments of hydraulic cottonseed oil mills, 1949–50*

Combination of cooker and corresponding minimum even number of presses	Cooker: Ring	Cooker: Diameter	Cooker-press combination: Approximate weight	Operating rates in seed crushed per 24 hours: Minimum	Normal	Maximum	Cost: Delivered [1]	Installation	Total
	No.	*Inches*	*Pounds*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*
1 cooker—4 presses	4	56	174, 333	33	44	55	59, 471	13, 807	73, 278
1 cooker—6 presses	4	85	239, 977	69	92	115	77, 485	17, 771	95, 256
1 cooker—10 presses	5	85	342, 932	86	114	143	100, 514	22, 985	123, 499
1 cooker—12 presses	6	85	404, 167	106	141	176	113, 708	25, 974	139, 682
2 cookers—14 presses	4	85	505, 574	138	184	230	155, 502	34, 815	190, 317
2 cookers—18 presses	5	85	617, 460	172	228	286	180, 856	41, 163	222, 019
2 cookers—22 presses	6	85	740, 251	212	282	352	207, 198	47, 133	254, 331
4 cookers—26 presses	4	85	969, 705	276	368	460	300, 703	67, 215	367, 918
4 cookers—34 presses	5	85	1, 193, 477	344	456	572	351, 410	79, 912	431, 322
1 additional press (15 box)			23, 374	8	10	14	5, 165	1, 173	6, 338

Combination of cooker and corresponding minimum even number of presses	Building: Length	Width	Area	Cost: Delivered	Construction	Total	Total cost [1]
	Feet	*Feet*	*Sq. ft.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1 cooker—4 presses	40	50	2, 000	11, 132	7, 409	18, 541	91, 819
1 cooker—6 presses	40	50	2, 000	11, 146	7, 409	18, 555	113, 811
1 cooker—10 presses	40	50	2, 000	11, 172	7, 411	18, 583	142, 082
1 cooker—12 presses	40	50	2, 000	10, 738	7, 358	18, 096	157, 778
2 cookers—14 presses	60	50	3, 000	14, 855	9, 833	24, 688	215, 005
2 cookers—18 presses	60	50	3, 000	14, 877	9, 834	24, 711	246, 730
2 cookers—22 presses	60	50	3, 000	14, 947	9, 838	24, 785	279, 116
4 cookers—26 presses	120	50	6, 000	27, 933	17, 327	45, 260	413, 178
4 cookers—34 presses	120	50	6, 000	28, 057	17, 333	45, 390	476, 712
1 additional press (15 box)							6, 338

[1] Memphis, Tenn. This location was used as the price basing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 20.—*Investment requirements for oil-extraction departments of different sizes of hydraulic cottonseed oil mills at specified locations, 1949–50*

Size of mill (number of presses)	Cooker press combination [1]	Additional presses to cooker press combination [1]	Building section	Automatic sprinklers	Total cost at—				
					Memphis, Tenn.[2]	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
4	73, 278		18, 541	1, 730	93, 549	93, 441	94, 715	97, 621	97, 621
6	95, 256		18, 555	1, 730	115, 541	115, 383	117, 189	121, 306	121, 306
8	95, 256	12, 676	18, 569	1, 730	128, 231	128, 035	130, 230	135, 234	135, 234
10	123, 499		18, 583	1, 730	143, 812	143, 573	146, 234	152, 295	152, 295
12	139, 682		18, 096	1, 730	159, 508	159, 220	162, 388	169, 603	169, 603
14	190, 317		24, 688	2, 437	217, 442	217, 085	221, 020	229, 992	229, 992
16	190, 317	12, 676	24, 688	2, 437	230, 118	229, 723	234, 048	243, 906	243, 906
18	222, 019		24, 711	2, 437	249, 167	248, 722	253, 588	264, 675	264, 675
20	222, 019	12, 676	24, 734	2, 437	261, 866	261, 382	266, 638	278, 612	278, 612
22	254, 331		24, 785	2, 437	281, 553	281, 012	286, 893	300, 287	300, 287
24	254, 331	12, 676	25, 321	2, 437	294, 765	294, 185	300, 456	314, 737	314, 737
28	367, 918	12, 676	45, 260	4, 518	430, 372	429, 657	437, 528	455, 471	455, 471
30	367, 918	25, 352	45, 260	4, 518	443, 048	442, 295	450, 556	469, 365	469, 365
32	367, 918	38, 028	45, 303	4, 518	455, 767	454, 977	463, 627	483, 342	483, 342
36	431, 322	12, 676	45, 390	4, 518	493, 906	493, 015	502, 748	524, 923	524, 923
40	431, 322	38, 028	45, 474	4, 518	519, 342	518, 375	528, 887	552, 835	552, 835

[1] From table 19.
[2] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

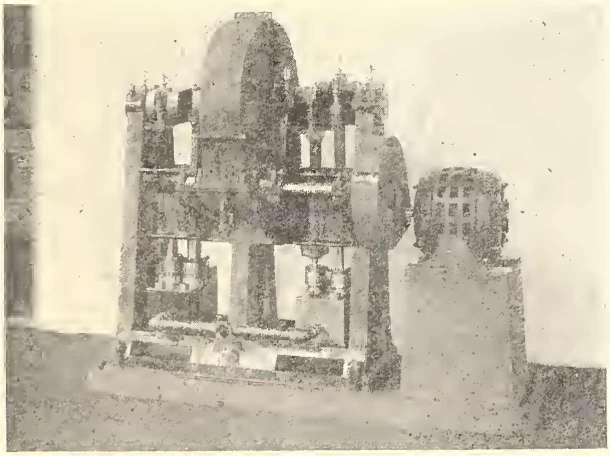

Figure 41.—High- and low-pressure hydraulic pump.

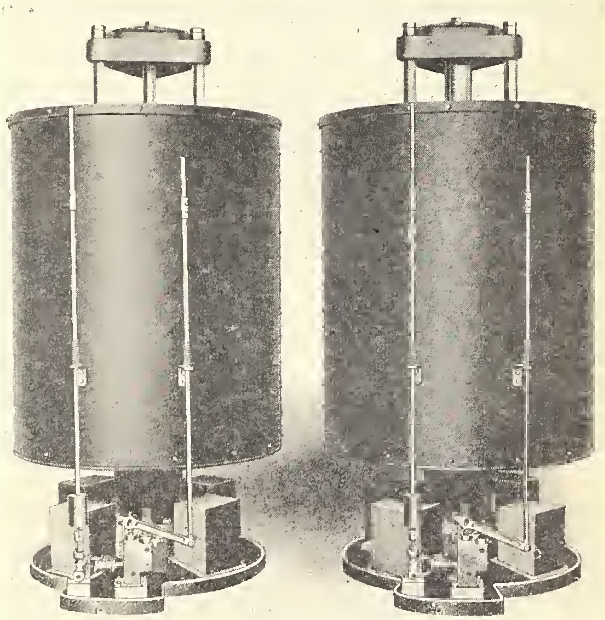

Figure 42.—Accumulators for hydraulic pressure system

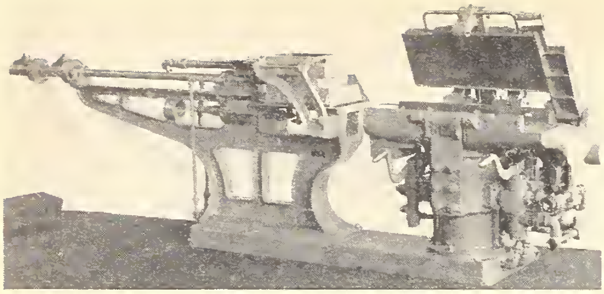

FIGURE 43.—Hydraulic cake former.

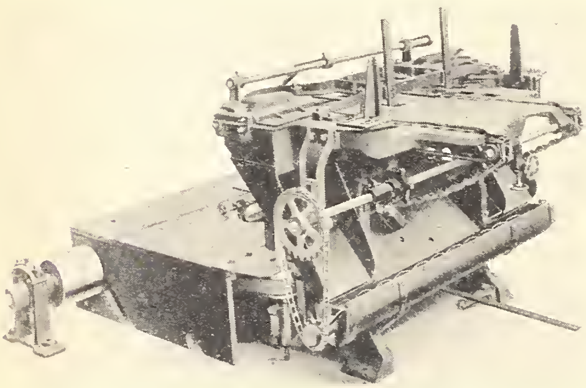

FIGURE 44.—Trimmer for hydraulic-pressed cake.

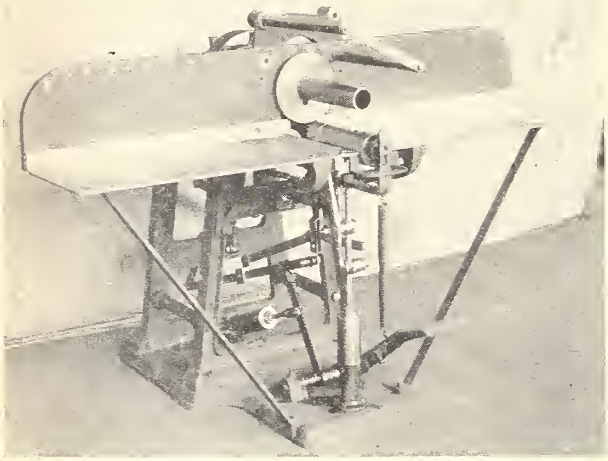

FIGURE 45.—Stripper for removing cloths from hydraulic-pressed cakes.

Prepress-Solvent Mills

As previously stated, the oil-extraction department of prepress-solvent mills includes a prepress section, housed in the mill building, and a solvent extraction section located outside this building (fig. 48). For this reason, substantially the same subtopics may be used for describing prepress-solvent extraction departments as for screw-press mills.

FLOW OF MATERIALS. The flow of materials in the prepress-solvent process is illustrated in figure

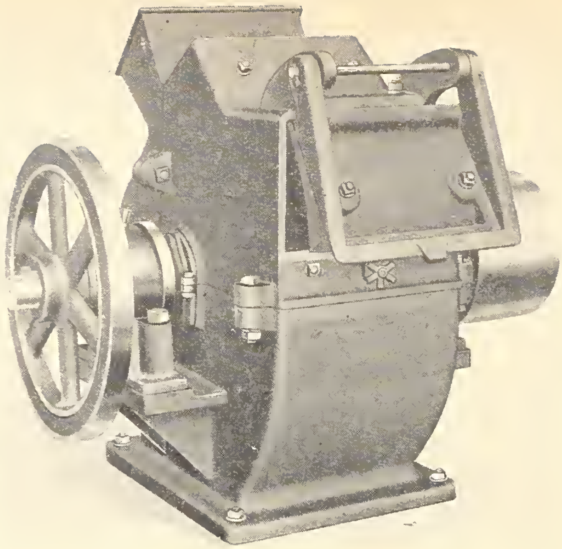

FIGURE 46.—Cake breaker.

47. The rolled meats from the mechanical pretreatment department are first cooked and pressed in nearly the same manner as in the screw-press process, except that the degree of pressing is less, and about 10 percent instead of 4 percent residual oil is left in the cake.

The cake from the prepresses is broken into small pieces which are adjusted in moisture and temperature, and are rolled into flakes by flaking rolls. From the cake conveyor, which runs in front of the prepresses, the cake is elevated into a breaker. From the breaker the cake drops into a series of screw conveyors. Water is sprayed onto the cake in the conveyors to cool it and

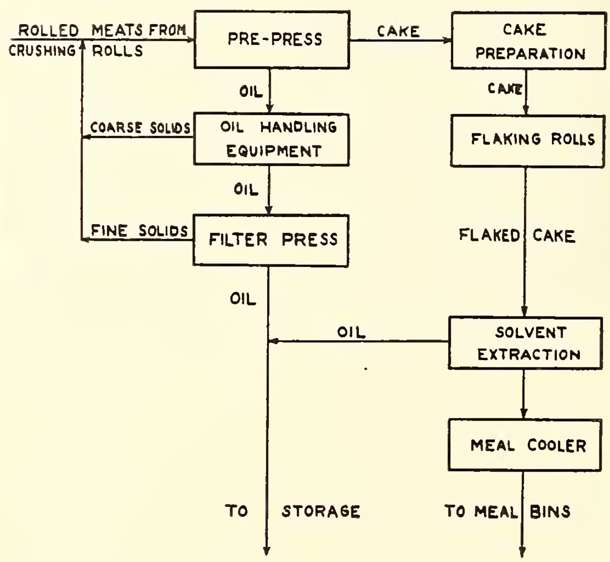

FIGURE 47.—Flowsheet of oil-extraction department of prepress-solvent cottonseed oil mills.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

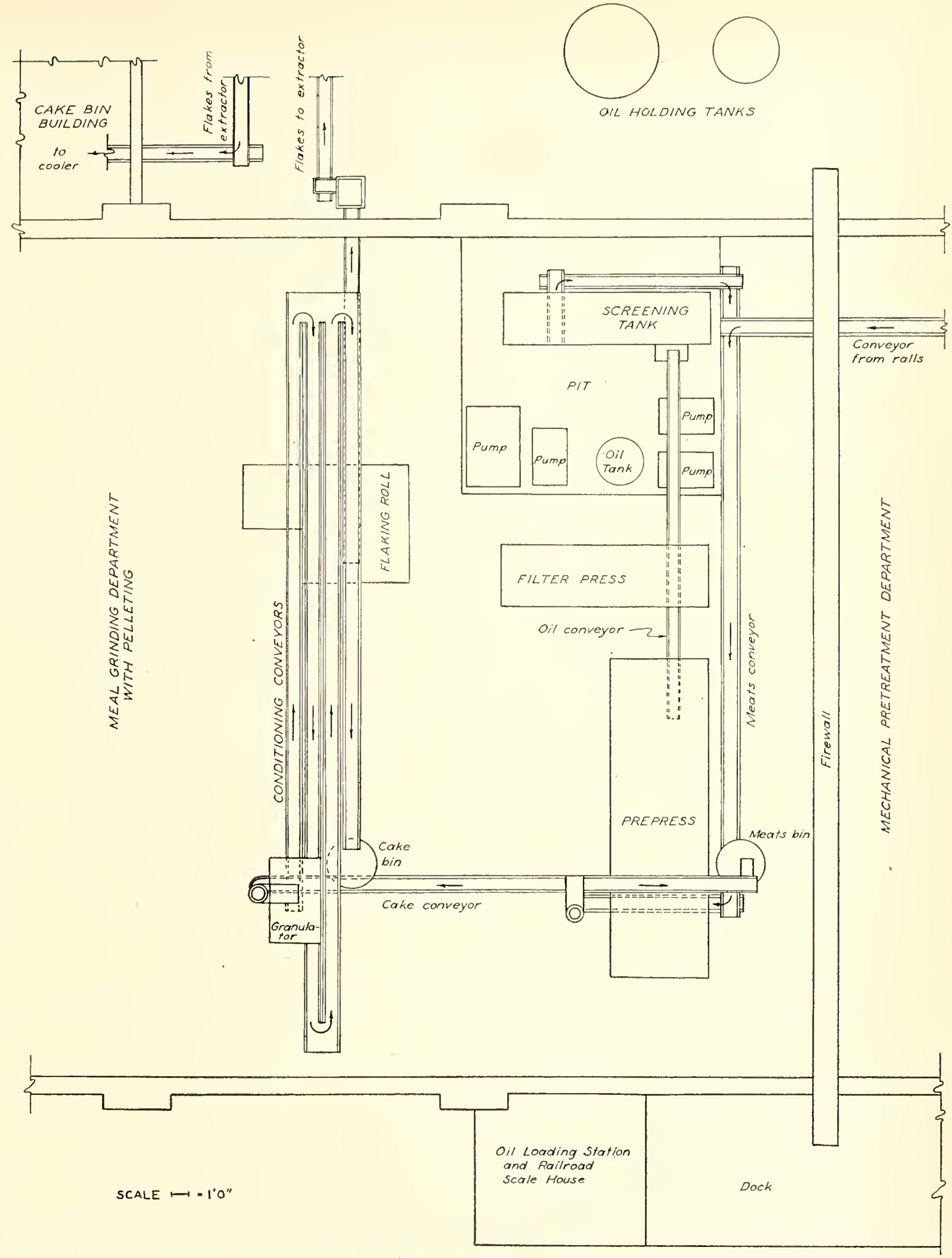

FIGURE 48.—Prepress phase of oil-extraction department of a prepress-solvent cottonseed oil mill designed to process 80 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

increase its moisture content. Air is pulled through the conveyors by a fan to aid in cooling the cake and to remove the vapor formed from the water that is added to the hot cake. The screw conveyor operates merely as a device to mix the cake with the water and to turn it while it is being cooled and penetrated by the water. This operation could be performed in a number of other ways with different types of equipment. From the conditioning conveyors the cake passes into the flaking rolls. The flakes are then conveyed to the solvent extractor, where most of the remaining oil is dissolved from the flakes by solvent. The solids and oil both are then desolventized by vaporizing the solvent with steam heat. The heat drives the vapor into water-cooled condensers where the solvent is condensed and recovered.

Principles of Design. Increasing the size of prepress-solvent mills resulted in only one important change in the design of the prepress room. In case of mills having from 1 to 3 prepresses, meats were received through only 1 conveyor from a single layout of linters in the mechanical pretreatment department. Under this circumstance, the pattern of machine layouts in the prepress room is as indicated in figure 48. For all larger mills, meats were received through two conveyors from a double layout of linters, and the corresponding changes in machine layouts in the prepress room are shown in figure 49.

Equipment Units. Except for cake-preparation units and flaking rolls, most of the prepress equipment of the prepress-solvent department is similar to that for the screw-press mills.

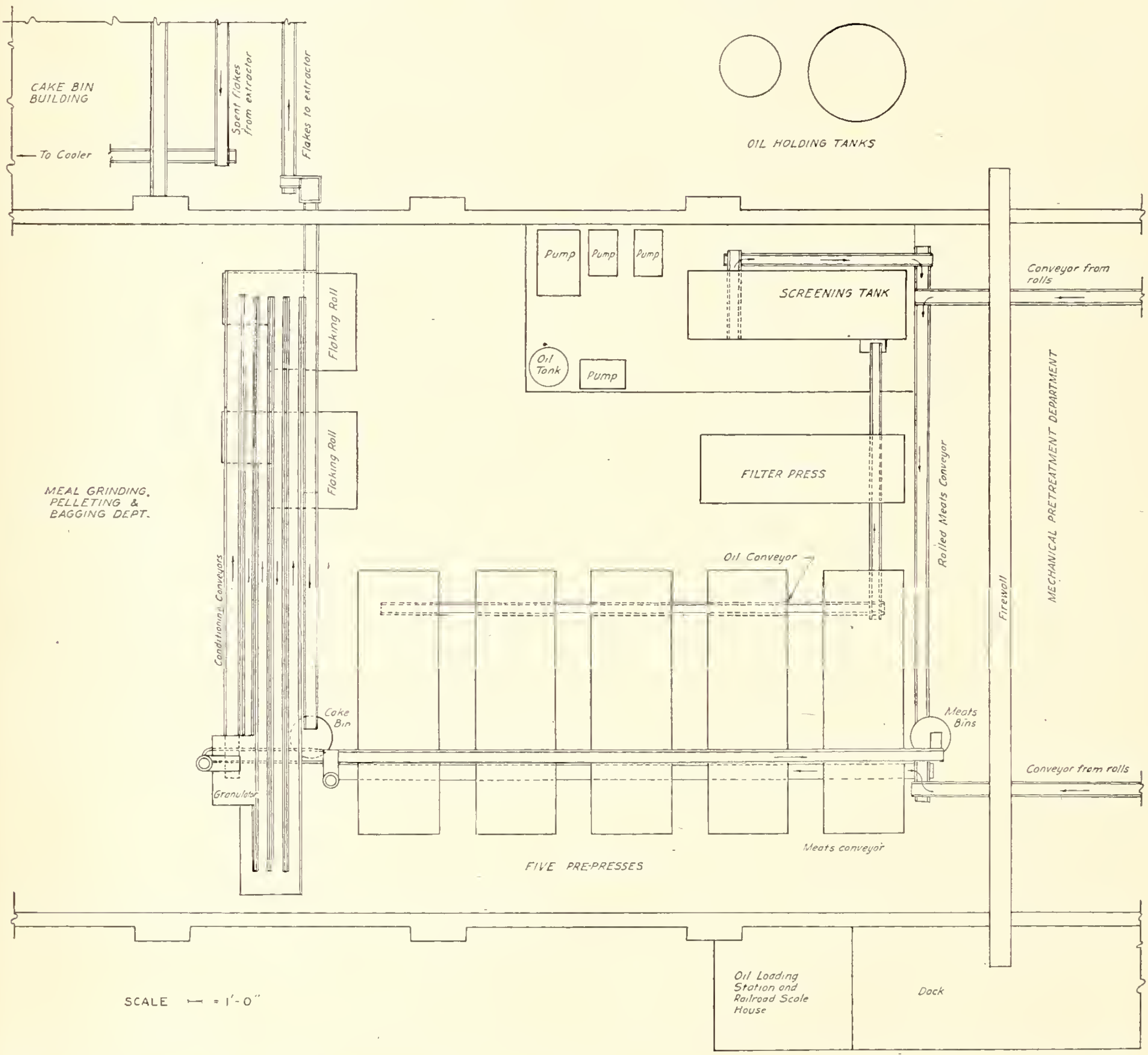

Figure 49.—Prepress phase of oil-extraction department of a prepress-solvent cottonseed oil mill designed to process 400 tons of seed per day.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

The cake-preparation units include a cake elevator to the cake breaker, conditioning conveyors, motors and electrical accessories for all power-driven machinery, steel to support the conditioning conveyors over the flaking rolls, meats run-around bin, and miscellaneous items.

The flaking-roll units are the same as those appearing in table 9 and figure 49. The flaking rolls would have greater outputs, in terms of tons of whole seed processed per day, when flaking prepressed cake than when flaking whole meats. The output rates for operation on prepressed cake are shown in table 21. Equipment for the solvent-extractor unit, whether in direct or prepress-solvent plants, includes the following items:

(1) Solvent-extraction, oil- and meal-desolventizing, and accessory equipment.
(2) Insulation for equipment.
(3) Concrete foundations and paved area around the equipment.
(4) Electric power supply, motors, controls, and wiring.
(5) Lighting for the extraction area.
(6) Small building near the extraction department to house electric controls and instruments and to provide shelter for the operators.
(7) Conveyors supplying flakes to the extractor and returning extracted meal to the meal bins.
(8) Trestle supporting conveyors and piping between the preparation departments and the extraction departments.
(9) Cooling tower, pumps, and piping to cool and recirculate condenser water.
(10) Refrigeration system to supply chilled water to the condenser into which run the vent lines for solvent vapor.
(11) Meal coolers.
(12) Solvent storage tank or tanks, with solvent unloading pump and piping.
(13) Piping (except steam, condensate, and oil lines between the solvent-extraction department and the preparation departments, which are charged to the piping costs in table 53).
(14) Instruments and flame arrestors.
(15) Fence enclosing the extraction department and solvent-storage tanks.
(16) Railroad siding on which to spot solvent cars for unloading.

Investment Requirements. No summaries were made of the costs of individual items of a solvent-extraction unit, the reason being that manufacturers of solvent-extraction equipment usually quote prices for the department as a whole. Prices used in this report were received in this form. Without a breakdown of costs on the major items of machinery, a breakdown of the lesser items was not thought to be necessary. Costs of oil-extraction machinery, equipment, and building units for prepress-solvent mills are shown in table 21.

The prepress-extraction equipment is housed in a section of the mill building. The solvent extractor, however, is not housed in either the prepress- or direct-solvent plants. This type of plant appears well suited to the Cotton Belt and is commonly used.

Investment requirements of complete oil-extraction departments of prepress-solvent mills are shown in table 22.

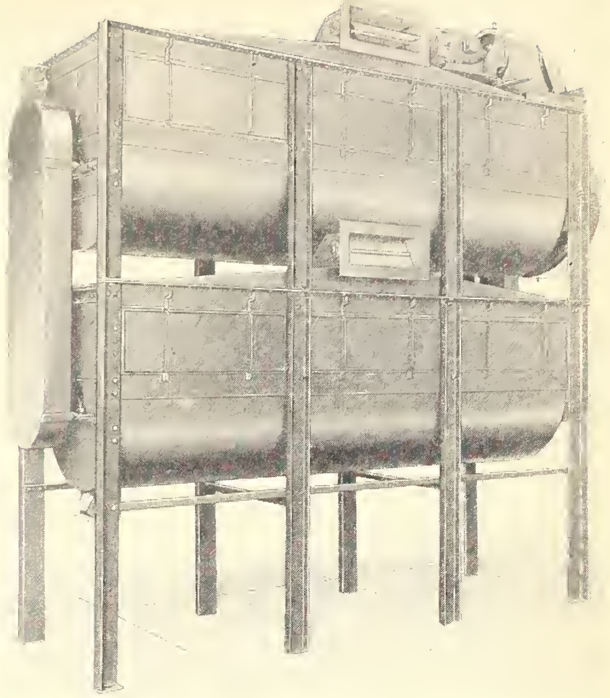

Figure 50.—Two-high meal cooler.

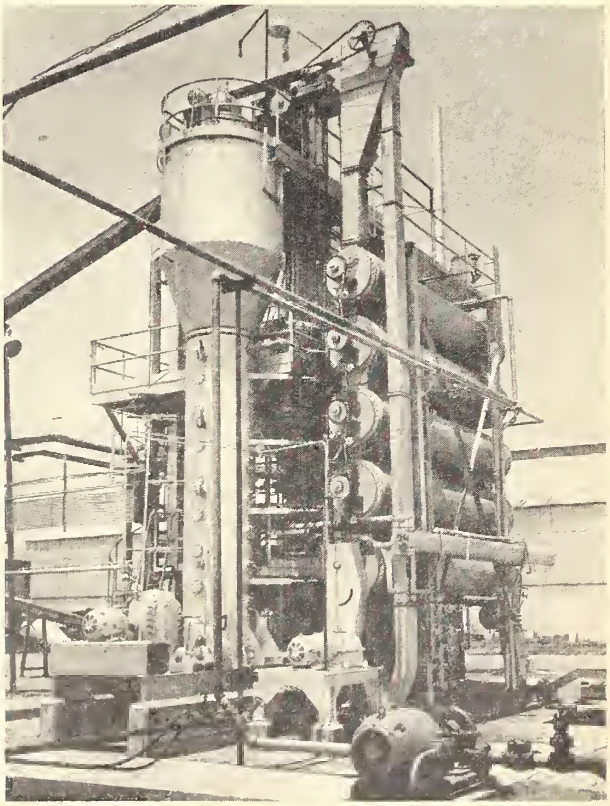

Figure 51.—One type of solvent extraction unit.

TABLE 21.—*Description and costs of machinery and equipment units and building requirements for oil-extraction departments of prepress-solvent cottonseed oil mills, 1949–50*

Item	Machinery and equipment							Building requirements			
	Physical description				Cost [1]			Physical description			Cost [2]
	Approx. shipping weight	Capacity (operating rates in seed crushed per 24 hours): Minimum	Normal	Maximum	Delivered	Installation	Total	Length	Width	Area	
	Pounds	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Feet*	*Feet*	*Sq. ft.*	*Dollars*
Prepress and auxiliary equipment	46,009	60	80	100	33,099	7,018	40,117				
Conveyor ends for prepress	6,166				4,065	1,225	5,290				
Filter press:											
24″	9,660				2,062	534	2,596				
36″	25,771				4,139	954	5,093				
42″	37,340				5,503	1,289	6,792				
Oil handling equipment for—											
1 to 2 prepresses	12,749				7,522	1,824	9,346				
3 and 5 prepresses	14,731				9,823	2,286	12,119				
Cake preparation equipment for—											
1 prepress	15,027			100	6,152	1,902	8,054				
2 prepresses	19,081			200	7,896	2,303	10,198				
3 and 5 prepresses	25,502			450	9,595	2,737	12,332				
Flaking roll:											
Small	15,196	85	110	140	9,503	1,916	11,419				
Large	20,601	135	180	225	13,582	2,690	16,272				
Auxiliary equipment for—											
1-prepress section	559				644	270	914				
2-prepress section	1,146				1,285	264	1,549				
3-prepress section	1,502				1,497	258	1,755				
5-prepress section	2,063				1,460	339	1,799				
Solvent extraction unit for—											
1 prepress	193,734	30	40	50	96,334	28,791	125,125				
1 prepress	227,781	60	80	100	133,218	36,896	170,114				
2 prepresses	282,907	120	160	200	160,371	42,967	203,338				
3 prepresses	382,552	180	240	300	217,277	55,753	273,030				
5 prepresses	497,508	270	400	450	278,163	69,877	348,040				
Building for prepress machine for—											
1 prepress								40	50	2,000	13,275
2 prepresses								40	50	2,000	12,771
3 prepresses								40	50	2,000	13,296
5 prepresses								60	50	3,000	17,437

[1] Memphis, Tenn., was used as the price basing point.
[2] Principal difference in cost of some sizes of buildings were owing to the number of fire hydrants included.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II)

TABLE 22.—*Investment requirements of oil-extraction departments of different sizes (TPD)* [1] *of prepress-solvent cottonseed oil mills, 1949–50*

Cost item	Cost of machinery unit [2]	Size of mill									
		Plant 1 (30 to 50 TPD)		Plant 2 (60 to 100 TPD)		Plant 3 (120 to 200 TPD)		Plant 4 (180 to 300 TPD)		Plant 5 (270 to 450 TPD)	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Prepress and auxiliary equipment	40, 117	1	40, 117	1	40, 117	2	80, 234	3	120, 351	5	200, 585
Conveyor ends for prepresses	5, 290	1	5, 290	1	5, 290	1	5, 290	1	5, 290	1	5, 290
Filter press:											
24 inch	2, 596	1	2, 596	1	2, 596						
36 inch	5, 093					1	5, 093	1	5, 093		
42 inch	6, 792									1	6, 792
Oil handling equipment for—											
1 to 2 prepresses	9, 346	1	9, 346	1	9, 346	1	9, 346				
3 and 5 prepresses	12, 119							1	12, 119	1	12, 119
Cake preparation equipment for—											
1 prepress	8, 054	1	8, 054	1	8, 054						
2 prepresses	10, 198					1	10, 198				
3 and 5 prepresses	12, 332							1	12, 332	1	12, 332
Flaking roll:											
Small	11, 419	1	11, 419	1	11, 419						
Large	16, 272					1	16, 272	2	32, 544	2	32, 544
Auxiliary equipment for—											
1-prepress section	914	1	914	1	914						
2-prepress section	1, 549					1	1, 549				
3-prepress section	1, 755							1	1, 755		
5-prepress section	1, 799									1	1, 799
Solvent extraction unit for—											
1 prepress (30 to 50 TPD)	125, 125	1	125, 125								
1 prepress (60 to 100 TPD)	170, 114			1	170, 114						
2 prepresses (120 to 200 TPD)	203, 338					1	203, 338				
3 prepresses (180 to 300 TPD)	273, 030							1	273, 030		
5 prepresses (270 to 450 TPD)	348, 040									1	348, 040
Cost of machinery and equipment (total)			202, 861		247, 850		331, 320		462, 514		619, 501
Delivered			159, 381		196, 265		265, 057		372, 867		501, 278
Installation			43, 480		51, 585		66, 263		89, 647		118, 223
Cost of building for prepress machinery			13, 275		13, 275		12, 771		13, 296		17, 437
Automatic sprinkler system			1, 102		1, 102		1, 102		1, 102		1, 486
Deluge sprinkler system			23, 702		30, 666		31, 528		34, 392		35, 289
Total cost of building, machinery, and equipment at—											
Memphis, Tenn.[3]			240, 940		292, 893		376, 721		511, 304		673, 713
Atlanta, Ga			241, 101		293, 082		377, 049		511, 757		674, 212
Dallas, Tex			242, 337		294, 542		379, 222		514, 847		678, 257
Phoenix, Ariz			244, 930		297, 573		383, 890		521, 608		687, 339
Bakersfield, Calif			245, 931		298, 491		384, 272		522, 308		689, 554

[1] Tons per day.
[2] From table 21.
[3] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differences in delivered cost of machinery.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Direct-Solvent Mills

In direct-solvent mills, the meats after being separated from the hulls are conveyed directly to the solvent extractor from the mechanical pretreatment department and rolled into flakes. As meats are separated into oil and meal. the desolventized meal is returned to the meal-grinding section of the mill building for further processing. Investment requirements are shown in table 23.

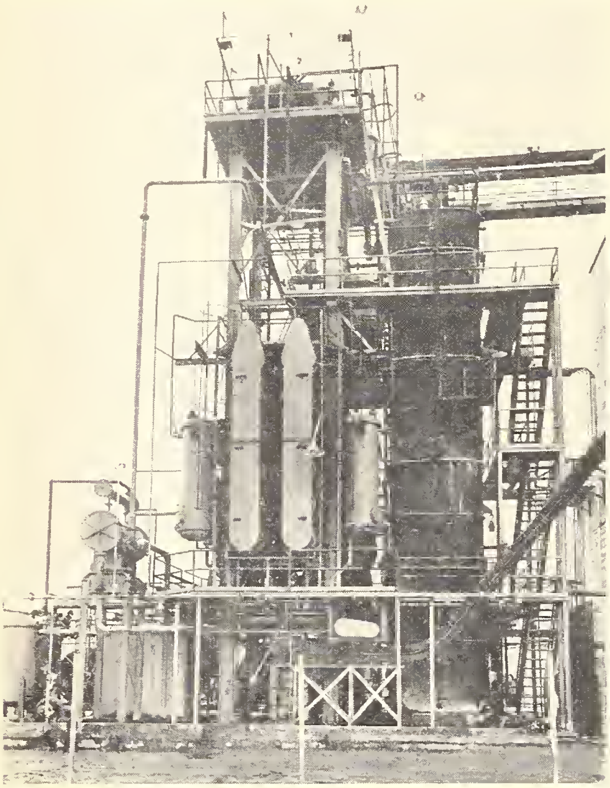

FIGURE 52.—Another type of solvent-extraction plant.

CRACKED CAKE OR MEAL BINS

The cake or meal bins were designed to receive cracked cake from either the hydraulic or screw-press processes, or extracted meal from solvent processes, and store it until it was further processed or shipped. Provision was made to cool cake in the bins by blowing air through it. It was assumed that solvent-extracted meal would be cooled before it reached the bins.

Cake bins were designed in multiples of four and were housed in buildings as shown in table 24. Each bin building was a steel frame, having a pitched roof—a structure similar to the warehouses but with a much higher truss line. Also, it was designed to adjoin the side or end of the mill building at any appropriate place.

The first building includes a group of 4 bins, the second a group of 8 bins, the third a group of 12, and the fourth a group of 16 bins. All these buildings were designed on the assumption that bins would never be combined into a total of more than 16.

The bins were constructed of steel and were square-shaped, with hopper bottoms discharging through feeders into conveyors. Four bins filled one bay of the building. As bins are added in multiples of four, proportionately less machinery and equipment are required per bin. Therefore, the investment cost per ton of bin capacity falls substantially as the size of the buildings for handling cake increases (table 24).

As illustrated in figures 3 through 7, the meal-bin building is located adjacent to the meal-grinding department. Figure 53 shows the layout of a 16-bin building. By envisioning this building reduced a bay at a time, beginning from the north end, the same figure also illustrates the principles of design employed in each of the three smaller bin buildings, except that no cake cooler is required for hydraulic or screw-press mills.

TABLE 23.—*Investment requirements for solvent-extraction departments of different sizes of direct-solvent cottonseed oil mills at specified locations, 1949–50*

Size of mill [1]	Approximate weight of equipment	Extraction unit			Deluxe sprinkler system	Total cost at—				
		Delivered [2]	Installation	Total		Memphis, Tenn.[3]	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
	Pounds	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 1 (40 to 65 TPD	267, 807	151, 914	40, 838	192, 752	30, 666	223, 418	223, 277	224, 738	227, 668	228, 085
Plant 2 (75 to 125 TPD)	332, 027	209, 881	54, 055	263, 936	31, 528	295, 464	295, 288	297, 153	301, 113	300, 789
Plant 3 (150 to 250 TPD)	454, 238	269, 853	67, 765	337, 618	34, 392	372, 010	371, 769	374, 357	379, 959	380, 167
Plant 4 (225 to 375 TPD)	589, 423	321, 835	79, 626	401, 461	35, 289	436, 750	436, 417	439, 781	447, 043	447, 998
Plant 5 (300 to 500 TPD)	635, 702	360, 570	89, 124	449, 694	40, 711	490, 405	490, 069	493, 620	501, 363	500, 635

[1] TPD means tons per day.
[2] Memphis, Tenn.
[3] Memphis, Tenn., was used as the price basing point for individual items. Differences from the Memphis totals at the other price basing points were owing to differenees in delivered cost of machinery.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

(No cake bins of any sort would be required if only slab cake were produced, since such cake is either loaded directly from the extraction department for shipment or placed directly in the meal-storage department. This situation, however, can occur only for hydraulic mills, as no other type of mill produces slab cake.)

In selecting the proper size of cake building for a particular mill, it was assumed that any well-balanced mill would have storage capacity for cracked cake equivalent to 2½ days of its total meal production. For example, on this basis, a 20-press hydraulic mill operating at 10 tons per press per 24 hours would have enough cracked-

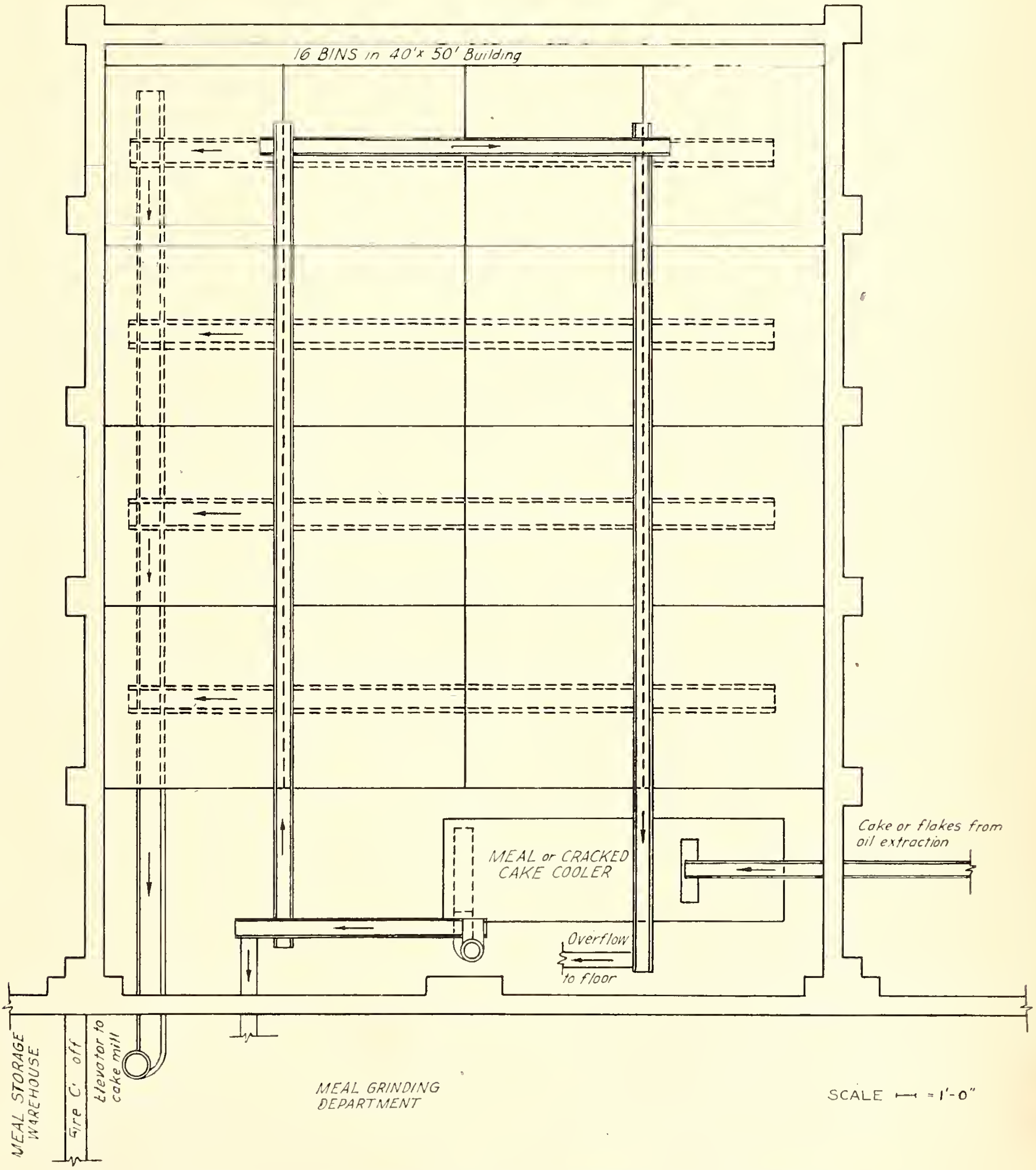

Figure 53.—Bulk storage bins and cooler for cottonseed meal or cracked cake.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 24.—*Description and costs of cracked cake or meal bin units for cottonseed oil mills at specified locations, 1949–50*

Unit	Symbol	Approximate weight of bin and machinery	Storage capacity		Cost		Building		Automatic sprinkler, cost	Total cost at [4]—				
			Cracked cake	Meal	Bin [1]	Machinery [2]	Gross area	Cost [3]		Memphis, Tenn.	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
	Code	*Pounds*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Sq. ft.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
4 bin	Ca	65, 140	122	107	5, 735	12, 825	800	3, 828	908	23, 296	23, 361	23, 326	23, 530	23, 596
8 bin	Cb	99, 081	244	214	10, 258	16, 689	1, 200	5, 262	1, 299	33, 508	33, 604	33, 568	33, 886	34, 002
12 bin	Cc	133, 022	366	321	14, 781	20, 553	1, 600	6, 696	1, 702	43, 732	43, 859	43, 822	44, 254	44, 420
16 bin	Cd	166, 963	488	428	19, 304	24, 417	2, 000	8, 130	2, 029	53, 880	54, 038	54, 000	54, 546	54, 762

[1] Installation cost approximately 35 percent of total cost.
[2] Installation cost approximately 20 percent of total cost.
[3] Installation cost approximately 30 percent of total cost.
[4] Memphis column represents total of costs in preceding columns. Differences among total columns were owing to differences in delivered cost of machinery at the 5 points.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

cake storage to handle at least 214 tons of cake (assuming a cake outturn of 853 pounds per ton of seed processed).

This assumption was used in all cases, except that no mill was provided with bin storage for cracked cake of more than 488 tons of cake. This amount of cracked cake is equivalent to the capacity of the largest building as shown in table 24. The investment requirements for different sizes of mills are shown in table 25.

TABLE 25.—*Investment requirements for meal or cracked cake bin units for cottonseed oil mills in mill areas I through VI, by size of mill, 1949–50*

[Based on table 24]

Size of mill (seed crushed per day at normal operating rate)	Maximum storage capacity required [1]		Symbol	Cost					
	Cracked cake	Meal		Area I [2]	Area II [3]	Area III [3 4]	Area IV [3]	Area V [5]	Area VI [6]
	Tons	*Tons*	*Code*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Up to 100 tons per day	122	107	Ca	23, 361	23, 296	23, 296	23, 296	23, 326	23, 596
110 to 200 tons per day	244	214	Cb	33, 604	33, 508	33, 508	33, 508	33, 568	34, 002
210 to 300 tons per day	366	321	Cc	43, 859	43, 732	43, 732	43, 732	43, 822	44, 420
310 to 400 tons per day	488	421	Cd	54, 038	53, 880	53, 880	53, 880	54, 000	54, 762

[1] Based on 2½ days' cracked cake or meal production.
[2] Atlanta, Ga., pricing point.
[3] Memphis, Tenn., pricing point.
[4] All hydraulic mills require first bin unit (Ca).
[5] Dallas, Tex., pricing point.
[6] Bakersfield, Calif., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

CAKE-PROCESSING DEPARTMENT

Equipment Units

All items of equipment in the cake-processing department were grouped into a meal-grinding (and bagging) unit, a pelleting unit, and a pneumatic cake-conveyor unit. These units were housed in the meal section of the mill building.

The pelleting unit included a meal bin, one large pellet mill, and pellet-cooling, -screening, and -bagging equipment. The pneumatic conveying unit was provided to convey cracked cake to or from a seedhouse in case it was wished to store large quantities of cake in mills operating for long seasons. It included one blower, pipe with yard supports, feeders, separators, and collectors at both ends of the pipe.

The cake-processing department did not include the same equipment units in all plants. Although some solvent operators do produce some pellets, the question is commonly raised as to whether or not it is economical to do so, since solvent-processed meal is difficult to pellet because of its low oil content. As the subject was controversial, no solvent mill (direct or prepress) considered in this report was provided with pelleting machines except in localities where it was definitely known that pellets were successfully produced. All hydraulic and screw-press mills were provided with such machines, except in localities where the 1949–50 survey on meal sales did not reflect the existence of an established pellet market.

No conveyor unit was included in any direct- or prepress-solvent mill, because such mills do not produce cracked cake. Nor was a conveyor unit included in any hydraulic or screw-press mill having an operating season of less than 6 months. These units were provided for longer seasons, as it was assumed to be desirable in such cases, to store large quantities of cake in seed houses in the latter part of the season when the houses were relatively empty and the meal market was slack.

Principle of Design

The principles of design used for any meal grinding and bagging department are illustrated in figures 55 and 56. Figure 55 illustrates a department in which no pellet mill was provided, whereas figure 56 illustrates the inclusion of this machine.

The meal department was housed in a section of the mill building between the oil-extraction department and the meal-storage department, in hydraulic, screw-press, and prepress-solvent mills; and adjacent to the mechanical pretreatment department in direct-solvent mills.

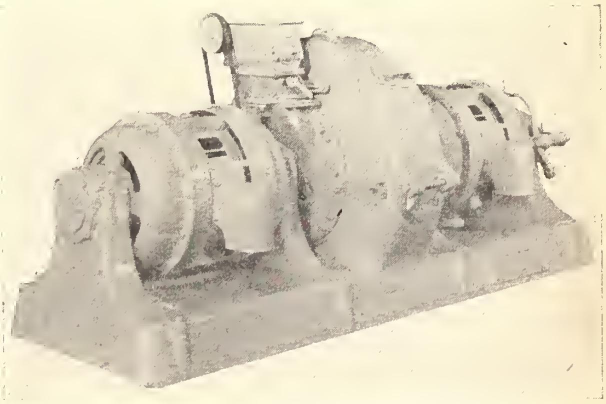

FIGURE 54.—Attrition mill for grinding cake.

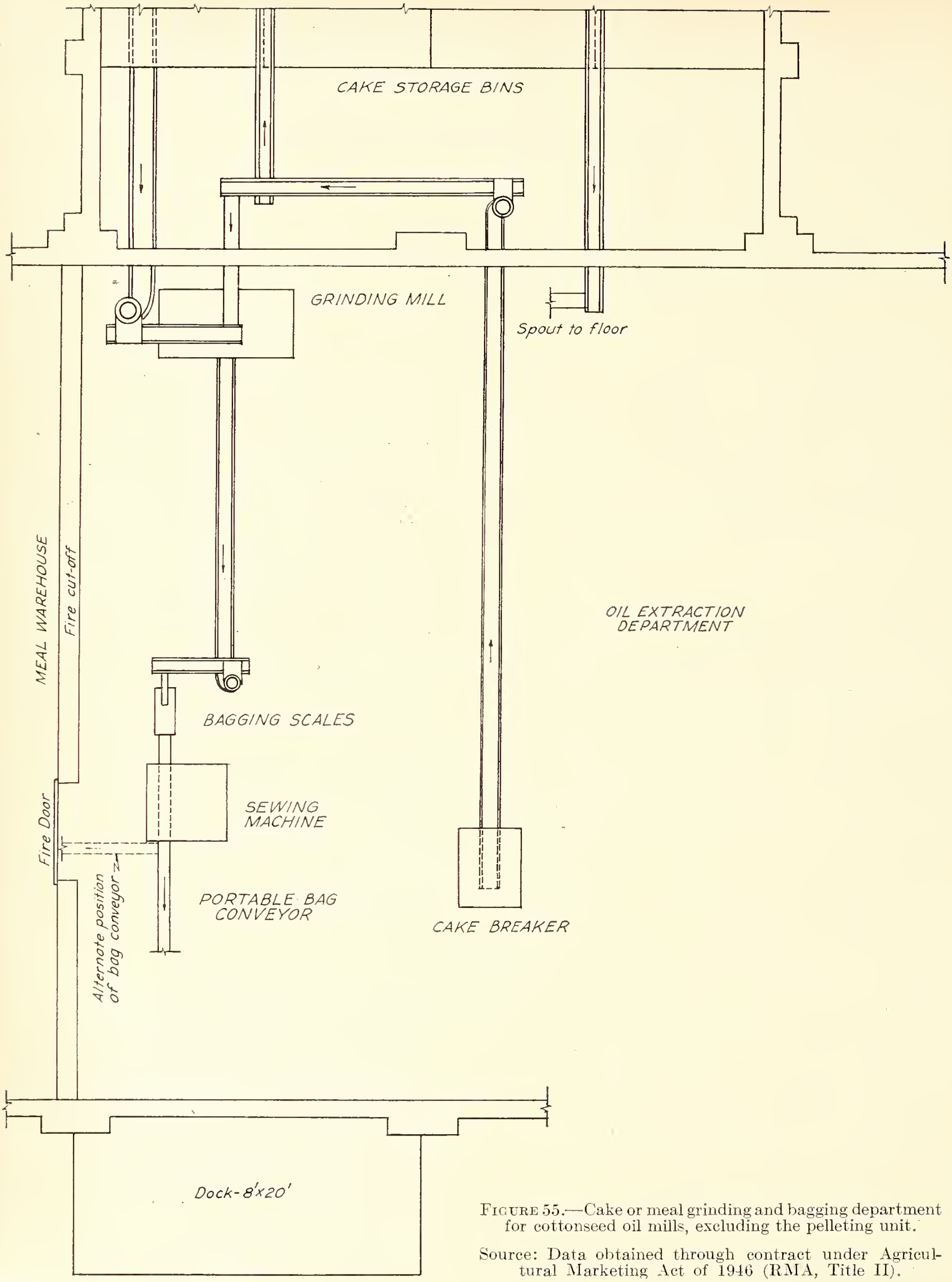

FIGURE 55.—Cake or meal grinding and bagging department for cottonseed oil mills, excluding the pelleting unit.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

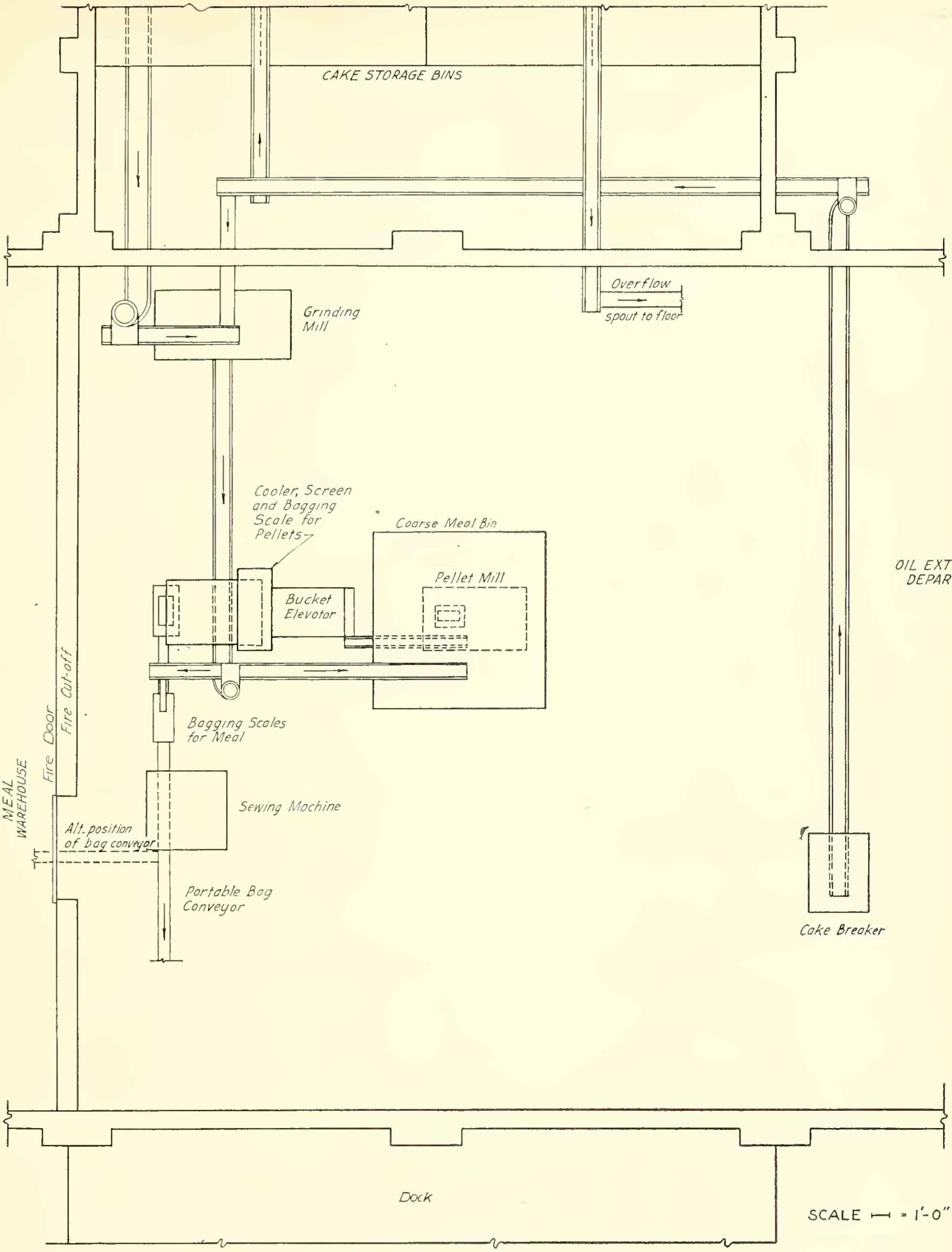

FIGURE 56.—Cake or meal grinding, pelleting, and bagging department for cottonseed oil mills.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Investment Requirements

Descriptions and unit costs of cake processing machinery, equipment, and building are given in table 26. Investment requirements of the cake processing department for different types and sizes of mills in various areas are shown in table 27. In this summary, the conveyor unit was used for all hydraulic and screw-press mills, as each mill was considered as operating for at least 6 months. Variations in investment reflected the use or nonuse of the pelleting unit, depending on the type of mill or area under consideration.

Table 26.—*Description and costs of machinery and equipment units and building requirements for cake-processing departments of cottonseed oil mills at specified locations, 1949–50*

Unit	Symbol	Machinery and equipment				Building requirement			
		Approx. weight	Cost			Length	Width	Area	Cost
			Delivered	Installation	Total				
	Code	*Pounds*	*Dollars*	*Dollars*	*Dollars*	*Feet*	*Feet*	*Sq. ft.*	*Dollars*
Cake or meal grinding and bagging machinery	Cg	25, 584	20, 461	4, 247	24, 708	20	50	1, 000	5, 072
Pellet manufacture and bagging machinery	Pm	27, 227	13, 961	3, 295	17, 256	20	50	1, 000	4, 777
Pneumatic cake conveyor	Pc		7, 924	3, 188	11, 112				

Unit	Symbol	Fire hydrants		Automatic sprinklers, cost	Total cost at[1]—				
		Quantity	Cost		Memphis, Tenn.	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
	Code	*No.*	*Dol.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Cake or meal grinding and bagging machinery	Cg	2	1, 022	639	31, 441	31, 462	31, 602	32, 021	32, 109
Pellet manufacture and bagging machinery	Pm			639	22, 672	22, 860	22, 631	22, 421	22, 346
Pneumatic cake conveyor	Pc				11, 112	11, 140	11, 133	11, 154	11, 157

[1] Memphis column represents total of the costs in the preceding columns. Differences among the total columns were owing to differences in delivered cost of machinery at the 5 points.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

STORAGE DEPARTMENTS

Cottonseed-oil mills include storage departments for seed and for four products as follows: Sacked or slab meal, baled linters and miscellaneous supplies, hulls, and cottonseed oil (tanks).

SEED

Associated with requirements for the storage of cottonseed are three questions: (1) What is the maximum seed tonnage that must be stored by each mill; (2) what seed house layouts, including equipment, are needed for these tonnages; and (3) what do such layouts cost.

Factors Affecting Maximum Seed-Storage Requirements

The maximum seed-storage requirement of any plant is controlled by three factors: (1) the size of the annual crush, (2) the rate of seed receipts from gins to mills during the ginning season, and (3) the crushing rate during the seed-receiving season. The maximum storage requirement for any annual crush is, therefore, equal to the cumulative seed receipts minus the cumulative seed crush at the time when seed receipts become lower than the amount crushed.

Seed Receipt Period. Seed begin to flow into mills from gins at the start of the cotton-picking and -ginning season. At first the flow is quite slow, not enough to keep the mill going full time; then it picks up, becoming much faster than the rate of crush for a time, then tapers off toward the close of the cotton harvest season and at last ceases altogether long before the new cotton harvest.

As used in this report, a seed receipt period is approximately 2 weeks, this being the unit used by the Bureau of the Census in reporting bales of cotton ginned during the ginning season. More seed may come in after the close of the ginning

TABLE 27.—*Investment requirements for cake-processing departments of cottonseed oil mills in mill areas I through VI, by type of mill, 1949–50* [1]

[Based on table 26]

Type of mill	Area I		Area II		Area III		Area IV		Area V		Area VI	
	Symbol	Cost [2]	Symbol	Cost [3]	Symbol	Cost [3]	Symbol	Cost [3]	Symbol	Cost [4]	Symbol	Cost [5]
		Dollars		*Dollars*		*Dollars*		*Dollars*		*Dollars*		*Dollars*
Direct solvent	Cg	31, 462	Cg, Pm	54, 113	Cg	31, 441	Cg	31, 441	Cg	31, 602	Cg	32, 109
Prepress solvent	Cg	31, 462	Cg, Pm	54, 113	Cg	31, 441	Cg	31, 441	Cg	31, 602	Cg	32, 109
Screw press	Cg, Pc	42, 602	Cg, Pm, Pc	65, 225	Cg, Pc	42, 553	Cg, Pc	42, 553	Cg, Pm, Pc	65, 336	Cg, Pm, Pc	65, 612
Hydraulic	Cg, Pc	42, 602	Cg, Pm, Pc	65, 225	Cg, Pc	42, 553	Cg, Pc	42, 553	Cg, Pm, Pc	65, 336	Cg, Pm, Pc	65, 612

[1] Each symbol column represents the combination of machinery units (from table 26) for mills in given areas.

[2] Atlanta, Ga., pricing point.

[3] Memphis, Tenn., pricing point.

[4] Dallas, Tex., pricing point.

[5] Bakersfield, Calif., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

season, but it does so at a rate that is slower than the rate of crush, so that the mill will have to draw seed out of storage in order to keep running.

Seed Ginning Rate. The average ginning rate and annual mill crush were used in determining the rate of seed receipts. As used in this report, the gin rate is the proportion of the 1943–47 average total seed ginned in the central delta area during each ginning period. These proportions are given in table 28.

Table 28.—*Total volumes and percentages of cottonseed ginned during specified ginning periods in Delta farming areas, 1943–47 average*

Area	Seed ginned										
	Total	Prior to—									After Jan. 16
		Sept. 1	Sept. 16	Oct. 1	Oct. 18	Nov. 1	Nov. 14	Dec. 1	Dec. 13	Jan. 16	
	Tons	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
All areas	1, 058, 021	4. 4	11. 1	18. 5	21. 5	14. 3	8. 2	7. 7	3. 7	3. 4	7. 1
Area 1	105, 848	. 3	6. 7	17. 4	21. 8	15. 7	8. 3	9. 4	6. 0	6. 0	8. 3
Area 2	105, 740	1. 2	7. 7	17. 2	21. 9	14. 8	7. 8	8. 3	5. 2	5. 4	10. 3
Area 3	105, 673	1. 5	8. 8	18. 0	22. 1	14. 5	7. 8	8. 8	4. 7	5. 3	7. 7
Area 4	105, 743	1. 5	6. 1	15. 7	22. 4	16. 3	9. 8	8. 7	4. 1	4. 0	10. 8
Area 5	105, 716	2. 3	9. 5	17. 3	22. 1	15. 0	8. 2	8. 5	3. 9	3. 3	9. 3
Area 6	105, 771	3. 2	9. 5	18. 0	22. 4	15. 7	9. 3	8. 5	3. 0	2. 2	8. 2
Area 7	105, 619	4. 0	11. 4	19. 2	22. 5	14. 6	8. 6	7. 7	3. 4	2. 4	6. 1
Area 8	106, 139	5. 2	11. 6	18. 3	20. 6	14. 2	9. 2	7. 7	3. 4	2. 6	6. 9
Area 9	105, 615	8. 5	18. 0	22. 1	21. 0	12. 2	7. 3	5. 1	2. 1	1. 4	1. 9
Area 10	106, 157	16. 2	21. 8	21. 2	18. 0	10. 1	5. 3	3. 9	1. 4	. 9	1. 0
Central Delta: Areas 5 and 6	211, 487	2. 8	9. 5	17. 7	22. 3	15. 4	8. 8	8. 5	3. 5	2. 8	8. 7

Source: Based on data from Bureau of Census publications, *Cotton Production in the U. S.*, 1943 through 1947.

The Bureau of the Census ginning periods are fixed calendar dates for all cotton-producing counties. The periods are September 1–14 and 15–30; October 1–15 and 16–31; November 1–14 and 15–30; December 1–13; December 14–January 15; January 16 and after. Although cotton harvesting and ginning begin and end earlier in the southern than in the northern parts of the Cotton Belt, the total period of harvesting and ginning is approximately the same. These reports will therefore show a faster ginning rate in the first ginning period in the south delta, for example, than is actually the case because this reporting period includes all seed ginned prior to September 1. Furthermore, since cotton picking and ginning start later in the north, the rate of seed flow will appear to be much faster in the southern than in the northern delta during the earlier census periods and slower in the later periods, whereas actually the rate is about the same in both areas, once the cotton harvesting and ginning season begins in each area. As the same principle applies to other north-south "bands" across the Cotton Belt, either east or west of the delta, central delta rates of seed ginnings were used for all mill areas considered in this report. Use of somewhat different rates in other areas would not materially affect total plant investment requirements.

Rate of Seed Flow to a Given Mill. The amount of seed flow to any particular mill in any seed receipt period was obtained by multiplying the gin rate of that period by the annual mill crush. For example, if the annual crush of a mill were 20,000 tons, and 5 percent of the seed crop were ginned in a seed receipt period (for example, September 15 to 30), then that mill's seed receipts for this period were considered to be 0.05 × 20,000 or 1,000 tons.

A particular mill may sometimes receive seed at a more rapid rate because of its special seed-buying practices, but on the average it is not possible for mills to receive seed more rapidly than at the rate at which the total crop is ginned. This general principle was applied to all mills in this study.

Amount of Seed Crushed During the Ginning Season. During the early part of the ginning season, the rate of seed receipts is commonly not sufficient to enable the mills to run full time. In view of this fact, a standardized schedule of operations was developed for each mill during the entire period in which seed receipts were less than its potential daily output. Such schedules rested on the assumptions that a mill: (1) Will operate at its scheduled rate (for example, 10 tons per press per 24 hours) whenever it runs; (2) will not start to operate until it has enough seed in sight for at least a week's operation; (3) will operate whenever it has a week's seed supply even though the rate of seed receipts is not sufficient to enable it to run continuously; and (4) will operate at an average of six 24-hour days a week until after the rate of seed receipts becomes permanently less than the rate of crush, as a shorter week would involve a greater storage requirement for any given annual crush. (After this period, it was assumed that the mills operated an average of 5 days per week for the remainder of the crushing season.)

From the crushing schedule developed for each mill, on the basis of these assumptions, there was computed the cumulative crush as of the last seed receipt period in which receipts were greater than the crush. With only minor exceptions, subtracting this quantity from the total seed receipts as of the last seed receipt period, gave the maximum amount of seed that had to be stored.

Relationship of Maximum Seed-Storage Requirement to Annual Crush

It was then found that the maximum seed-storage requirement of any mill, according to the above rules, was related to its annual crush and length of operating season as indicated in table 29. Take, for example, a 10-press hydraulic mill operating at 100 tons per day for 6 months or 132 working days. Its annual crush would be 13,200 tons. Its maximum seed storage is 31.34 percent of this crush or 4,137 tons. Again, the annual crush of the smallest prepress-solvent mill, operating at its normal rate for a 12-month season (264 days), was 10,560 tons of seed. Its maximum seed storage requirement was, therefore, 57.73 percent of 10,560 or approximately 6,100 tons.

Table 29.—*Cottonseed oil mills: Maximum seed storage requirements as a percentage of annual crush, by length of operating season*

Length of operating season [1] (months)	Maximum seed storage requirements as percentage of annual crush [2]
	Percent
4.8	22. 3
6.0	31. 3
6.4	34. 1
7.2	39. 5
7.5	41. 3
7.7	42. 4
8.0	44. 1
8.7	47. 5
9.0	48. 6
9.6	50. 9
10.0	52. 3
10.3	53. 2
10.9	55. 0
11.0	55. 3
11.5	56. 6
12.0	57. 7

[1] Averaging 22 24-hour working days per month.
[2] Based on standardized schedule of operations.

Seed Storage Houses

Eleven seed houses were designed to meet the storage requirements of any cottonseed oil mill.

Principles of Design. Figure 58 illustrates the principles of floor design, showing the tunnel conveyors and the positions of the seed unloaders, cooling fans, and other equipment. The same figure illustrates the overhead appearance of each house.

The way in which seed houses were located in reference to other mill buildings is illustrated in figures 3 through 7. Finally, the way in which the houses were designed for fire protection purposes, discussed in chapter IV, is illustrated in figure 59.

Figure 57.—Cottonseed storage houses.

Structural Features. The seed houses were of the steel-frame, ironclad, pillarless type. Each house was provided with an overhead conveyor to fill it and a conveyor in a tunnel, running lengthwise of the house, to unload it. The seed house equipment and machinery shown in table 30 included the drives and ends for the overhead and tunnel conveyors; elevator to lift the seed coming from the house into a conveyor to the mill; a conveyor from the seed house to the mill seed bin or to the next seed house and the trestle supporting this conveyor; and fire-protection equipment.

A pneumatic unloader was provided to unload the seed from trucks or wagons and elevate it to the overhead conveyor in the seed house. The auxiliary equipment for the rail-truck unloader enables the same unloader to be used on both trucks and railway cars. The cooling fan, for cooling the seed, included a motor and accessories.

Investment Requirements

Three steps were involved in calculating the seed-storage investment requirements of any particular mill. First, cost-units were developed (table 30) for two minimum-size houses 60 x 70 feet and 90 x 100 feet, including machinery and equipment and yard improvements. Each of these

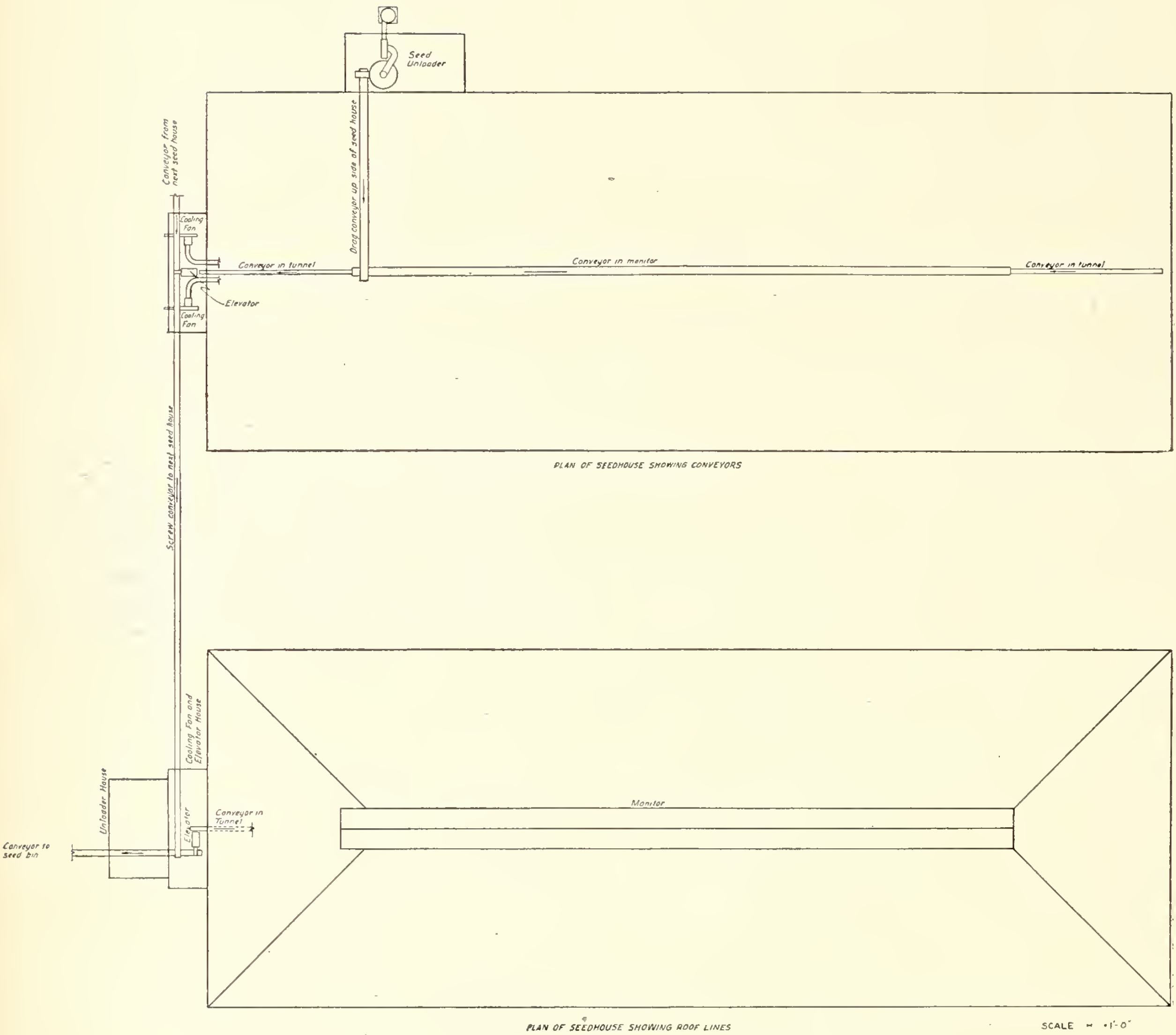

FIGURE 58.—Layout of seed storage houses for cottonseed oil mills.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

minimum sizes included the cost of a "first house" and an "additional house"; in case a mill required 2 houses the second house would cost less than if only 1 were required.

Building cost included the steel building itself, the foundation and floor, the tile air ducts under the floor for the cooling system, and the lighting system. The yard improvements consisted of a road, water main, and concrete-lined drainage ditch, all of which encircled the building on all four sides. (Cost of these improvements also included the power line and poles running alongside the building to supply the lighting system and the various electric motors.) Yard improvements differed for the first house and each additional house, chiefly because of the amount of water main required in each case. With a water main encircling the first house, the second house, when situated alongside the first, required a water main on only one side. The same principle applied to additional houses. Additional houses required fewer fire hydrants than the first house.

By adding a "center section," each of the minimum houses may be expanded. Accordingly, in addition to the costs of the minimum house, table 30 shows the cost of the center section along with the unit cost of seed-house machinery and equipment—a pneumatic seed unloader, cooling fan, and fire hydrant, and hose house.

These unit costs have been combined in table 31 to show the investment requirements of 22 individual seed houses.

Table 32 shows the combination of seed houses that was selected for each mill in this report and the investment requirements. The least cost principle was used in determining the combination of houses selected for any particular mill; that is, wherever the maximum storage requirement of a given mill could be met by a number of house combinations, that combination was selected which required the least investment. Unlike processing departments, seed-storage investment requirements of any mill depend on its length of season and daily rate, as well as on its mere size. For example, the requirement of a 10-press hydraulic mill which operated for 6 months at 10 tons per press would be different from the requirements of the same mill operating at 14 tons per press for the same number of months.

TABLE 30.—*Description and costs of machinery and building units for seed storage houses for cottonseed oil mills, 1949–50*

Unit	Capacity	Cost					
		Machinery and equipment		Building[1]	Yard improvement		Total
		Delivered	Installation		Delivered	Installation	
	Tons	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Minimum length—first house: [2]							
60 feet wide	1, 400	6, 312	2, 384	20, 506	2, 151	1, 065	32, 418
90 feet wide	3, 700	6, 990	2, 684	33, 365	3, 056	1, 595	47, 690
Minimum length—additional house:							
60 feet wide	1, 400	6, 312	2, 384	20, 506	1, 921	939	32, 062
90 feet wide	3, 700	6, 990	2, 684	33, 365	2, 786	1, 407	47, 232
Center section for first house:							
60 feet wide	475	790	262	5, 472	276	93	6, 893
90 feet wide	875	790	262	6, 761	347	119	8, 279
Center section for additional house:							
60 feet wide	475	790	262	5, 472	249	75	6, 848
90 feet wide	875	790	262	6, 761	320	99	8, 232
Pneumatic unloader		2, 277	509				2, 786
Auxiliary equipment for each unloader		3, 850	1, 029				4, 879
Auxiliary equipment for rail-truck unloader		292					292
Cooling fan		1, 340	268				1, 608
Auxiliary equipment for each fan		563	123				686
Fire hydrant and hose house		457	54				511

[1] Includes installation charges.
[2] Any size house may be obtained by adding "center section" units to "minimum length house."

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 31.—*Unit requirements and total costs of seed storage houses of different sizes for specified building, machinery, and equipment units of cottonseed oil mills, 1949–50*

Building, machinery, and equipment unit	Cost of unit [1]	70′ by 60′ (1,400-ton capacity)				90′ by 60′ (1,850-ton capacity)				110′ by 60′ (2,350-ton capacity)				100′ by 90′ (3,700-ton capacity)			
		(Code-Sa) First house		(Code-Saa) Additional house		(Code-Sb) First house		(Code-Sbb) Additional house		(Code-Sc) First house		(Code-Scc) Additional house		(Code-Sd) First house		(Code-Sdd) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
Minimum length—first house: [2]																	
60 feet wide	32, 418	1	32, 418			1	32, 418			1	32, 418						
90 feet wide	47, 690													1	47, 690		
Minimum length—additional house:																	
60 feet wide	32, 062			1	32, 062			1	32, 062			1	32, 062				
90 feet wide	47, 232															1	47, 232
Center section for first house:																	
60 feet wide	6, 893					1	6, 893			2	13, 786						
90 feet wide	8, 279																
Center section for additional house:																	
60 feet wide	6, 848							1	6, 848			2	13, 696				
90 feet wide	8, 232																
Pneumatic unloader	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786
Auxiliary equipment	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879
Auxiliary equipment for rail-truck unloader	292	1	292			1	292			1	292			1	292		
Cooling fan	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608
Auxiliary equipment for each fan	686	1	686	1	686	1	686	1	686	1	686	1	686	1	686	1	686
Fire hydrant and hose house	511	4	2, 044	2	1, 022	4	2, 044	2	1, 022	6	3, 066	3	1, 533	4	2, 044	2	1, 022
Automatic sprinkler			3, 038				3, 038				3, 078				3, 038		1, 121
Total cost of building, machinery, and equipment (at all pricing points)			47, 751		43, 043		54, 644		49, 891		62, 599		57, 250		63, 023		59, 334

Building, machinery, and equipment unit	Cost of unit	120′ by 90′ (4,600-ton capacity)				140′ by 90′ (5,450-ton capacity)				160′ by 90′ (6,300-ton capacity)				180′ by 90′ (7,200-ton capacity)			
		(Code-Se) First house		(Code-See) Additional house		(Code-Sf) First house		(Code-Sff) Additional house		(Code-Sg) First house		(Code-Sgg) Additional house		(Code-Sh) First house		(Code-Shh) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Minimum length—First house: [2]	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
60 feet wide	32, 418																
90 feet wide	47, 690	1	47, 690			1	47, 690			1	47, 690			1	47, 690		
Minimum length—additional house:																	
60 feet wide	32, 062																
90 feet wide	47, 232			1	47, 232			1	47, 232			1	47, 232			1	47, 232
Center section for first house:																	
60 feet wide	6, 893																
90 feet wide	8, 279	1	8, 279			2	16, 558			3	24, 837			4	33, 116		
Center section for additional house:																	
60 feet wide	6, 848																
90 feet wide	8, 232			1	8, 232			2	16, 464			3	24, 696			4	32, 928
Pneumatic unloader	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786
Auxiliary equipment	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879
Auxiliary equipment for rail-truck unloader	292	1	292			1	292			1	292			1	292		
Cooling fan	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608	1	1, 608
Auxiliary equipment for each fan	686	1	686	1	686	1	686	1	686	1	686	1	686	1	686	1	686
Fire hydrant and hose house	511	6	3, 066	3	1, 533	6	3, 066	3	1, 533	6	3, 066	3	1, 533	6	3, 066	3	1, 533
Automatic sprinkler			3, 038		1, 121		3, 281		1, 363		3, 462		1, 544		3, 629		1, 712
Total cost of building, machinery, and equipment (at all pricing points)			72, 324		68, 077		80, 846		76, 551		89, 306		84, 964		97, 752		93, 364

See footnotes at end of table.

Table 31.—*Unit requirements and total costs of seed storage houses of different sizes for specified building, machinery, and equipment units of cottonseed oil mills, 1949–50*—Continued

Building, machinery, and equipment unit	Cost of unit [1]	200′ by 90′ (8,050-ton capacity)				220′ by 90′ (8,950-ton capacity)				240′ by 90′ (9,800-ton capacity)			
		(Code–Si) First house		(Code–Sii) Additional house		(Code–Sj) First house		(Code–Sjj) Additional house		(Code–Sk) First house		(Code–Skk) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Minimum length—first house: [2]	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
60 feet wide	32, 418												
90 feet wide	47, 690	1	47, 690			1	47, 690			1	47, 690		
Minimum length—additional house:													
60 feet wide	32, 062												
90 feet wide	47, 232			1	47, 232			1	47, 232			1	47, 232
Center section for first house:													
60 feet wide	6, 893												
90 feet wide	8, 279	5	41, 395			6	49, 674			7	57, 953		
Center section for additional house:													
60 feet wide	6, 848												
90 feet wide	8, 232			5	41, 160			6	49, 392			7	57, 624
Pneumatic unloader	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786	1	2, 786
Auxiliary equipment	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879	1	4, 879
Auxiliary equipment for rail-truck unloader	292	1	292			1	292			1	292		
Cooling fan	1, 608	2	3, 216	2	3, 216	2	3, 216	2	3, 216	2	3, 216	2	3, 216
Auxiliary equipment for each fan	686	2	1, 372	2	1, 372	2	1, 372	2	1, 372	2	1, 372	2	1, 372
Fire hydrant and hose house	511	6	3, 066	3	1, 533	6	3, 066	3	1, 533	6	3, 066	3	1, 533
Automatic sprinkler			3, 799		1, 969		3, 964		2, 134		4, 124		2, 294
Total cost of building, machinery, and equipment (at all pricing points)			108, 495		104, 147		116, 939		112, 544		125, 378		120, 936

[1] From table 30.
[2] Any size house may be obtained by adding "center section" units to the "minimum length house."

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 32.—*Investment requirements of seed storage houses for cottonseed oil mills, at specified volumes of seed crushed annually, 1949–50*

[Based on tables 29 and 31]

ANNUAL CRUSH: 10,600 TONS

Mill	Size of mill, seed crushed per day at normal operating rate	Length of operating season [1]	Maximum seed storage capacity required	Symbol of each house															Total houses	Cost (Memphis, Tenn., pricing point)
				Sc	Sd	Se	Sf	Sg	Sh	Si	Sj	Sk	Sdd	Sff	Sgg	Shh	Sjj	Skk		
	Tons	*Months*	*Tons*																*No.*	*Dollars*
Prepress solvent:																				
Plant 1	40	12.0	6,100	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1	89,306
Plant 2	80	6.0	3,300	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	63,023
Direct solvent:																				
Plant 1	50	9.6	5,350	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	80,846
Plant 2	100	4.8	2,350	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	62,599
Screw press:																				
2 press	50	9.6	5,350	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	80,846
3 press	75	6.4	3,600	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	63,023
Hydraulic:																				
4 press	40	12.0	6,100	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1	89,306
6 press	60	8.0	4,700	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	80,846
8 press	80	6.0	3,300	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	63,023
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1	50	12.0	7,600	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1	108,495
Plant 2	100	6.0	4,150	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1	72,324
Prepress solvent: Plant 2	80	7.5	5,450	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	80,846
Screw press:																				
2 press	50	12.0	7,600	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1	108,495
3 press	75	8.0	5,800	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1	89,306
4 press	100	6.0	4,150	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1	72,324
Hydraulic:																				
6 press	60	10.0	6,900	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1	97,752
8 press	80	7.5	5,450	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	80,846

See footnote at end of table.

TABLE 32.—*Investment requirements of seed storage houses for cottonseed oil mills, at specified volumes of seed crushed annually, 1949–50*—Con.

[Based on tables 29 and 31]

Mill	Size of mill, seed crushed per day at normal operating rate	Length of operating season [1]	Maximum seed storage capacity required	Symbol of each house: Sc	Sd	Se	Sf	Sg	Sh	Si	Sj	Sk	Sdd	Sff	Sgg	Shh	Sjj	Skk	Total houses	Cost (Memphis, Tenn., pricing point)
ANNUAL CRUSH: 21,100 TONS																				
	Tons	*Months*	*Tons*																*No.*	*Dollars*
Prepress solvent:																				
Plant 2	80	12. 0	12, 200						1					1					2	174, 303
Plant 3	160	6. 0	6, 600						[2] 1										1	105, 417
Direct solvent: Plant 2	100	9. 6	10, 750							1			1						2	157, 086
Screw press:																				
4 press	100	9. 6	10, 750							1			1						2	157, 086
5 press	125	7. 7	8, 950									[2] 1							1	124, 604
Hydraulic:																				
8 press	80	12. 0	12, 200						1					1					2	174, 303
10 press	100	9. 6	10, 750							1			1						2	157, 086
12 press	120	8. 0	9, 300									[2] 1							1	133, 043
ANNUAL CRUSH: 26,400 TONS																				
Direct solvent:																				
Plant 2	100	12. 0	15, 200							1						1			2	201, 859
Plant 2	200	6. 0	8, 250								[2] 1								1	124, 604
Prepress solvent: Plant 3	160	7. 5	10, 900						1				1						2	157, 086
Screw press:																				
4 press	100	12. 0	15, 200							1						1			2	201, 859
5 press	125	9. 6	13, 450						1						1				2	182, 716
Hydraulic:																				
10 press	100	12. 0	15, 200							1						1			2	201, 859
12 press	120	10. 0	13, 800						1							1			2	191, 116
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3	160	12. 0	24, 400								1					1	1		3	322, 847
Direct solvent: Plant 3	200	9. 6	21, 500						1							2			3	284, 480
Screw press:																				
7 press	175	11. 0	23, 300								1					2			3	303, 667
8 press	200	9. 6	21, 500						1							2			3	284, 480
Hydraulic:																				
16 press	160	12. 0	24, 400								1					1	1		3	322, 847
22 press	220	8. 7	20, 050						1						1	1			3	276, 080
24 press	240	8. 0	18, 600									[2] 1					1		2	245, 587

ANNUAL CRUSH: 52,800 TONS

Direct solvent: Plant 3	200	12.0	30,500								1					[3] 3			4	398,948
Prepress solvent: Plant 4	240	10.0	27,600									[2] 1					2		3	358,131
Screw press:																				
8 press	200	12.0	30,500								1					[3] 3			4	398,948
10 press	250	9.6	26,850								[2] 1						2		3	349,692
Hydraulic:																				
20 press	200	12.0	30,500								1					[3] 3			4	398,948
22 press	220	10.9	29,050									[2] 1						2	3	374,915
24 press	240	10.0	27,600									[2] 1					2		3	358,131

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4	240	12.0	36,600									1				1		[3] 2	4	462,444
Direct solvent:																				
Plant 4	300	9.6	32,250								1					[3] 2	1		4	418,041
Plant 5	400	7.2	25,050								[2] 1					[3] 1	1		3	330,512
Screw press:																				
10 press	250	11.5	35,850									1				1		[3] 2	4	462,444
12 press	300	9.6	32,250								1					[3] 2	1		4	418,041
Hydraulic: 24 press	240	12.0	36,600									1				1		[3] 2	4	462,444

ANNUAL CRUSH: 79,200 TONS

Direct solvent:																				
Plant 4	300	12.0	45,700									1				1		[3] 3	5	583,380
Plant 5	400	9.0	38,500									[2] 1						[3] 3	4	497,681
Prepress solvent: Plant 5	400	9.0	38,500									[2] 1						[3] 3	4	497,681
Screw press:																				
12 press	300	12.0	45,700									1				1		[3] 3	5	583,380
14 press	350	10.3	42,100									1				2	[3] 2		5	539,024
Hydraulic:																				
30 press	300	12.0	45,700									1				1		[3] 3	5	583,380
36 press	360	10.0	41,400									1				2	[3] 2		5	539,024
40 press	400	9.0	38,500									[2] 1						[3] 3	4	497,681

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5	400	12.0	61,000									1				2	2	[4] 2	7	782,726
Direct solvent: Plant 5	400	12.0	61,000									1				2	2	[4] 2	7	782,726
Screw press: 16 press	400	12.0	61,000									1				2	2	[4] 2	7	782,726
Hydraulic: 40 press	400	12.0	61,000									1				2	2	[4] 2	7	782,726

[1] Averaging 22 24-hour working days per month.
[2] 1 pneumatic unloader added to house.
[3] For a combination of 4 to 6 houses, the sprinkler cost of the first house was used with the first additional house.
[4] For a combination of 7 to 8 houses, the sprinkler cost of the first house was used with the first 2 additional houses.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

PRODUCTS

Meal Storage Warehouses

Meal-storage housing was provided for all mills in a section of the mill building, as indicated in figures 3 through 7. Eighteen houses of different sizes were designed to meet the requirements of any particular mill. The first house was only 40 x 40 feet and was designed for the smallest mills operating for very short seasons. The next larger house was 50 x 50 feet. All the other houses were also 50 feet wide, but of increasing lengths up to a maximum of 320 feet as shown in table 34.

Structural Characteristics. All the houses were of standard design, with pitched roof and steel frame. They were ironclad structures, with 12 feet under trusses and 10-foot bays, were windowless, and had ventilators. Each house had water mains on two sides, a road, drainage ditch, lighting, and lighting powerline and poles.

Doors were provided in the "Doors and Dock Section" unit (figs. 3 through 7) which included two 9-foot sliding doors and a concrete loading dock 10 feet long and 8 feet wide. The doors were located opposite each other on the two sides of the building for loading or unloading from trucks and railway cars. The dock was opposite one of the doors. For some purposes, a continuous, roofed loading dock was desirable for the side opposite the individual unroofed docks.

Assumptions Used in Calculating Meal House Capacities. In calculating the capacity of warehouses for bagged meal or pellets and cracked or sized cake, it was assumed that bags, each containing 100 pounds of material, occupied an area of 370 square feet, and that the bags were stacked 12 bags high over the entire area of the storage bays, except for an 8-foot-wide aisle running lengthwise down the middle of the building.

If slab cake were stacked about 5 feet high in the same floor pattern as the bagged products, the capacity of the warehouses for slab would be the same as for bagged products stacked 12 bags high. By assuming these conditions to apply, the capacities of the warehouses in tons stored are the same for bagged meal products and for slab cake.

Rules for Calculating Meal-Storage Requirements of Individual Mills. Sacked meal may be in any of three forms—bulk, pellets, and cracked or sized cake. No meal can be stored in bulk without sacking because of a tendency to heat. For storage calculation purposes, the other meal forms were considered as sacked meal, as they required the same storage space per ton.

To provide enough meal storage for orderly marketing requirements and at the same time hold storage investment to a minimum, it was assumed that any well-balanced mill should be able to store as much sacked meal as it produces in a 7-day period, assuming sacked meal is stacked as indicated above. This amount of space would result in sacked meal being stacked only six bags high during most of the operating season. Only in unusual situations would it have to be stacked 12 bags high.

As the proportions of bulk, slab, and sacked meal may vary greatly in different localities, the meal-storage requirements of mills having the same total meal production will likewise vary. This fact has been taken into account throughout this report.

Investment Requirements. The units that may be combined into any number of meal houses are shown in table 33. In table 34 these units are combined, showing costs of 18 sizes of meal houses. By using this information, investment requirements for meal houses for mills in mill areas I through VI were calculated and are shown in table 35. Area variations in meal yield per ton of cottonseed accounted for differences in meal-storage requirements for the same daily crush.

Table 33.—*Description and costs of building and equipment units in meal storage houses for cottonseed oil mills, 1949–50*

Description of unit	Approximate weight	Gross floor area	Bagged meal or slab cake storage provision [1]	Cost [2]		
				Delivered	Construction	Total
Building—50 feet wide: [3]	*Pounds*	*Sq. ft.*	*Tons*	*Dollars*	*Dollars*	*Dollars*
Ends section—10 feet long	11, 530	500	68	2, 010	1, 432	3, 442
Center section—10 feet long	4, 463	500	68	749	568	1, 317
Doors and dock—2 doors and 10-foot section unroofed dock (for loading bays)	1, 149			580	302	882
Continuous dock—roofed:						
Ends section—20 feet long	1, 207			480	461	941
Center section—10 feet long	493			167	156	323
Fire cutoff and fire door				289	245	534
Fire hydrant and hose house				457	54	511

[1] Bagged meal (100 pounds per bag) stacked 12 bags high. Slab cake stacked 5 feet high.

[2] Memphis, Tenn., pricing point.

[3] Varying building sizes may be obtained by adding "center section" units to "ends section."

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 34.—*Unit requirements and total costs of meal storage houses for cottonseed oil mills, by size of house, 1949–50*

Size of house [1]	Building symbol	Storage capacity	Building-ends section cost [2]	Building-center section		Doors and dock		Continuous dock-ends section cost [2]	Continuous dock-center section		Fire cut-off and fire door cost [2]	Fire hydrant and hose house		Automatic sprinkler system cost	Total cost [3]
				Unit	Cost [2]	Unit	Cost [2]		Unit	Cost [2]		Unit	Cost [2]		
	Code	*Tons*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*Dollars*	*No.*	*Dollars*	*Dollars*	*No.*	*Dollars*	*Dollars*	*Dollars*
40 by 40 feet [4]	Ma	156	----	----	----	----	----	----	----	----	----	----	----	3, 502	13, 847
50 by 50 feet	Mb	272	3, 442	4	5, 268	1	882	941	3	969	534	2	1, 022	3, 988	17, 046
60 by 50 feet	Mc	340	3, 442	5	6, 585	1	882	941	4	1, 292	534	2	1, 022	4, 238	18, 936
80 by 50 feet	Md	408	3, 442	7	9, 219	2	1, 764	941	6	1, 938	534	2	1, 022	4, 717	23, 577
90 by 50 feet	Me	476	3, 442	8	10, 536	2	1, 764	941	7	2, 261	534	2	1, 022	4, 963	25, 463
100 by 50 feet	Mf	544	3, 442	9	11, 853	2	1, 764	941	8	2, 584	534	2	1, 022	5, 169	27, 309
110 by 50 feet	Mg	612	3, 442	10	13, 170	2	1, 764	941	9	2, 907	534	2	1, 022	5, 389	29, 169
120 by 50 feet	Mh	680	3, 442	11	14, 487	2	1, 764	941	10	3, 230	534	2	1, 022	5, 613	31, 033
140 by 50 feet	Mi	748	3, 442	13	17, 121	3	2, 646	941	12	3, 876	534	2	1, 022	5, 985	35, 567
150 by 50 feet	Mj	816	3, 442	14	18, 438	3	2, 646	941	13	4, 199	534	2	1, 022	6, 133	37, 355
160 by 50 feet	Mk	884	3, 442	15	19, 755	3	2, 646	941	14	4, 522	534	2	1, 022	6, 377	39, 239
170 by 50 feet	Ml	952	3, 442	16	21, 072	3	2, 646	941	15	4, 845	534	2	1, 022	6, 544	41, 046
180 by 50 feet	Mm	1, 020	3, 442	17	22, 389	3	2, 646	941	16	5, 168	534	2	1, 022	6, 734	42, 876
210 by 50 feet	Mn	1, 156	3, 442	20	26, 340	4	3, 528	941	19	6, 137	534	4	2, 044	7, 418	50, 384
230 by 50 feet	Mo	1, 292	3, 442	22	28, 974	4	3, 528	941	21	6, 783	534	4	2, 044	7, 589	53, 835
260 by 50 feet	Mp	1, 428	3, 442	25	32, 925	5	4, 410	941	24	7, 752	534	4	2, 044	8, 224	60, 272
280 by 50 feet	Mq	1, 564	3, 442	27	35, 559	5	4, 410	941	26	8, 398	534	4	2, 044	8, 773	64, 101
300 by 50 feet	Mr	1, 700	3, 442	29	38, 193	5	4, 410	941	28	9, 044	534	4	2, 044	8, 986	67, 594

[1] Varying building sizes obtained by adding "building-center section" units to "building-ends section."

[2] Unit costs of building-ends section, building-center section, doors and dock, continuous dock-ends section, continuous dock-center section, fire cutoff and fire door, fire hydrant and hose house were \$3,442, \$1,317, \$882, \$941, \$323, \$534, and \$511, respectively.

[3] Memphis, Tenn., pricing point.

[4] This 40-foot building was included to provide a smaller warehouse than the minimum practical length of 50-foot building would provide; only the total cost for 40-foot building was available.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 35.—*Investment requirements of meal storage houses for cottonseed oil mills, in mill areas I through VI, by size of mill, 1949–50*

[Based on table 34]

Size of mill (tons crushed per day at normal operating rate)	Area I			Area II			Area III			Area IV			Area V			Area VI		
	Maximum meal storage capacity required [1]	Building symbol	Cost [2]	Maximum meal storage capacity required [1]	Building symbol	Cost [2]	Maximum meal storage capacity required [1]	Building symbol	Cost [2]	Maximum meal storage capacity required [1]	Building symbol	Cost [2]	Maximum meal storage capacity required [1]	Building symbol	Cost [2]	Maximum meal storage capacity required [1]	Building symbol	Cost [2]
	Tons	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*
40 to 50	115 to 145	Ma	13,847				125 to 156	Ma	13,847	132 to 156	Ma	13,847	133 to 156	Ma	13,847			
40 to 75				90 to 156	Ma	13,847										95 to 156	Ma	13,847
60 to 80	175 to 235	Mb	17,046				187 to 249	Mb	17,046	197 to 263	Mb	17,046	199 to 265	Mb	17,046			
80 to 100 [3]																179 to 248	Mb	17,046
80 to 125				179 to 272	Mb	17,046												
100							312	Me	18,936	329	Me	18,936	331	Me	18,936			
100 to 120	290 to 340	Me	18,936															
120 to 125							374 to 390	Md	23,577	395 to 408	Md	23,577	398 to 408	Md	23,577	298 to 310	Me	18,936
125	365	Md	23,577															
160 [4]	465	Me	25,463							526	Mf	27,309	530	Mf	27,309	452	Me	25,463
160 to 175				358 to 392	Md	23,577	499 to 544	Mf	27,309									
175	510	Mf	27,309							576	Mg	29,169	580	Mg	29,169	495	Mf	27,309
200	580	Mg	29,169	448	Me	25,463	612	Mg	29,169	658	Mh	31,033	663	Mh	31,033	555 to 578	Mg	29,169
220	640	Mh	31,033				680	Mh	31,033	724	Mi	35,567	729	Mi	35,567	632	Mh	31,033
220 to 240				493 to 537	Mf	27,309												
240							748	Mi	35,567									
240 to 250	700 to 725	Mi	35,567							790 to 816	Mj	37,355	796 to 816	Mj	37,355	696 to 735	Mi	35,567
250				560	Mg	29,169	779	Mj	37,355									
300	870	Mk	39,239	672	Mh	31,033	935	Ml	41,046	987	Mm	42,876	994	Mm	42,876	884	Mk	39,239
350										1,152	Mn	50,384	1,156	Mn	50,384	1,020	Mm	42,876
350 to 360	1,015 to 1,020	Mm	42,876	784 to 806	Mj	37,355	1,091 to 1,122	Mn	50,384									
360																1,067	Mn	50,384
360 to 400										1,184 to 1,292	Mo	53,835	1,193 to 1,292	Mo	53,835			
400 [5]	1,156	Mn	50,384	884	Mk	39,239	1,247	Mo	53,835							1,195	Mo	53,835

[1] Based on 7 days' slab, bagged meal, or pellet production. 1 house used for each range of storage requirements.

[2] Memphis, Tenn., pricing point.

[3] 80-ton prepress-solvent plant had maximum meal storage requirement of 156 tons and therefore used Warehouse Ma.

[4] 160-ton prepress-solvent plant had maximum meal storage requirement of 408 tons in Area VI and therefore used Warehouse Md.

[5] 400-ton direct- and prepress-solvent plants had maximum meal storage requirement of 1,170 tons in Area VI and therefore used Warehouse Mn.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Storage Warehouses for Baled Linters and Miscellaneous Supplies

A series of 18 houses were designed for meeting the storage requirements for baled linters and miscellaneous supplies of each mill.

Structural Features of Linters Warehouses. With only two exceptions, these houses were structurally the same as the storage houses for bagged meal, previously considered. The exceptions were: First, only the single, unroofed loading docks were provided for the linters house, whereas the continuous dock was provided in addition to the single docks for the meal house. (The loading doors and dock were increased with every six bays.) This proportion was determined by assuming that two 50-foot boxcars could be spotted at adjacent doors with the minimum distance of separation between the cars. Second, since the linters house was situated alongside the seed house (fig. 3), it required fewer fire hydrants than the meal house, which was a continuation of the mill building.

Assumptions Used in Calculating Capacities of Linters Houses. The capacity of each linters house was calculated on the assumptions (1) that the dimensions of the bales were 2×4×3.5 feet; (2) that the bales were stored 4 bales high on the 4×3.5 sides, with the 4-foot dimension running crosswise of the building and with a 2-foot passageway alongside each row of bales; and (3) that no bales were stored in the bays containing the loading doors. Under these assumptions, each stack of 4 bales required 14 square feet of floor area, and provision of the 2-foot-wide aisles resulted in the coverage of 80 percent of the floor area in the storage bays.

Other storage patterns would result in about the same storage capacity for each bay of the warehouse. The storage capacity for baled material of each bay of the warehouse was about the same as the capacity of a 50-foot boxcar. This fact was used in making additions to the warehouse requirements for different sizes of mills for storage of bagging and ties.

Rules Used in Calculating Requirements of Linters Warehouses of Individual Mills. To provide enough linters storage for orderly marketing, at the same time holding investment to a minimum, it was assumed that any well-balanced mill would require storage space equivalent to the amount of linters it produced during a 12-day production period, and the number of bales equivalent to bagging and ties storage requirement as given below:

Daily crush of mills, tons	*Number of linters bales equivalent to bagging and ties storage requirements*
Under 160	244
160 to 240	366
240 to 320	488
320 to 400	560

Investment Requirements. Costs of building and equipment units, costs of individual houses, and investment requirements for warehouse for baled linters and miscellaneous supplies for particular mills, are shown in tables 36 through 38.

Table 36.—*Description and costs of building and equipment units of storage houses for baled linters and miscellaneous supplies for cottonseed oil mills, 1949–50*

Description of unit	Approximate weight	Gross floor area	Baled linters and miscellaneous supplies storage provision [1]	Cost [2]		
				Delivered	Construction	Total
	Pounds	*Sq. ft.*	*Bales*	*Dollars*	*Dollars*	*Dollars*
Building—50 feet wide: [3]						
Ends section—10 feet long	11, 530	500	112	2, 010	1, 432	3, 442
Center section—10 feet long	4, 463	500	112	749	568	1, 317
Doors and dock—2 doors and 10-foot section unroofed dock (for loading bays)	1, 149			580	302	882
Fire hydrant and hose house				457	54	511

[1] Stacked 4 bales high.
[2] Memphis, Tenn., pricing point.
[3] Varying building sizes may be obtained by adding "center section" units to "ends section."

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 37.—*Unit requirements and total costs of storage houses for baled linters and miscellaneous supplies for cottonseed oil mills, by size of house, 1949–50*

Size of house [1]	Building symbol	Storage capacity	Building-ends section cost [2]	Building-center section		Doors and dock		Fire hydrant and hose house		Automatic sprinkler system cost	Total cost [3]
				Unit	Cost [2]	Unit	Cost [2]	Unit	Cost [2]		
	Code	*Bales*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Dollars*	*Dollars*
40 by 40 feet [4]	La	269								3, 322	10, 603
50 by 50 feet	Lb	448	3, 442	4	5, 268	1	882	1	511	3, 781	13, 884
60 by 50 feet	Lc	560	3, 442	5	6, 585	1	882	1	511	4, 017	15, 437
80 by 50 feet	Ld	672	3, 442	7	9, 219	2	1, 764	1	511	4, 454	19, 390
90 by 50 feet	Le	784	3, 442	8	10, 536	2	1, 764	1	511	4, 653	20, 906
100 by 50 feet	Lf	896	3, 442	9	11, 853	2	1, 764	1	511	4, 883	22, 453
110 by 50 feet	Lg	1, 008	3, 442	10	13, 170	2	1, 764	1	511	5, 060	23, 947
120 by 50 feet	Lh	1, 120	3, 442	11	14, 487	2	1, 764	1	511	5, 251	25, 455
140 by 50 feet	Li	1, 232	3, 442	13	17, 121	3	2, 646	1	511	5, 613	29, 333
150 by 50 feet	Lj	1, 344	3, 442	14	18, 438	3	2, 646	1	511	5, 773	30, 810
160 by 50 feet	Lk	1, 456	3, 442	15	19, 755	3	2, 646	2	1, 022	5, 936	32, 801
170 by 50 feet	Ll	1, 568	3, 442	16	21, 072	3	2, 646	2	1, 022	6, 134	34, 316
180 by 50 feet	Lm	1, 680	3, 442	17	22, 389	3	2, 646	2	1, 022	6, 283	35, 782
210 by 50 feet	Ln	1, 904	3, 442	20	26, 340	4	3, 528	2	1, 022	6, 748	41, 080
230 by 50 feet	Lo	2, 128	3, 442	22	28, 974	4	3, 528	2	1, 022	7, 038	44, 004
260 by 50 feet	Lp	2, 352	3, 442	25	32, 925	5	4, 410	2	1, 022	7, 510	49, 309
280 by 50 feet	Lq	2, 576	3, 442	27	35, 559	5	4, 410	2	1, 022	7, 813	52, 246
300 by 50 feet	Lr	2, 800	3, 442	29	38, 193	5	4, 410	2	1, 022	8, 170	55, 237

[1] Varying building sizes obtained by adding "building-center section" units to "building-ends section."
[2] Unit costs of building-ends section, building-center section, doors and dock, and fire hydrant and hose house were $3,442, $1,317, $882, and $511, respectively.
[3] Memphis, Tenn., pricing point.
[4] This 40-foot building was included to provide a smaller warehouse than the minimum practical length that a 50-foot building would provide; only total cost for 40-foot building was available.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 38.—*Investment requirements of storage houses for baled linters and miscellaneous supplies for cottonseed oil mills, by size of mill, 1949–50*

[Based on table 37]

Size of mill (tons crushed per day at normal operating rate)	Maximum storage capacity required [1]	Building symbol	Cost [2]
	Bales	*Code*	*Dollars*
40 to 60	360 to 430	Lb	13, 884
75 to 100	495 to 565	Lc	15, 437
120 to 125	635	Ld	19, 390
140 to 150	700 to 740	Le	20, 906
160	885	Lf	22, 453
175 to 180	950	Lg	23, 947
200 to 220	1,020 to 1,090	Lh	25, 455
240 to 250	1,270 to 1,300	Lj	30, 810
300	1,475	Ll	34, 316
320	1,655	Lm	35, 782
350 to 360	1,790	Ln	41. 080
400	1,925	Lo	44, 004

[1] Stacked 4 bales high and based on 12 days' linters production plus bagging and ties requirements as follows: Up to 160 tons per day, the equivalent in linters bales of 224 bales of bagging and ties; from 160 to 240 tons per day, 336 bales; from 240 to 320 tons per day, 448 bales; and for 320 to 400 tons per day, 560 bales.
[2] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Hull Storage Houses

Fifteen hull houses were designed to meet requirements for hull storage of any mill discussed in this report. Each house had a water main on two sides, a road, drainage ditch, lighting, and lighting power line and poles.

EQUIPMENT UNITS. Each house included two main units of equipment: (1) An overhead conveyor to carry the hulls from the mechanical pretreatment department, as the hullers and beaters separated them from the cottonseed meats, and (2) a pneumatic conveying system to transport the hulls to railway cars or trucks.

DESIGN. Unlike the seed houses, no hull house included a tunnel and conveyor in the tunnel, nor an air-cooling system. Yard improvements similar to those for seed houses were included in the design for each house.

SIZE OF HOUSES. The houses fell into two size groups—houses 40 feet wide ranging from 50 to 170 feet long, and houses 60 feet wide ranging from 90 to 310 feet in length.

The group of 40-foot-wide houses was developed because the minimum capacity of the shortest 60-foot-wide house was found to be considerably above the maximum hull-storage requirements of very small mills.

INVESTMENT REQUIREMENTS. For each mill, enough storage capacity was provided to store as much as 2 weeks' production of hulls. Investment requirements of individual mills for hull houses were calculated in the usual manner as indicated in tables 39 through 41. Variation among areas in hull yields accounted for differences in hull-house requirements of mills having the same daily crush.

TABLE 39.—*Description and costs of building and machinery units in hull storage houses for cottonseed oil mills, 1949–50*

Unit	Maximum hull storage capacity	Cost [1]					
		Building installed	Machinery		Yard improvements		Total
			Delivered	Installation	Delivered	Installation	
	Tons	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Minimum length house—50 by 40 feet [2]	306	9, 965	2, 480	685	1, 490	1, 463	16, 083
Center section—20 by 40 feet	128	2, 727	281	106	99	105	3, 318
Minimum length house—70 by 60 feet [2]	700	13, 867	3, 452	953	2, 073	2, 036	22, 381
Center section—20 by 60 feet	233	3, 201	330	125	115	123	3, 894
Fire hydrant and hose house					457	54	511

[1] Memphis, Tenn., pricing point.
[2] Varying house sizes may be obtained by adding "center section" units to minimum length house.
Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 40.—*Costs of hull storage houses for cottonseed oil mills, by size of house, 1949–50*

Size of house	Maximum hull storage capacity	Symbol	Cost [1]						
			House 40 feet wide [2]		House 60 feet wide [2]		Fire hydrant	Automatic sprinkler system	Total
			Minimum length	Center section	Minimum length	Center section			
	Tons	*Code*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
50 by 40 feet	306	Ha	16, 083				1, 022	1, 325	18, 430
70 by 40 feet	434	Hb	16, 083	3, 318			1, 022	1, 704	22, 127
70 by 60 feet	700	Hc			22, 381		1, 022	2, 324	25, 727
90 by 60 feet	925	Hd			22, 381	3, 894	1, 022	2, 802	30, 099
110 by 60 feet	1, 175	He			22, 381	7, 788	1, 022	3, 245	34, 436
130 by 60 feet	1, 400	Hf			22, 381	11, 682	1, 022	3, 663	38, 748
150 by 60 feet	1, 625	Hg			22, 381	15, 576	1, 533	4, 083	43, 573
170 by 60 feet	1, 850	Hh			22, 381	19, 470	1, 533	4, 463	47, 847
190 by 60 feet	2, 100	Hi			22, 381	23, 364	1, 533	4, 829	52, 107
210 by 60 feet	2, 325	Hj			22, 381	27, 258	1, 533	5, 204	56, 376
230 by 60 feet	2, 550	Hk			22, 381	31, 152	1, 533	5, 558	60, 624
250 by 60 feet	2, 800	Hl			22, 381	35, 046	1, 533	5, 935	64, 895
270 by 60 feet	3, 025	Hm			22, 381	38, 940	1, 533	6, 321	69, 175
290 by 60 feet	3, 275	Hn			22, 381	42, 834	1, 533	6, 748	73, 496
310 by 60 feet	3, 500	Ho			22, 381	46, 728	1, 533	7, 169	77, 811

[1] Memphis, Tenn., pricing point.
[2] Varying house sizes may be obtained by adding "center section" units to minimum length house.
Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 41.—*Investment requirements of hull storage houses for cottonseed oil mills, in mill areas I through VI, by size of mill, 1949–50*

[Based on table 40]

Size of mill (tons crushed per day at normal operating rate)	Area I			Area II			Area III			Area IV			Area V			Area VI		
	Maximum hull storage capacity required [1]	Symbol	Cost [2]	Maximum hull storage capacity required [1]	Symbol	Cost [2]	Maximum hull storage capacity required [1]	Symbol	Cost [2]	Maximum hull storage capacity required [1]	Symbol	Cost [2]	Maximum hull storage capacity required [1]	Symbol	Cost [2]	Maximum hull storage capacity required [1]	Symbol	Cost [2]
	Tons	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*	*Tons*	*Code*	*Dollars*
40 to 80	127 to 273	IIa	18,430	121 to 262	IIa	18,430										120 to 261	IIa	18,430
40 to 100							114 to 309	IIa	18,430	113 to 308	IIa	18,430	116 to 314	IIa	18,430			
100 to 125 [3]	321 to 426	IIb	22,127	322 to 408	IIb	22,127										321 to 407	IIb	22,127
120 to 125							370 to 385	IIb	22,127	370 to 381	IIb	22,127	377 to 392	IIb	22,127			
160 to 200	506 to 674	IIc	25,727	483 to 654	IIc	25,727												
160 to 220							453 to 679	IIc	25,727	452 to 677	IIc	25,727	463 to 692	IIc	25,727	481 to 707	IIc	25,727
220 to 250	752 to 842	IId	30,099	720 to 805	IId	30,099												
240 to 250																722 to 803	IId	30,099
240 to 300 [4]							741 to 926	IId	30,099	739 to 924	IId	30,099	755 to 929	IId	30,099			
300 to 350	962 to 1,168	IIe	34,436															
300 to 360 [5]				967 to 1,178	IIe	34,436										964 to 1,174	IIe	34,436
350 to 360							1,052 to 1,111	IIe	34,436	1,050 to 1,109	IIe	34,436	1,073 to 1,132	IIe	34,436			
360 to 400	1,230 to 1,367	IIf	38,748															
400 [6]				1,207 to 1,308	IIf	38,748	1,215 to 1,235	IIf	38,748	1,212 to 1,232	IIf	38,748	1,238 to 1,258	IIf	38,748	1,203 to 1,305	IIf	38,748

[1] Based on 12 days' hull production.

[2] Memphis, Tenn., pricing point.

[3] 100-ton direct-solvent mill requires maximum hull storage capacity of 300 tons in Areas II and VI, and therefore uses House IIa.

[4] 240-ton prepress-solvent mill requires maximum hull storage capacity of 680, 678, and 694 tons in Areas III, IV, and V, respectively, and therefore uses House IIc. 300-ton hydraulic mill requires maximum storage capacity of 943 tons in Area V and therefore uses House IIe.

[5] 300-ton direct-solvent mill requires maximum hull storage capacity of 915 tons in Areas II and VI, and therefore uses House IId.

[6] 400-ton direct-solvent mill requires maximum hull storage capacity of 1,150, 1,147, and 1,173 tons in Areas III, IV, and V, respectively, and therefore uses House IIe. 400-ton prepress-solvent mill requires maximum hull storage of 1,134, 1,130, and 1,157 tons, respectively, in the same areas and therefore also uses House IIe.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II)

Cottonseed-Oil Storage Tanks

Storage facilities for cottonseed oil were grouped in two-tank units of widely different capacities. A two-tank unit is desirable, as it permits greater flexibility of operations. In the interest of orderly marketing, it was assumed that any well-balanced plant would be equipped with an oil-storage capacity equivalent to at least its oil output over a 7-day production period. In these terms:

Minimum oil storage=7 (oil yield per ton of seed × tons of seed processed per 24 hours).

For any particular mill, that two-tank unit was selected which most nearly coincided with the mill's weekly oil production. Owing to the wide difference in the capacity of storage tanks, considerably more storage was often provided than was actually required.

Costs of two-tank units are shown in table 42. (Piping from the oil extraction department to the oil storage tanks is discussed in the section on service piping.)

Oil-storage investment requirements for individual mills by areas are shown in table 43.

TABLE 42.—*Costs of oil storage tank units of different capacities for cottonseed oil mills, at specified locations, 1949–50*

Tank unit [1]	Code	Capacity		Cost at [2]—				
				Memphis, Tenn.	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
		Pounds	*Gallons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
First	A	360, 000	48, 000	7, 893	7, 793	8, 493	9, 093	9, 193
Second	B	630, 000	84, 000	9, 541	9, 441	10, 141	10, 941	11, 141
Third	C	1, 650, 000	220, 000	14, 374	14, 174	14, 974	15, 874	16, 274

[1] Each unit includes 2 tanks of equal size, connecting piping manifold, tank foundations, and dike.
[2] Includes installation charges.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 43.—*Investment requirements of cottonseed oil storage tank units for cottonseed oil mills, in mill areas I through VI, by size of mill, 1949–50*

[Based on table 42]

Size of mill (tons crushed per day at normal operating rate)	Maximum oil storage requirement [1]	Investment requirement in—					
		Area I [2]	Area II [3]	Area III [3]	Area IV [3]	Area V [4]	Area VI [5]
	1,000 lb.	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
40 to 160 [6]	80 to 360	7, 793	7, 893	7, 893	7, 893	8, 493	9, 193
170 to 280	360 to 630	9, 441	9, 541	9, 541	9, 541	10, 141	11, 141
290 to 400	630 to 1, 650	14, 174	14, 374	14, 374	14, 374	14, 974	16, 274

[1] Based on 7 days, oil production. 1 oil storage tank for each of the 3 ranges of oil requirements as follows: 360,000 pounds; 630,000 pounds; and 1,650,000 pounds, respectively.
[2] Atlanta, Ga., pricing point.
[3] Memphis, Tenn., pricing point.
[4] Dallas, Tex., pricing point.
[5] Bakersfield, Calif., pricing point.
[6] 160-ton prepress solvent mill has maximum oil storage requirement of approximately 400,000 pounds and therefore falls in the second size group.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

GENERAL SERVICE DEPARTMENT

The general service department included a boilerroom, a locker room, and a machine shop and storeroom housed in the same building (figs. 3 through 7). The machine shop occupied the center section of the building, whereas the boilerroom was placed in one end of the building and the locker room in the other end. This building was 32 feet wide and of the same type as the houses for bagged meal and baled linters. It was provided with doors and windows and lighting and the cost-unit included drainage ditch, water main along 1 side and 1 end, road and parking area, and sidewalks.

BOILERROOM

Boiler Unit

Eight boiler units were selected to meet the steam generating requirements of different mills. As the boilers were assumed to be oil-fired, the costs of each boiler unit included the cost of the boiler, a building section to house the boiler, and a fuel-oil storage tank having a tank-car unloading pump and connecting piping.

Boiler Requirements of Individual Mills

The boiler capacities required for mills were calculated by adding to the processing horsepower hours needed per day, an arbitrary amount of "surplus" horsepower to take care of miscellaneous steam requirements such as heating buildings or steam cleaning. (The processing requirements per ton of seed per day were 0.25 boiler horsepower for hydraulic and screw-press mills, 0.67 for prepress-solvent mills, and 0.93 for direct-solvent mills.) The boiler-horsepower processing requirements for each type of mill were based on estimated amounts of steam required per ton of seed crushed, considering the mill as operating at its normal rate.

As there were only eight boiler sizes to select from, it was often necessary to provide larger boilers than were actually required. For example, a boiler having a capacity of 50 horsepower per day was the smallest size available. This size coincided with the requirements of a 12-press hydraulic mill. A very large amount of excess boiler capacity was, therefore, associated with smaller mills, especially a 4-press mill.

As solvent must be vaporized from the oil and meal, the steam, and hence boiler, requirements for prepress and direct-solvent mills are much greater than for comparable sizes of hydraulic and screw-press mills where the steam requirements are mainly limited to needs for cooking cottonseed meats. For example, a 20-press (200-ton) hydraulic mill required a boiler having a capacity of 80 horsepower per day, whereas a boiler having a capacity of 200 horsepower per day was required by a 200-ton direct-solvent mill.

Investment Requirements

Boilerroom investment requirements were calculated in the usual manner, as indicated in tables 44 through 46.

Table 44.—*Cost of building and equipment units in boilerroom sections of general service buildings for cottonseed oil mills, 1949–50*

Unit	Approximate weight	Cost [1]		
		Delivered	Installation	Total
	Pounds	*Dollars*	*Dollars*	*Dollars*
Building-center section—32 by 10 feet		710	441	1, 151
Fuel oil storage tank and accessories (24,000 gallons)		3, 701	758	4, 459
Boiler size (steam generating capacity per day):				
50 horsepower	7, 500	3, 909	774	4, 683
80 horsepower	10, 000	5, 054	994	6, 048
100 horsepower	15, 000	6, 944	1, 354	8, 298
125 horsepower	18, 000	7, 398	1, 434	8, 832
150 horsepower	20, 000	8, 536	1, 655	10, 191
200 horsepower	25, 300	11, 644	2, 295	13, 939
300 horsepower	35, 400	14, 527	2, 870	17, 397
400 horsepower	43, 000	17, 084	3, 384	20, 468

[1] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 45.—*Cost of boilerroom sections of general service rooms for cottonseed oil mills, at specified locations, by size of boiler, 1949–50*

Size of boiler (steam generating capacity per day: Boiler horsepower)	Fuel oil storage tank and accessories cost	Building-center section		Boiler cost	Total cost at—				
		Unit	Cost		Memphis, Tenn. [1]	Atlanta, Ga.	Dallas, Tex.	Phoenix, Ariz.	Bakersfield, Calif.
	Dollars	*No.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
50	4, 459	1	1, 151	4, 683	10, 293	10, 281	10, 677	11, 102	11, 202
80	4, 459	1	1, 151	6, 048	11, 658	11, 659	12, 071	12, 537	12, 652
100	4, 459	1	1, 151	8, 298	13, 908	13, 934	14, 377	14, 923	15, 044
125	4, 459	1	1, 151	8, 838	14, 442	14, 482	14, 944	15, 540	15, 673
150	4, 459	1	1, 151	10, 191	15, 801	15, 852	16, 326	16, 954	17, 081
200	4, 459	1	1, 151	13, 939	19, 549	19, 572	20, 319	20, 751	20, 801
300	4, 459	2	2, 302	17, 397	24, 158	24, 209	24, 690	25, 599	25, 649
400	4, 459	2	2, 302	20, 468	27, 229	27, 301	27, 811	28, 399	28, 449

[1] Memphis, Tenn., was used as pricing point for individual items. Differences from the Memphis totals at the other pricing points were owing to differences in delivered cost of equipment.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 46.—*Investment requirements of boilerrooms for cottonseed oil mills, in mill areas I through VI, by type and size of mill at normal crushing rate, 1949–50*

[Based on table 45]

Type and size of mill at normal crushing rate	Steam generating capacity required per day [1]	Steam generating capacity of boiler per day	Building symbol	Investment requirement in—					
				Area I [2]	Area II [3]	Area III [3]	Area IV [3]	Area V [4]	Area VI [5]
Hydraulic and screw-press mills:	*B. hp.*	*Hp.*	*Code*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
25 to 120 tons per day	21 to 50	50	B1	10, 281	10, 293	10, 293	10, 293	10, 677	11, 202
125 to 220 tons per day	51 to 80	80	B2	11, 659	11, 658	11, 658	11, 658	12, 071	12, 652
240 to 300 tons per day	85 to 100	100	B3	13, 934	13, 908	13, 908	13, 908	14, 377	15, 044
320 to 400 tons per day	105 to 125	125	B4	14, 482	14, 442	14, 442	14, 442	14, 944	15, 673
Prepress-solvent mills:									
40 tons per day	42	50	B1	10, 281	10, 293	10, 293	10, 293	10, 677	11, 202
80 tons per day	69	80	B2	11, 659	11, 658	11, 658	11, 658	12, 071	12, 652
160 tons per day	128	125	B4	14, 482	14, 442	14, 442	14, 442	14, 944	15, 673
240 tons per day	187	200	B6	19, 572	19, 549	19, 549	19, 549	20, 319	20, 801
400 tons per day	297	300	B7	24, 209	24, 158	24, 158	24, 158	24, 690	25, 649
Direct-solvent mills:									
50 tons per day	62	80	B2	11, 659	11, 658	11, 658	11, 658	12, 071	12, 652
100 tons per day	108	125	B4	14, 482	14, 442	14, 442	14, 442	14, 944	15, 673
200 tons per day	207	200	B6	19, 572	19, 549	19, 549	19, 549	20, 319	20, 801
300 tons per day	305	300	B7	24, 209	24, 158	24, 158	24, 158	24, 690	25, 649
400 tons per day	399	400	B8	27, 301	27, 229	27, 229	27, 229	27, 811	28, 449

[1] Steam generating requirements for processing seed were as follows: 0.25 boiler horsepower per ton of seed per day for hydraulic and screw press mills; 0.67 boiler horsepower per ton of seed per day for prepress-solvent mills; and 0.93 boiler horsepower per ton of seed per day for direct-solvent mills. To the total boiler horsepower for processing the following were added for other uses: 15 boiler horsepower for mills processing up to and including 100 tons per day; 20 boiler horsepower for mills processing between 100 and 200 tons per day; and 25 boiler horsepower for larger mills.

[2] Atlanta, Ga., pricing point.

[3] Memphis, Tenn., pricing point.

[4] Dallas, Tex., pricing point.

[5] Bakersfield, Calif., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

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LOCKER ROOM

To service the needs of workers for space to keep personal belongings, locker rooms of 16 sizes were designed to meet the requirements of different mills. The smallest room was designed to accommodate 9 men per 24 hours and each next larger room was designed to accommodate 9 additional men for the same time period. The dimensions of these rooms, the number of men each will serve per 24 hours, and the value of the building, lockers, and plumbing fixtures are shown in table 48. One locker was provided per production worker per 24 hours. The number of production workers provided with lockers was calculated on the assumption of mills operating at their normal rates. There would be a shortage of lockers if mills were run at faster rates, and a surplus at slower rates.

Investment requirements for locker rooms are shown in tables 47 through 49.

TABLE 47.—*Cost of building and equipment units in locker room section of general service building for cottonseed oil mills, 1949–50*

Unit	Cost [1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Building: [2]			
Ends section—10 by 32 feet	2,375	2,601	4,976
Center section—1 by 32 feet	86	61	147
Locker	14	3	17
Plumbing fixtures	100	100	200
Fire hydrant	457	54	511

[1] Memphis, Tenn., pricing point.
[2] Varying building sizes may be obtained by adding "center section" unit to "ends section" unit.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 48.—*Costs of locker room sections of general service buildings for cottonseed oil mills, by number of men served per day, 1949–50*

Men served per day (number)	Length of 32'-wide building section [1]	Building symbol	Building-ends section cost	Building-center section		Locker		Plumbing fixtures		Fire hydrant cost	Unallocated cost [3]	Total cost [4]
				Unit	Cost [2]	Unit	Cost [2]	Unit	Cost [2]			
	Feet	*Code*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
9	10	L1	4,976	----	--------	9	153	4	800	511	182	6,622
18	10	L2	4,976	----	--------	18	306	4	800	511	182	6,775
27	25	L3	4,976	15	2,205	27	459	9	1,800	511	365	10,316
36	25	L4	4,976	15	2,205	36	612	9	1,800	511	365	10,469
45	33	L5	4,976	23	3,381	45	765	9	1,800	511	396	11,829
54	33	L6	4,976	23	3,381	54	918	12	2,400	511	396	12,582
63	33	L7	4,976	23	3,381	63	1,071	16	3,200	511	396	13,535
72	38	L8	4,976	28	4,116	72	1,224	16	3,200	511	396	14,423
81	38	L9	4,976	28	4,116	81	1,377	17	3,400	511	396	14,776
90	46	L10	4,976	36	5,292	90	1,530	20	4,000	511	427	16,736
99	52	L11	4,976	42	6,174	99	1,683	23	4,600	511	435	18,379
108	52	L12	4,976	42	6,174	108	1,836	23	4,600	511	435	18,532
117	57	L13	4,976	47	6,909	117	1,989	24	4,800	511	444	19,629
126	57	L14	4,976	47	6,909	126	2,142	27	5,400	511	444	20,382
135	63	L15	4,976	53	7,791	135	2,295	30	6,000	511	463	22,036
144	63	L16	4,976	53	7,791	144	2,448	30	6,000	511	463	22,189

[1] Varying building sizes may be obtained by adding "center section" units to "ends section" unit.
[2] Unit costs of building-center section, locker, and plumbing fixtures are $147, $17, and $200, respectively.
[3] Miscellaneous costs of general service building.
[4] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 49.—*Investment requirements for locker rooms for men employed at cottonseed oil mills, by type and size of mills operating at normal rates, 1949–50*

[Based on table 48]

Type and size of mill at normal crushing rate	Men required per day [1]	Building symbol	Cost [2]
	Number	*Code*	*Dollars*
Hydraulic:			
40 to 60 tons per day	30 to 36	L_4	10, 469
80 tons per day	42	L_5	11, 829
100 to 120 tons per day	48 to 51	L_6	12, 582
160 tons per day	63	L_7	13, 535
200 to 220 tons per day	78 to 81	L_9	14, 776
240 tons per day	84	L_{10}	16, 736
300 tons per day	102	L_{12}	18, 532
360 to 400 tons per day	120 to 126	L_{14}	20, 382
Screw press:			
50 tons per day	24	L_3	10, 316
75 to 100 tons per day	30 to 34	L_4	10, 469
125 tons per day	37	L_5	11, 829
175 to 200 tons per day	46 to 50	L_6	12, 582
250 tons per day	60	L_7	13, 535
300 tons per day	67	L_8	14, 423
350 tons per day	76	L_9	14, 776
400 tons per day	83	L_{10}	16, 736
Direct solvent:			
50 tons per day	27	L_3	10, 316
100 tons per day	36	L_4	10, 469
200 tons per day	51	L_6	12, 582
300 tons per day	66	L_8	14, 423
400 tons per day	81	L_9	14, 776
Prepress solvent:			
40 to 80 tons per day	30 to 36	L_4	10, 469
160 tons per day	49	L_6	12, 582
240 tons per day	63	L_7	13, 535
400 tons per day	87	L_{10}	16, 736

[1] Based on number of production workers required per 24 hours.
[2] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

MACHINE SHOP AND STOREROOM

Three rooms were designed in meeting the storeroom and machine-shop requirements of different mills. These units are shown in table 50 in terms of their building equipment and total investment costs.

As there is no exact relationship between the size of these units and the size of mill, machine shop and storeroom costs were estimated merely for small, medium, and large mills, processing, at their normal processing rates, up to 100 tons, 100 to 250 tons, and 260 to 400 tons of seed per day, respectively.

ELECTRIC SUBSTATION

Twelve power substations, ranging from 255 to 3,400 kilowatts were used in meeting the requirements of the various types and sizes of mills. These stations in terms of the type, number, and size of transformers and cost, are shown in table 51.

In designing these substations, electric power for mills was assumed to be stepped down at a substation on the mill property to 440 volts with a 3-wire system for 3-phase power and to 220 volts with a 3-wire system for single-phase lighting and power. Transmission throughout the mill would be at these voltages. This conforms with general practice in the cottonseed-crushing industry.

Costs were made up on different sizes of high and low voltage transformers and on auxiliary equipment to serve and connect a bank of 3 single-phase high-voltage transformers and 1 low-voltage transformer.

Substations of more than 1,000 kilovolt-amperes in size were made up by combining additional transformers and additional auxiliary units. These

TABLE 50.—*Investment requirements of storeroom and machine shop sections of general service buildings for cottonseed oil mills, by size of mill and description of units, 1949–50*

Size of mill and description of unit	Floor area	Cost [1]		
		Delivered	Installation	Total
	Sq. ft.	*Dollars*	*Dollars*	*Dollars*
Small mill [2]		24, 314	5, 334	29, 648
Building unit	2, 080	6, 012	3, 430	9, 442
Storeroom equipment		12, 861	790	13, 651
Machine shop equipment		5, 441	1, 114	6, 555
Medium mill [3]		40, 637	8, 345	48, 982
Building unit	2, 944	8, 881	4, 733	13, 614
Storeroom equipment		19, 755	1, 173	20, 928
Machine shop equipment		12, 001	2, 439	14, 440
Large mill [4]		62, 366	12, 625	74, 991
Building unit	4, 096	12, 432	6, 401	18, 833
Storeroom equipment		26, 928	1, 571	28, 499
Machine shop equipment		23, 006	4, 653	27, 659

[1] Memphis, Tenn., pricing point.
[2] Includes mills operating at 100 tons per day, and less, at normal rate.
[3] Includes mills operating at 110 to 250 tons per day at normal rate.
[4] Includes mills operating at 260 to 400 tons per day at normal rate.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 51.—*Unit requirements and total costs of electric power substations of different capacities for specified equipment units for cottonseed oil mills, 1949–50* [1]

Equipment unit	Cost of unit			3-phase power capacity at 0.85 power factor (kw.) and rated 3-phase capacity (kv.-a.)																							
	Delivered	Installation	Total	255 kw. (300 kv.-a.)		425 kw. (500 kv.-a.)		640 kw. (750 kv.-a.)		850 kw. (1,000 kv.-a.)		1,060 kw. (1,250 kv.-a.)		1,270 kw. (1,500 kv.-a.)		1,490 kw. (1,750 kv.-a.)		1,700 kw. (2,000 kv.-a.)		2,120 kw. (2,500 kv.-a.)		2,550 kw. (3,000 kv.-a.)		2,980 kw. (3,500 kv.-a.)		3,400 kw. (4,000 kv.-a.)	
				Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost
	Dol.	*Dol.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*
High voltage transformer:																											
100 kilovolt-amperes	2,391	2,215	4,606	2	9,212																						
167 kilovolt-amperes	2,606	2,412	5,018	1	5,018	2	10,036					2	10,036													1	4,606
250 kilovolt-amperes	2,863	2,652	5,515			1	5,515	2	11,030			4	22,060	5	27,575	2	11,030					1	5,515				
333 kilovolt-amperes	3,229	2,994	6,223					1	6,223	2	12,446			1	6,223	3	18,669	5	31,115	2	12,446			4	24,892	2	12,446
500 kilovolt-amperes	3,849	3,570	7,419							1	7,419					1	7,419	1	7,419	4	29,676	6	44,514	5	37,095	7	51,933
Low voltage transformer:																											
25 kilovolt-amperes	321	309	630	1	630																						
50 kilovolt-amperes	493	467	960			1	960	1	960			2	1,920	2	1,920	1	960	1	960								
75 kilovolt-amperes	648	610	1,258							1	1,258					1	1,258	1	1,258	1	1,258			3	3,774	1	1,258
100 kilovolt-amperes	797	746	1,543																	1	1,543	2	3,086			2	3,086
Auxiliary equipment	984	928	1,912	1	1,912	1	1,912	1	1,912	1	1,912	2	3,824	2	3,824	2	3,824	2	3,824	2	3,824	2	3,824	3	5,736	3	5,736
Total cost					16,772		18,423		20,125		23,035		37,840		39,542		43,160		44,576		48,747		56,939		71,497		79,065
Delivered					8,693		9,552		10,432		11,939		19,618		20,498		22,371		23,103		25,267		29,519		37,057		40,986
Installation					8,079		8,871		9,693		11,096		18,222		19,044		20,789		21,473		23,480		27,420		34,440		38,079

[1] The capacity ratings of the substations do not include the single-phase power transformers which provide lighting.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

sizes are given in terms of 3-phase power at 0.85 power factor and in terms of rated 3-phase kilovolt-amperes. The total costs include the cost of equipment for single-phase power.

The sizes of transformers required to supply the 220-volt single-phase system were calculated by assuming the 220-volt kilovolt-ampere requirement bore the same relationship to the 440-volt kilovolt-ampere requirements as the kilovolt-ampere power for the lighting, installed in all buildings except seed houses, bore to the kilovolt-ampere requirements of all motors at full load except those in the seed houses. Investment requirements are shown in table 52 for mills crushing specified volumes of seed.

TABLE 52.—*Investment requirements of electric substations for cottonseed oil mills crushing specified volumes of seed annually, 1949–50*

[Based on table 51]

Mill	Size of mill (seed crushed per day at normal operating rate)	Length of operating season [1]	Maximum electric power demand required [2]	Cost [3]
ANNUAL CRUSH: 10,600 TONS				
	Tons	*Months*	*Kilowatts*	*Dollars*
Prepress solvent:				
Plant 1	40	12. 0	253	16, 772
Plant 2	80	6. 0	405	18, 423
Direct solvent:				
Plant 1	50	9. 6	241	16, 772
Plant 2	100	4. 8	382	18, 423
Screw press:				
2 press	50	9. 6	320	18, 423
3 press	75	6. 4	437	20, 125
Hydraulic:				
4 press	40	12. 0	219	16, 772
6 press	60	8. 0	279	18, 423
8 press	80	6. 0	339	18, 423
ANNUAL CRUSH: 13,200 TONS				
Direct solvent:				
Plant 1	50	12. 0	291	18, 423
Plant 2	100	6. 0	382	18, 423
Prepress solvent: Plant 2	80	7. 5	405	18, 423
Screw press:				
2 press	50	12. 0	370	18, 423
3 press	75	8. 0	437	20, 125
4 press	100	6. 0	540	20, 125
Hydraulic:				
6 press	60	10. 0	279	18, 423
8 press	80	7. 5	339	18, 423

See footnotes at end of table.

TABLE 52.—*Investment requirements of electric substations for cottonseed oil mills crushing specified volumes of seed annually, 1949–50*—Continued

[Based on table 51]

Mill	Size of mill (seed crushed per day at normal operating rate)	Length of operating season [1]	Maximum electric power demand required [2]	Cost [3]
ANNUAL CRUSH: 21,100 TONS				
	Tons	*Months*	*Kilowatts*	*Dollars*
Prepress solvent:				
Plant 2	80	12. 0	505	20, 125
Plant 3	160	6. 0	761	23, 035
Direct solvent: Plant 2	100	9. 6	482	20, 125
Screw press:				
4 press	100	9. 6	640	20, 125
5 press	125	7. 7	742	23, 035
Hydraulic:				
8 press	80	12. 0	439	20, 125
10 press	100	9. 6	498	20, 125
12 press	120	8. 0	558	20, 125
ANNUAL CRUSH: 26,400 TONS				
Direct solvent:				
Plant 2	100	12. 0	532	20, 125
Plant 3	200	6. 0	763	23, 035
Prepress solvent: Plant 3	160	7. 5	811	23, 035
Screw press:				
4 press	100	12. 0	690	23, 035
5 press	125	9. 6	742	23, 035
Hydraulic:				
10 press	100	12. 0	548	20, 125
12 press	120	10. 0	558	20, 125
ANNUAL CRUSH: 42,200 TONS				
Prepress solvent: Plant 3	160	12. 0	911	37, 840
Direct solvent: Plant 3	200	9. 6	863	37, 840
Screw press:				
7 press	175	11. 0	1, 077	39, 542
8 press	200	9. 6	1, 180	39, 542
Hydraulic:				
16 press	160	12. 0	827	23, 025
22 press	220	8. 7	956	37, 840
24 press	240	8. 0	1, 016	37, 840
ANNUAL CRUSH: 52,800 TONS				
Direct solvent: Plant 3	200	12. 0	1, 013	37, 840
Prepress solvent: Plant 4	240	10. 0	1, 316	43, 160
Screw press:				
8 press	200	12. 0	1, 330	43, 160
10 press	250	9. 6	1, 500	44, 576
Hydraulic:				
20 press	200	12. 0	1, 047	37, 840
22 press	220	10. 9	1, 056	37, 840
24 press	240	10. 0	1, 116	39, 542

See footnotes at end of table.

TABLE 52.—*Investment requirements of electric substations for cottonseed oil mills crushing specified volumes of seed annually, 1949–50*—Continued

[Based on table 51]

Mill	Size of mill (seed crushed per day at normal operating rate)	Length of operating season [1]	Maximum electric power demand required [2]	Cost [3]
ANNUAL CRUSH: 63,400 TONS				
	Tons	*Months*	*Kilowatts*	*Dollars*
Prepress solvent: Plant 4	240	12.0	1,366	43,160
Direct solvent:				
Plant 4	300	9.6	1,295	43,160
Plant 5	400	7.2	1,527	44,576
Screw press:				
10 press	250	11.5	1,550	44,576
12 press	300	9.6	1,770	48,747
Hydraulic: 24 press	240	12.0	1,166	39,542
ANNUAL CRUSH: 79,200 TONS				
Direct solvent:				
Plant 4	300	12.0	1,445	43,160
Plant 5	400	9.0	1,677	44,576
Prepress solvent: Plant 5	400	9.0	2,077	48,747
Screw press:				
12 press	300	12.0	1,920	48,747
14 press	350	10.3	2,105	48,747
Hydraulic:				
30 press	300	12.0	1,495	44,576
36 press	360	10.0	1,624	44,576
40 press	400	9.0	1,743	48,747
ANNUAL CRUSH: 105,600 TONS				
Prepress solvent: Plant 5	400	12.0	2,327	56,939
Direct solvent: Plant 5	400	12.0	1,927	48,747
Screw press: 16 press	400	12.0	2,560	71,497
Hydraulic: 40 press	400	12.0	1,993	48,747

[1] Averaging 22 24-hour working days per month.
[2] Based on calculations of kilowatt power demand required during any 15-minute period for the unloading, storing, and processing of seed. It was assumed that meal grinding, pelleting, or sacking would be performed during periods of low demand in such a way that the total demand for power would not be altered.
[3] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

SERVICE PIPING

To a large degree, the machinery and building units were made up so that they could be put together in different ways from the original design and still cost about the same. To carry out this plan, certain items, such as connecting piping, the quantity and cost of which would depend on the layout, were grouped in units. In estimating the costs for a different layout of buildings or machinery, the units containing these connecting items would be the only ones that would need to be changed. These costs include oil, steam, and water piping between buildings, trestles to carry piping across the railroad tracks between the mill building and the service building, sewer lines, cost for connecting the fire main to the municipal water system, control valves in the fire main, and other similar items.

Variations in these cost requirements are slight for small differences in size of mills. All mills were grouped into "small," "medium," and "large" in determining costs, as indicated in table 53, assuming each mill was operated at its normal rate.

TABLE 53.—*Costs of service piping for cottonseed oil mills, by type and size of mill, 1949–50*

Type and size of mill [1]	Cost [2]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Hydraulic:			
Small	4,737	4,631	9,368
Medium	5,287	5,891	11,178
Large	6,205	7,605	13,810
Screw press:			
Small	4,050	4,486	8,536
Medium	4,456	5,542	9,998
Large	5,000	6,782	11,782
Direct solvent:			
Small	5,562	5,723	11,285
Medium	6,258	6,931	13,189
Large	7,744	8,827	16,571
Prepress solvent:			
Small	5,562	5,723	11,285
Medium	6,258	6,931	13,189
Large	7,744	8,827	16,571

[1] Small mills crush 100 tons of cottonseed per day and less; medium mills crush 110 to 250 tons; and large mills crush 260 to 400 tons per day. All mills assumed to be operating at their normal rates.
[2] These costs cover piping requirements for steam, water, and oil lines to processing departments, sanitary water main, sewer lines, connection of fire main to municipal system, control valves in fire main, and other items of similar nature. These costs would be approximately the same for Memphis, Tenn.; Atlanta, Ga.; Dallas, Tex.; Phoenix, Ariz.; and Bakersfield, Calif., pricing points.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

MISCELLANEOUS FACILITIES

There are a number of other capital items, required by any mill, which may be most conveniently discussed under the general heading of miscellaneous items. These include a vehicle shed, seed-sampling building, office building and furniture and supplies, railroad-scale house and oil-unloading station, railroad scale, railroad track and switches, truck scale, trucks and automobiles, sundry equipment, and a fire-protection tank (provided only for hydraulic and screw-press mills).

There is no known exact relationship between the size of mill and the needed amount of each of these miscellaneous facilities. Therefore, as in the case of the storeroom and machine shops, the amount and cost of each of these facilities have been estimated merely for small, medium, and large mills, as previously defined. A summary of these estimates is shown in table 54, except for the cost of the fire-protection tank which is shown in table 55. The way in which this summary was reached for each item is briefly described in the following paragraphs.

SEED-SAMPLING UNIT

In areas where seed is sold on the basis of grade, facilities should be provided to handle and store seed samples. The three units of different sizes designed for this purpose included concrete block buildings, each with a shed along one side. Also, each building included sample preparation instruments and equipment.

OFFICE BUILDING

The administrative office was assumed to be a single-story frame building with asbestos shingle siding and asphalt shingle roof.

Costs of each building were estimated by laying out floor plans and applying a cost of $9 per square foot. The cost thus computed included the cost of the building with heating and air conditioning. Furniture and supplies, landscaping, and a parking lot were estimated separately.

RAILROAD-SCALE HOUSE AND OIL-LOADING STATION

The housing for the railroad-scale beam was placed at one end of the loading dock, alongside the mill building. Within the same structure were the control valves for loading oil into tank cars, and the costs for this installation were combined into the railroad-scale house and oil-loading station.

Each of these three houses is shown in table 54 in terms of the size range of mills it is designed to accommodate.

TABLE 54.—*Costs of miscellaneous items for cottonseed oil mills, by cost item and size of mill, 1949–50* [1]

Cost item and size of mill	Building				Equipment			Total
	Gross area	Materials	Construction	Total	Delivered	Installation	Total	
	Sq. ft.	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Trucks and autos for—								
Small mill	990	524	420	944			[2] 6,000	6,944
Medium mill	1,980	924	723	1,647			[2] 8,000	9,647
Large mill	2,970	1,324	1,025	2,349			[2] 10,000	12,349
Seed sampling unit for—								
Small mill	500	1,154	873	2,027	2,263	453	2,716	4,743
Medium mill	600	1,260	974	2,234	2,510	502	3,012	5,246
Large mill	700	1,362	1,067	2,429	2,807	562	3,369	5,798
Office for—								
Small mill	880			9,100	5,348	1,010	6,358	15,458
Medium mill	1,604			16,600	7,684	1,457	9,141	25,741
Large mill	2,546			26,200	10,684	2,017	12,701	38,901
Railroad scale and oil loading station for—								
Small mill	80	601	295	896			[3] 15,000	15,896
Medium mill	80	601	295	896			[3] 16,000	16,896
Large mill	80	601	295	896			[3] 18,000	18,896
Truck scale for—								
Small mill							5,000	5,000
Medium mill							5,500	5,500
Large mill							6,000	6,000
Railroad track and switches for—								
Small mill							26,900	26,900
Medium mill							31,700	31,700
Large mill							42,100	42,100
Sundry items for—								
Small mill							10,500	10,500
Medium mill							14,900	14,900
Large mill							20,000	20,000

[1] Small mills crush 100 tons and less; medium mills crush 110 to 250 tons; and large mills crush 260 to 400 tons per day. All mills assumed to be operating 24 hours per day at their normal rates.

[2] Trucks and autos.

[3] Railroad scale.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 55.—*Installed cost of fire protection tanks and tank-heating equipment for hydraulic and screw-press cottonseed oil mills at specified locations, 1949–50* [1]

Cost item	Atlanta	Memphis	Dallas	Phoenix [2]	Bakersfield [2]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Tank (50,000 gallons)	19, 580	19, 680	20, 230	19, 980	21, 030
Heating equipment	2, 022	2, 022	2, 022		
Total	21, 602	21, 702	22, 252	19, 980	21, 030

[1] Heating equipment to prevent freezing of noncirculating water reserve.
[2] Not needed because of warm climate.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

RAILROAD AND TRUCK SCALES

With each size group of mills, table 54 also shows the required size of railroad and truck scales.

RAILROAD TRACK AND SWITCHES

As there was no exact relationship between size of mill and the amount of railroad track needed, estimates of needed track were made only for small, medium, and large mills. The costs were calculated at $8 per foot, and the totals are shown in table 54 for groups of mills of different sizes.

TRUCKS, AUTOMOBILES, AND VEHICLE SHEDS

The report assumed a truck and auto investment of $6,000, $8,000, and $10,000, respectively, for small, medium, and large mills, each vehicle costing approximately $2,000. No investment in a fleet of seed-hauling trucks was provided, as it was assumed that hauling cost per ton of seed would be about the same whether done by the mill or others. In other words, the equivalent of the seed-truck investment requirements was included in operating costs as charges for seed hauling, and is considered in the next chapter.

The 3 different sizes of vehicle sheds were designed to house 5, 10, and 15 vehicles, respectively, and to be constructed of corrugated sheet metal on wooden framing and containing 9 x 22-foot stalls.

SUNDRY ITEMS

This category of capital outlays included such items as a fork truck for handling linters bales, portable seed house and hull conveyors, portable scales, drinking fountains, and fire extinguishers.

LAND

Four assumptions were used in calculating the land-investment requirements of any mill. First, the property would be a rectangular plot whose dimensions were fixed by the number and sizes of buildings and clearances. Second, below the railroad track as shown for example in figure 3, the width of the property would be a 50-foot clearance between the property line and the linters warehouse, the width of this warehouse and unloading dock (60 ft.), and the distance between this warehouse and the first seed house (50 ft.), or a total of 160 feet. Third, the length of the property was determined by the length of the longest seed house, the length of the mill building, and 280 feet of clearance—110 feet between the end of the meal warehouse and the property line, 110 feet between the end of the mill building and the seed houses, and 60 feet between the end of the longest seed house and the property line. Fourth, the cost of the land was estimated at $500 per acre.

On these assumptions, total land investment for any hydraulic or screw-press mill may be expressed by the following equation:

$$\text{Land cost} = \frac{500}{43{,}500} \times (W+G+P+O+M+S+280)\ (140N+160)$$

W = length of meal warehouse
G = length of meal-grinding department = 20 feet
P = length of pelleting department = 20 feet
O = length of oil-extraction department
M = length of mechanical pretreatment department
S = length of longest seed house
N = number of seed houses (N must always be 2 or more)
43,500 = number of square feet in an acre

All building lengths are expressed in feet.

The same formula was used for direct-solvent and prepress-solvent mills except that 480 was used in place of the term (140N+160) until the mill was large enough to require enough seed houses for this term to be greater than 480. After this point, the formula given was used for all types of mills.

TOTAL PLANT INVESTMENTS

The costs of mill departments described, including land and miscellaneous items, may now be consolidated into total investment requirements for individual plants in any particular area. Table 56 shows these requirements in area II for all plants discussed in this report.

As already stated, total investment requirements for any particular mill vary somewhat from area to area, owing to the effect on storage requirements of variation among areas in product yields and in freight costs on machinery and equipment between the point of manufacture and the mill locality. Total plant investments for five other typical mill areas are shown in table 57.

TABLE 56.—*Calculated investment requirements for different departments of different types and sizes of cottonseed oil mills crushing specified volumes of seed annually, mill area II, 1949–50*

ANNUAL CRUSH: 10,600 TONS OF SEED

Mill	24-hour crushing capacity, at normal operating rates	Length of operating season [2]	Investment [1]: Processing department: Mechanical pretreatment	Processing department: Baling press	Processing department: Oil extraction	Processing department: Cracked cake or meal bins	Processing department: Meal grinding, pelleting, and sacking	Storage department: Seed	Storage department: Sacked meal and pellets	Storage department: Baled lint and miscellaneous supplies	Storage department: Hulls	Storage department: Cottonseed oil
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:												
Plant 1	40	12. 0	133, 212	22, 691	240, 940	23, 296	54, 113	89, 306	13, 847	13, 884	18, 430	7, 893
Plant 2	80	6. 0	185, 761	22, 841	292, 893	23, 296	54, 113	63, 023	17, 046	15, 437	18, 430	7, 893
Direct solvent:												
Plant 1	50	9. 6	153, 984	22, 691	223, 418	23, 296	54, 113	80, 846	13, 847	13, 884	18, 430	7, 893
Plant 2	100	4. 8	244, 688	23, 066	295, 464	23, 296	54, 113	62, 599	17, 046	15, 437	18, 430	7, 893
Screw press:												
2 press	50	9. 6	147, 908	22. 691	99. 362	23, 296	65, 225	80, 846	13, 847	13, 884	18, 430	7, 893
3 press	75	6. 4	185, 761	22, 841	127, 993	23, 296	65, 225	63, 023	13, 847	15, 437	18, 430	7, 893
Hydraulic:												
4 press	40	12. 0	133, 212	22, 691	93, 549	23, 296	65, 225	89, 306	13, 847	13, 884	18, 430	7, 893
6 press	60	8. 0	158, 719	22, 691	115, 541	23, 296	65, 225	80, 846	13, 847	13, 884	18, 430	7, 893
8 press	80	6. 0	185, 761	22, 841	128, 231	23, 296	65, 225	63, 023	17, 046	15, 437	18, 430	7, 893

ANNUAL CRUSH: 13,200 TONS OF SEED

Mill	24-hour crushing capacity, at normal operating rates	Length of operating season [2]	Investment [1]: Processing department: Mechanical pretreatment	Processing department: Baling press	Processing department: Oil extraction	Processing department: Cracked cake or meal bins	Processing department: Meal grinding, pelleting, and sacking	Storage department: Seed	Storage department: Sacked meal and pellets	Storage department: Baled lint and miscellaneous supplies	Storage department: Hulls	Storage department: Cottonseed oil
Direct solvent:												
Plant 1	50	12. 0	153, 984	22, 691	223, 418	23, 296	54, 113	108, 495	13, 847	13, 884	18, 430	7, 893
Plant 2	100	6. 0	244, 688	23, 066	295, 464	23, 296	54, 113	72, 324	17, 046	15, 437	18, 430	7, 893
Prepress solvent: Plant 2	80	7. 5	185, 761	22, 841	292, 893	23, 296	54, 113	80, 846	17, 046	15, 437	18, 430	7, 893
Screw press:												
2 press	50	12. 0	147, 908	22, 691	99, 362	23, 296	65, 225	108, 495	13, 847	13, 884	18, 430	7, 893
3 press	75	8. 0	185, 761	22, 841	127, 993	23, 296	65, 225	89, 306	13, 847	15, 437	18, 430	7, 893
4 press	100	6. 0	240, 297	23, 066	165, 902	23, 296	65, 225	72, 324	17, 046	15, 437	22, 127	7. 893
Hydraulic:												
6 press	60	10. 0	158, 719	22, 691	115, 541	23, 296	65, 225	97, 752	13, 847	13, 884	18. 430	7, 893
8 press	80	7. 5	185, 761	22, 841	128, 231	23, 296	65, 225	80, 846	17, 046	15, 437	18, 430	7. 893

See footnotes at end of table.

260538°—54——8

TABLE 56.—*Calculated investment requirements for different departments of different types and sizes of cottonseed oil mills crushing specified volumes of seed annually, mill area II, 1949–50*—Continued

Mill	24-hour crushing capacity, at normal operating rates	Length of operating season [2]	Investment [1]: Processing department: Mechanical pretreatment	Processing department: Baling press	Processing department: Oil extraction	Processing department: Cracked cake or meal bins	Processing department: grinding, pelleting, and sacking	Storage department: Seed	Storage department: Sacked meal and pellets	Storage department: Baled lint and miscellaneous supplies	Storage department: Hulls	Storage department: Cottonseed oil
ANNUAL CRUSH: 21,100 TONS OF SEED												
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:												
Plant 2	80	12.0	185, 761	22, 811	292, 893	23, 296	54, 113	174, 303	17, 046	15, 437	18, 430	7, 893
Plant 3	160	6.0	328, 661	23, 516	376, 721	33, 508	54, 113	105, 417	23, 577	22, 453	25, 727	9, 541
Direct solvent: Plant 2	100	9.6	244, 688	23, 066	295, 464	23, 296	54, 113	157, 086	17, 046	15, 437	18, 430	7, 893
Screw press:												
4 press	100	9.6	240, 297	23, 066	165, 902	23, 296	65, 225	157, 086	17, 046	15, 437	22, 127	7, 893
5 press	125	7.7	282, 618	23, 216	194, 454	33, 508	65, 225	124, 604	17, 046	19, 390	22, 127	7, 893
Hydraulic:												
8 press	80	12.0	185, 761	22, 811	128, 231	23, 296	65, 225	174, 303	17, 046	15, 437	18, 430	7, 893
10 press	100	9.6	240, 297	23, 066	143, 812	23, 296	65, 225	157, 086	17, 046	15, 437	22, 127	7, 893
12 press	120	8.0	282, 618	23, 216	159, 508	33, 508	65, 225	133, 043	17, 046	19, 390	22, 127	7, 893
ANNUAL CRUSH: 26,400 TONS OF SEED												
Direct solvent:												
Plant 2	100	12.0	244, 688	23, 066	295, 464	23, 296	54, 113	201, 859	17, 046	15, 437	18, 430	7, 893
Plant 3	200	6.0	403, 552	31, 455	372, 010	33, 508	54, 113	124, 604	25, 463	25, 455	25, 727	9, 541
Prepress solvent: Plant 3	160	7.5	328, 661	23, 516	376, 721	33, 508	54, 113	157, 086	23, 577	22, 453	25, 727	9, 541
Screw press:												
4 press	100	12.0	240, 297	23, 066	165, 902	23, 296	65, 225	201, 859	17, 046	15, 437	22, 127	7, 893
5 press	125	9.6	282, 618	23, 216	194, 454	33, 508	65, 225	182, 716	17, 046	19, 390	22, 127	7, 893
Hydraulic:												
10 press	100	12.0	240, 297	23, 066	143, 812	23, 296	65, 225	201, 859	17, 046	15, 437	22, 127	7, 893
12 press	120	10.0	282, 618	23, 216	159, 508	33, 508	65, 225	191, 116	17, 046	19, 390	22, 127	7, 893
ANNUAL CRUSH: 42,200 TONS OF SEED												
Prepress solvent: Plant 3	160	12.0	328, 661	23, 516	376, 721	33, 508	54, 113	322, 847	23, 577	22, 453	25, 727	9, 541
Direct solvent: Plant 3	200	9.6	403, 552	31, 455	372, 010	33, 508	54, 113	284, 480	25, 463	25, 455	25, 727	9, 541
Screw press:												
7 press	175	11.0	372, 231	31, 455	258, 070	33, 508	65, 225	303, 667	23, 577	23, 917	25, 727	9, 541
8 press	200	9.6	407, 321	31, 455	287, 292	33, 508	65, 225	284, 480	25, 463	25, 455	25, 727	9, 541
Hydraulic:												
16 press	160	12.0	328, 661	23, 516	230, 118	33, 508	65, 225	322, 847	23, 577	22, 453	25, 727	7, 893
22 press	220	8.7	432, 953	31, 455	281, 553	43, 732	65, 225	276, 080	27, 309	25, 455	30, 099	9, 541
24 press	240	8.0	471, 308	35, 409	294, 765	43, 732	65, 225	245, 587	27, 309	30, 810	30, 099	9, 541

ANNUAL CRUSH: 52,800 TONS OF SEED												
Direct solvent: Plant 3	200	12.0	403, 552	31, 455	372, 010	33, 508	54, 113	398, 948	25, 463	25, 455	25, 727	9, 541
Prepress solvent: Plant 4	240	10.0	471, 308	35, 409	511, 304	43, 732	54, 113	358, 131	27, 309	30, 810	30, 099	9, 541
Screw press:												
8 press	200	12.0	407, 321	31, 455	287, 292	33, 508	65, 225	398, 948	25, 463	25, 455	25, 727	9, 541
10 press	250	9.6	504, 586	35, 484	358, 965	43, 732	65, 225	349, 692	29, 169	30, 810	30, 099	9, 541
Hydraulic:												
20 press	200	12.0	407, 321	31, 455	261, 866	33, 508	65, 225	398, 948	25, 463	25, 455	25, 727	9, 541
22 press	220	10.9	432, 953	31, 455	281, 553	43, 732	65, 225	374, 915	27, 309	25, 455	30, 099	9, 541
24 press	240	10.0	471, 308	35, 409	294, 765	43, 732	65, 225	358, 131	27. 309	30, 810	30, 099	9, 541
ANNUAL CRUSH: 63,400 TONS OF SEED												
Prepress solvent: Plant 4	240	12.0	471, 308	35, 409	511, 304	43, 732	54. 113	462, 444	27, 309	30, 810	30, 099	9, 541
Direct solvent:												
Plant 4	300	9.6	612, 511	35, 709	436, 750	43, 732	54, 113	418, 041	31, 033	34, 316	30, 099	14, 374
Plant 5	400	7.2	770, 940	45, 312	490, 405	53, 880	54, 113	330, 512	39, 239	44, 004	38, 748	14, 374
Screw press:												
10 press	250	11.5	504, 586	35, 484	358, 965	43, 732	65, 225	462, 444	29, 169	30, 810	30, 099	9, 541
12 press	300	9.6	614, 416	35, 709	420, 110	43, 732	65, 225	418, 041	31, 033	34, 316	34, 436	14, 374
Hydraulic: 24 press	240	12.0	471, 308	35, 409	294, 765	43, 732	65, 225	462, 444	27, 309	30, 810	30, 099	9, 541
ANNUAL CRUSH: 79,200 TONS OF SEED												
Direct solvent:												
Plant 4	300	12.0	612, 511	35, 709	436, 750	43, 732	54, 113	583. 380	31, 033	34, 316	30, 099	14, 374
Plant 5	400	9.0	770, 940	45, 312	490, 405	53, 880	54, 113	497, 681	39, 239	44, 004	38, 748	14, 374
Prepress solvent: Plant 5	400	9.0	787, 985	45, 312	673, 713	53. 880	54, 113	497, 681	39, 239	44. 004	38, 748	14, 374
Screw press:												
12 press	300	12.0	614. 416	35, 709	420. 110	43, 732	65, 225	583, 380	31, 033	34, 316	34, 436	14. 374
14 press	350	10.3	718, 276	45, 312	481, 795	53, 880	65, 225	539, 024	37, 355	41, 080	34, 436	14, 374
Hydraulic:												
30 press	300	12.0	614, 416	35, 709	443, 048	43, 732	65, 225	583, 380	31. 033	34, 316	34, 436	14, 374
36 press	360	10.0	718, 276	45, 312	493, 906	53, 880	65, 225	539, 024	37, 355	41, 080	34, 436	14, 374
40 press	400	9.0	787, 985	45, 312	519, 342	53, 880	65. 225	497, 681	39, 239	44, 004	38, 748	14, 374
ANNUAL CRUSH: 105,600 TONS OF SEED												
Prepress solvent: Plant 5	400	12.0	787, 985	45, 312	673, 713	53, 880	54, 113	782, 726	39, 239	44, 004	38, 748	14, 374
Direct solvent: Plant 5	400	12.0	770, 940	45, 312	490, 405	53, 880	54, 113	782. 726	39, 239	44, 004	38, 748	14, 374
Screw press: 16 press	400	12.0	787, 985	45, 312	539, 872	53, 880	65, 225	782, 726	39, 239	44, 004	38, 748	14, 374
Hydraulic: 40 press	400	12.0	787, 985	45. 312	519, 342	53, 880	65, 225	782, 726	39, 239	44, 004	38, 748	14. 374

See footnotes at end of table.

TABLE 56.—*Calculated investment requirements for different departments of different types and sizes of cottonseed oil mills crushing specified volumes of seed annually, mill area II, 1949–50*—Continued

ANNUAL CRUSH: 10,600 TONS OF SEED

Mill	24-hour crushing capacity, at normal operating rates	Length of operating season [2]	Investment [1]: General service department: Boiler-room	Locker room	Store room and machine shop	Electric power substation	Miscel-laneous items [3]	Service piping	Land	Total
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:										
Plant 1	40	12. 0	10, 293	10, 469	29, 648	16, 772	85, 441	11, 285	3, 531	785, 051
Plant 2	80	6. 0	11, 658	10, 469	29, 648	18, 423	85, 441	11, 285	3, 365	871, 022
Direct solvent:										
Plant 1	50	9. 6	11, 658	10, 316	29, 648	16, 772	85, 441	11, 285	3, 200	780, 722
Plant 2	100	4. 8	14, 442	10, 469	29, 648	18, 423	85, 441	11, 285	3, 310	935, 050
Screw press:										
2 press	50	9. 6	10, 293	10, 316	29, 648	18, 423	107, 143	8, 536	3, 136	680, 877
3 press	75	6. 4	10, 293	10, 469	29, 648	20, 125	107. 143	8, 536	3, 034	732, 994
Hydraulic:										
4 press	40	12. 0	10, 293	10, 469	29, 648	16, 772	107. 143	9, 368	3, 237	668, 263
6 press	60	8. 0	10, 293	10, 469	29, 648	18, 423	107, 143	9, 368	3, 136	708, 852
8 press	80	6. 0	10, 293	11, 829	29. 648	18, 423	107, 143	9, 368	3, 085	736, 972

ANNUAL CRUSH: 13,200 TONS OF SEED

Mill	24-hour crushing capacity	Length of operating season	Boiler-room	Locker room	Store room and machine shop	Electric power substation	Miscel-laneous items	Service piping	Land	Total
Direct solvent:										
Plant 1	50	12. 0	11, 658	10, 316	29, 648	18, 423	85, 441	11, 285	3, 531	810, 353
Plant 2	100	6. 0	14, 442	10, 469	29, 648	18, 423	85, 441	11, 285	3, 365	944, 830
Prepress solvent: Plant 2	80	7. 5	11, 658	10, 469	29. 648	18, 423	85, 441	11, 285	3, 586	889, 066
Screw press:										
2 press	50	12. 0	10, 293	10, 316	29, 648	18, 423	107, 143	8, 536	3, 439	708, 829
3 press	75	8. 0	10, 293	10, 469	29, 648	20, 125	107, 143	8, 536	3, 338	759, 581
4 press	100	6. 0	10, 293	10, 469	29, 648	20, 125	107, 143	8, 536	3, 287	842, 114
Hydraulic:										
6 press	60	10. 0	10, 293	10, 469	29, 648	18, 423	107, 143	9, 368	3, 338	725, 960
8 press	80	7. 5	10, 293	11, 829	29, 648	18, 423	107, 143	9, 368	3, 287	754, 997

ANNUAL CRUSH: 21,100 TONS OF SEED										
Prepress solvent:										
Plant 2	80	12.0	11,658	10,469	29,648	20,125	85,441	11,285	3,807	984,446
Plant 3	160	6.0	14,442	12,582	48,982	23,035	109,630	13,189	4,303	1,229,397
Direct solvent: Plant 2	100	9.6	14,442	10,469	29,648	20,125	85,441	11,285	3,696	1,031,625
Screw press:										
4 press	100	9.6	10,293	10,469	29,648	20,125	107,143	8,536	3,591	927,180
5 press	125	7.7	11,658	11,829	48,982	23,035	131,332	9,998	3,995	1,030,910
Hydraulic:										
8 press	80	12.0	10,293	11,829	29,648	20,125	107,143	9,368	3,490	850,359
10 press	100	9.6	10,293	12,582	29,648	20,125	107,143	9,368	3,591	908,035
12 press	120	8.0	10,293	12,582	48,982	20,125	131,332	11,178	3,995	1,002,061
ANNUAL CRUSH: 26,400 TONS OF SEED										
Direct solvent:										
Plant 2	100	12.0	14,442	10,469	29,648	20,125	85,441	11,285	3,807	1,076,509
Plant 3	200	6.0	19,549	12,582	48,982	23,035	109,630	13,189	4,579	1,336,971
Prepress solvent: Plant 3	160	7.5	14,442	12,582	48,982	23,035	109,630	13,189	4,303	1,281,066
Screw press:										
4 press	100	12.0	10,293	10,469	29,648	23,035	107,143	8,536	3,692	974,964
5 press	125	9.6	11,658	11,829	48,982	23,035	131,332	9,998	3,692	1,088,719
Hydraulic:										
10 press	100	12.0	10,293	12,582	29,648	20,125	107,143	9,368	3,692	952,909
12 press	120	10.0	10,293	12,582	48,982	20,125	131,332	11,178	3,692	1,059,831
ANNUAL CRUSH: 42,200 TONS OF SEED										
Prepress solvent: Plant 3	160	12.0	14,442	12,582	48,982	37,840	109,630	13,189	5,467	1,462,796
Direct solvent: Plant 3	200	9.6	19,549	12,582	48,982	37,840	109,630	13,189	5,267	1,512,343
Screw press:										
7 press	175	11.0	11,658	12,582	48,982	39,542	131,332	9,998	5,733	1,406,775
8 press	200	9.6	11,658	12,582	48,982	39,542	131,332	9,998	5,667	1,455,228
Hydraulic:										
16 press	160	12.0	11,658	13,535	48,982	23,035	131,332	11,178	5,600	1,328,845
22 press	220	8.7	11,658	14,776	48,982	37,840	131,332	11,178	5,867	1,485,035
24 press	240	8.0	13,908	16,736	48,982	37,840	131,332	11,178	4,855	1,518,616
ANNUAL CRUSH: 52,800 TONS OF SEED										
Direct solvent: Plant 3	200	12.0	19,549	12,582	48,982	37,840	109,630	13,189	6,869	1,628,413
Prepress solvent: Plant 4	240	10.0	19,549	13,535	48,982	43,160	109,630	13,189	6,267	1,826,068
Screw press:										
8 press	200	12.0	11,658	12,582	48,982	43,160	131,332	9,998	7,365	1,575,012
10 press	250	9.6	13,908	13,535	48,982	44,576	131,332	9,998	6,600	1,726,234
Hydraulic:										
20 press	200	12.0	11,658	14,776	48,982	37,840	131,332	11,178	7,365	1,547,640
22 press	220	10.9	11,658	14,776	48,982	37,840	131,332	11,178	6,267	1,584,270
24 press	240	10.0	13,908	16,736	48,982	39,542	131,332	11,178	6,400	1,634,407

See footnotes at end of table.

Table 56.—*Calculated investment requirements for different departments of different types and sizes of cottonseed oil mills crushing specified volumes of seed annually, mill area II, 1949–50*—Continued

Mill	24-hour crushing capacity, at normal operating rates	Length of operating season [2]	Investment [1]: General service department: Boiler-room	Locker room	Store room and machine shop	Electric power substation	Miscellaneous items [3]	Service piping	Land	Total
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
ANNUAL CRUSH: 63,400 TONS OF SEED										
Prepress solvent: Plant 4	240	12.0	19,549	13,535	48,982	43,160	109,630	13,189	7,779	1,931,893
Direct solvent:										
Plant 4	300	9.6	24,158	14,423	74,991	43,160	144,044	16,571	8,110	2,036,135
Plant 5	400	7.2	27,229	14,776	74,991	44,576	144,044	16,571	7,200	2,210,914
Screw press:										
10 press	250	11.5	13,908	13,535	48,982	44,576	131,332	9,998	8,358	1,840,744
12 press	300	9.6	13,908	14,423	74,991	48,747	165,746	11,782	8,772	2,049,761
Hydraulic: 24 press	240	12.0	13,908	16,736	48,982	39,542	131,332	11,178	7,945	1,740,265
ANNUAL CRUSH: 79,200 TONS OF SEED										
Direct solvent:										
Plant 4	300	12.0	24,158	14,423	74,991	43,160	144,044	16,571	9,885	2,203,249
Plant 5	400	9.0	27,229	14,776	74,991	44,576	144,044	16,571	9,103	2,379,986
Prepress solvent: Plant 5	400	9.0	24,158	16,736	74,991	48,747	144,044	16,571	9,600	2,583,896
Screw press:										
12 press	300	12.0	13,908	14,423	74,991	48,747	165,746	11,782	10,676	2,217,004
14 press	350	10.3	14,442	14,776	74,991	48,747	165,746	11,782	11,565	2,372,806
Hydraulic:										
30 press	300	12.0	13,908	18,532	74,991	44,576	165,746	13,810	11,071	2,242,303
36 press	360	10.0	14,442	20,382	74,991	44,576	165,746	13,810	11,763	2,388,578
40 press	400	9.0	14,442	20,382	74,991	48,747	165,746	13,810	10,096	2,454,004
ANNUAL CRUSH: 105,600 TONS OF SEED										
Prepress solvent: Plant 5	400	12.0	24,158	16,736	74,991	56,939	144,044	16,571	15,200	2,882,733
Direct solvent: Plant 5	400	12.0	27,229	14,776	74,991	48,747	144,044	16,571	14,413	2,674,512
Screw press: 16 press	400	12.0	14,442	16,736	74,991	71,497	165,746	11,782	15,724	2,782,283
Hydraulic: 40 press	400	12.0	14,442	20,382	74,991	48,747	165,746	13,810	15,986	2,744,939

[1] Memphis, Tenn., pricing point except for land.
[2] Averaging 22 24-hour working days per month.
[3] Includes trucks and autos, vehicle shed, seed sample building, and equipment, office building and equipment, railroad and truck scales, railroad track and switches and sundry items. Includes fire protection tank for hydraulic and screw press mills only.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

TABLE 57.—*Cottonseed oil mills: Calculated total investment requirements of different types and sizes of mills for each of specified volumes of seed crushed annually, in mill areas I through VI, 1949–50*

Mill	Size of mill at normal crushing rate per day	Length of operating season [1]	Total investment in— Area I	Area II	Area III	Area IV	Area V	Area VI
ANNUAL CRUSH: 10,600 TONS								
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:								
Plant 1	40	12. 0	762, 705	785, 051	762, 270	762, 270	764, 929	773, 640
Plant 2	80	6. 0	848, 833	871, 022	848, 240	848, 240	851, 214	858, 303
Direct solvent:								
Plant 1	50	9. 6	758, 137	780, 722	757, 940	757, 940	760, 566	769, 614
Plant 2	100	4. 8	918, 316	935, 050	914, 213	914, 213	917, 354	926, 976
Screw press:								
2 press	50	9. 6	658, 453	680, 877	658, 103	658, 103	683, 786	689, 755
3 press	75	6. 4	713, 867	732, 994	713, 471	713, 471	739, 513	743, 647
Hydraulic:								
4 press	40	12. 0	645, 584	668, 263	645, 490	645, 490	671, 218	677, 758
6 press	60	8. 0	689, 935	708, 852	689, 329	689, 328	715, 559	720, 715
8 press	80	6. 0	714, 322	736, 972	714, 199	714, 199	740, 797	750, 656
ANNUAL CRUSH: 13,200 TONS								
Direct solvent:								
Plant 1	50	12. 0	787, 768	810, 353	787, 571	787, 571	790, 197	799, 245
Plant 2	100	6. 0	928, 091	944, 830	923, 993	923, 993	927, 134	936, 756
Prepress solvent: Plant 2	80	7. 5	866, 877	889, 066	866, 284	866, 284	869, 258	876, 347
Screw press:								
2 press	50	12. 0	686, 406	708, 829	686, 056	686, 056	711, 998	717, 707
3 press	75	8. 0	740, 453	759, 581	740, 057	740, 057	766, 099	770, 234
4 press	100	6. 0	821, 767	842, 114	817, 585	817. 585	844, 017	855, 046
Hydraulic:								
6 press	60	10. 0	706, 543	725, 960	706, 436	706, 436	732, 667	737, 823
8 press	80	7. 5	732. 347	754, 997	732, 224	732, 224	758, 822	768, 681
ANNUAL CRUSH: 21,100 TONS								
Prepress solvent:								
Plant 2	80	12. 0	962, 256	984, 446	961, 663	961, 663	964, 637	971, 726
Plant 3	160	6. 0	1, 209, 177	1, 229, 397	1, 210, 457	1, 210, 457	1, 215, 515	1, 226, 898
Direct solvent: Plant 2	100	9. 6	1, 014, 886	1, 031, 625	1, 010, 788	1, 010, 788	1, 013, 929	1, 023, 551
Screw press:								
4 press	100	9. 6	906, 832	927, 180	902, 650	902, 650	929, 082	940, 112
5 press	125	7. 7	1, 014, 978	1, 030, 910	1, 014, 820	1, 014, 820	1, 042, 557	1, 048, 727
Hydraulic:								
8 press	80	12. 0	827, 708	850, 359	827, 585	827, 585	854, 093	864, 043
10 press	100	9. 6	887, 406	908, 035	883, 505	883. 505	910, 561	924, 519
12 press	120	8. 0	981, 079	1, 002, 061	985, 971	985. 971	1, 014, 423	1, 024, 046

See footnote at end of table.

TABLE 57.—*Cottonseed oil mills: Calculated total investment requirements of different types and sizes of mills for each of specified volumes of seed crushed annually, in mill areas I through VI, 1949–50*—Continued

Mill	Size of mill at normal crushing rate per day	Length of operating season [1]	Total investment in— Area I	Area II	Area III	Area IV	Area V	Area VI
ANNUAL CRUSH: 26,400 TONS								
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:								
Plant 2	100	12.0	1,059,770	1,076,509	1,055,672	1,055,672	1,058,813	1,068,434
Plant 3	200	6.0	1,318,102	1,336,974	1,318,008	1,319,927	1,325,398	1,341,027
Prepress solvent: Plant 3	160	7.5	1,260,846	1,281,066	1,262,126	1,262,126	1,267,184	1,278,567
Screw press:								
4 press	100	12.0	954,616	974,964	950,434	950,434	976,866	987,896
5 press	125	9.6	1,072,786	1,088,719	1,072,628	1,072,628	1,100,366	1,106,535
Hydraulic:								
10 press	100	12.0	932,280	952,909	928,379	928,379	955,435	969,393
12 press	120	10.0	1,038,848	1,059,831	1,043,740	1,043,710	1,072,193	1,081,815
ANNUAL CRUSH: 42,200 TONS								
Prepress solvent: Plant 3	160	12.0	1,442,564	1,462,796	1,443,856	1,443,856	1,448,914	1,460,273
Direct solvent: Plant 3	200	9.6	1,493,471	1,512,343	1,493,377	1,495,307	1,500,778	1,516,396
Screw press:								
7 press	175	11.0	1,387,955	1,406,775	1,387,835	1,389,762	1,418,509	1,431,160
8 press	200	9.6	1,436,371	1,455,228	1,436,262	1,438,232	1,467,405	1,481,404
Hydraulic:								
16 press	160	12.0	1,307,779	1,328,845	1,309,905	1,309,905	1,339,638	1,355,828
22 press	220	8.7	1,465,838	1,485,035	1,461,715	1,466,382	1,497,960	1,517,846
24 press	240	8.0	1,504,070	1,518,616	1,501,303	1,506,142	1,538,250	1,562,885
ANNUAL CRUSH: 52,800 TONS								
Direct solvent: Plant 3	200	12.0	1,609,541	1,628,413	1,609,447	1,611,394	1,616,865	1,632,466
Prepress solvent: Plant 4	240	10.0	1,812,656	1,826,068	1,807,415	1,809,270	1,816,228	1,839,697
Screw press:								
8 press	200	12.0	1,556,155	1,575,012	1,556,046	1,557,993	1,587,238	1,601,221
10 press	250	9.6	1,710,394	1,726,234	1,711,881	1,711,881	1,742,662	1,760,978
Hydraulic:								
20 press	200	12.0	1,528,434	1,547,640	1,528,674	1,530,621	1,561,547	1,582,042
22 press	220	10.9	1,565,073	1,584,270	1,560,950	1,565,637	1,597,195	1,617,081
24 press	240	10.0	1,619,893	1,634,407	1,620,126	1,621,981	1,654,121	1,678,741

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4	240	12.0	1, 918, 514	1, 931, 893	1, 913, 273	1, 915, 143	1, 922, 101	1, 945, 555
Direct solvent:								
Plant 4	300	9.6	2, 026, 103	2, 036, 135	2, 023, 724	2, 025, 637	2, 032, 615	2, 054, 226
Plant 5	400	7.2	2, 199, 640	2, 210, 914	2, 198, 859	2, 198, 859	2, 206, 801	2, 235, 364
Screw press:								
10 press	250	11.5	1, 624, 920	1, 840, 744	1, 826, 424	1, 826, 424	1, 857, 236	1, 875, 537
12 press	300	9.6	2, 035, 482	2, 049, 761	2 033, 013	2, 034, 926	2, 066, 963	2, 091, 461
Hydraulic: 24 press	240	12.0	1, 725, 783,	1, 740, 265	1, 726, 016	1, 727, 887	1, 760. 059	1, 784, 663

ANNUAL CRUSH: 79,200 TONS

Direct solvent:								
Plant 4	300	12.0	2, 193, 249	2, 203, 249	2, 190, 886	2, 192, 815	2, 199, 793	2, 221, 372
Plant 5	400	9.0	2, 368, 761	2, 379, 986	2, 368, 012	2, 368, 012	2, 375, 954	2, 404, 485
Prepress solvent: Plant 5	400	9.0	2, 573, 493	2, 583, 896	2, 571, 922	2, 571, 922	2, 581, 228	2, 614, 825
Screw press:								
12 press	300	12.0	2, 202, 756	2, 217, 004	2, 200, 304	2, 202, 233	2, 234, 302	2, 258, 768
14 press	350	10.3	2, 355, 799	2, 372, 806	2, 363, 559	2, 363, 559	2, 396, 831	2, 416, 886
Hydraulic:								
30 press	300	12.0	2, 227, 450	2, 242, 303	2, 225, 604	2, 227, 532	2, 266, 673	2, 297, 134
36 press	360	10.0	2, 375, 209	2, 388, 578	2, 379, 330	2, 382, 979	2, 419, 647	2, 456, 409
40 press	400	9.0	2, 442, 053	2, 454, 004	2, 446, 342	2, 446, 342	2, 483, 987	2, 527, 827

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5	400	12.0	2, 872, 475	2, 882, 733	2, 871, 000	2, 871, 000	2, 880, 306	2, 913, 807
Direct solvent: Plant 5	400	12.0	2, 663, 432	2, 674, 512	2, 662, 780	2, 662, 780	2, 670, 722	2, 699, 156
Screw press: 16 press	400	12.0	2, 771, 156	2, 782, 283	2, 774, 862	2, 774, 862	2, 809, 179	2, 839, 840
Hydraulic: 40 press	400	12.0	2, 733, 132	2, 744, 939	2, 737, 518	2, 737, 518	2, 775, 259	2, 819 099

[1] Averaging 22 24-hour working days per month.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 58.—*Investment requirements of oil-extraction departments for different types of cottonseed oil mills, by size of mill, 1949–50* [1]

Size of mill (tons crushed per day at normal operating rate)	Investment requirement											
	Per ton of seed crushed per day by—								Index for—			
	Hydraulic mill		Screw press mill		Direct solvent mill		Prepress solvent mill		Hydraulic mill	Screw press mill	Direct solvent mill	Prepress solvent mill
	Total	Decrease	Total	Decrease	Total	Decrease	Total	Decrease				
	Dol.	*Pct.*	*Dol.*	*Pct.*	*Dol.*	*Pct.*	*Dol.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
40	2, 339	0					6, 024	0	100			258
50			1, 987	0	4, 468	0				100	225	
60	1, 926	18										
75			1, 707	14								
80	1, 603	31					3, 661	39	100			228
100	1, 438	39	1, 659	17	2, 955	34			100	115	205	
120	1, 329	43										
125			1, 556	22								
160	1, 438	39					2, 355	61	100			164
175			1, 475	26								
200	1, 309	44	1, 436	28	1, 860	58			100	110	142	
220	1, 280	45										
240	1, 228	47					2, 130	65	100			173
250			1, 436	28								
300	1, 477	37	1, 400	30	1, 456	67			100	95	99	
350			1, 377	31								
360	1, 372	41										
400	1, 298	45	1, 350	32	1, 226	73	1, 684	72	100	104	94	130

[1] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Table 59.—*Total investment requirements for different types of cottonseed oil mills operating during a 12-month season in mill area II, by size of mill, 1949–50* [1]

Size of mill (tons crushed per day at normal operating rate)	Investment requirement											
	Per ton of seed crushed per day by—								Index for—			
	Hydraulic mill		Screw press mill		Direct solvent mill		Prepress solvent mill		Hydraulic mill	Screw press mill	Direct solvent mill	Prepress solvent mill
	Total	Decrease	Total	Decrease	Total	Decrease	Total	Decrease				
	Dol.	*Pct.*	*Dol.*	*Pct.*	*Dol.*	*Pct.*	*Dol.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
40	16, 707	0					19, 626	0	100			117
50			14, 177	0	16, 207	0				100	114	
80	10, 629	36					12, 334	37	100			116
100	9, 569	43	9, 789	31	10, 805	33			100	102	113	
160	8, 305	50					9, 174	53	100			110
200	7, 738	54	7, 875	44	8, 142	50			100	102	105	
240	7, 251	57					8, 069	59	100			111
300	7, 474	55	7, 390	48	7, 344	55			100	99	98	
400	6, 867	59	6, 961	51	6, 691	59	7, 219	63	100	101	97	105

[1] Memphis, Tenn., pricing point.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Oil-extraction department investment per ton of daily crushing capacity showed marked variation among different types of mills, as shown in table 58. In small mills, this investment per ton of capacity is much higher for solvent mills than for hydraulic and screw-press mills. For example, the per ton investment for a 40-ton prepress-solvent department was more than 2.5 times the cost for a 40-ton hydraulic extraction department. A 100-ton direct-solvent department cost over twice as much per ton of capacity as the same size hydraulic department, and nearly 1.8 times the cost of the same size screw-press department.

Although investment requirement per ton of crushing capacity declines for all types of mills as their size increases, the decline is much faster for solvent mills, whether direct or prepress. For example, increasing daily crushing capacity from 40 to 400 tons per day (assuming normal rates of operation) was associated with a 72-percent decline in extraction-department investment requirements for prepress-solvent mills as compared with only a 45-percent decline for hydraulic mills.

This does not necessarily mean that small solvent mills (direct or prepress) will yield less net revenue per ton of seed crushed than small hydraulic or screw-press mills, as the increased oil recovery efficiency of solvent mills may more than offset their higher extraction costs, even for the smallest mills.

IV. PROCESSING REQUIREMENTS AND COST RATES

Mill operating requirements and the 1949–50 cost rates, which were used in computing processing costs, are discussed in this chapter.

PLANT INVESTMENT COST RATES

DEPRECIATION RATES

As indicated in table 60, four depreciation rates were used in estimating plant costs, depending on the type of structure or facility involved. These rates are similar to those used by the Bureau of Internal Revenue for tax evaluation purposes. The Bureau's listing included only cottonseed oil mill buildings under the 40-year life expectancy. It was assumed, however, that water mains, piping, tanks, and yard improvements would have approximately the same depreciation rate as buildings. Also, the listing on machinery did not include electric substations, railroad tracks, and scales, but it did include such machines as delinters and hullers. The assumption was that the life expectancy period would be approximately the same for all these items.

INTEREST RATES

Interest was charged at the rate of 4 percent on the entire initial investment for each mill. This was the legally required rate of the Federal Land Bank system. Capital advances from other sources might have been obtained at a somewhat lower or higher figure. For purposes of this report, use of the 4-percent rate for 1949–50 appeared fair and reasonable.

TABLE 60.—*Cottonseed oil mill depreciation rates, by length of useful life and type of asset*

Length of useful life and type of asset	Annual rate [1]
	Percent
40 years:	
Buildings	2.5
Yard improvements	2.5
Water mains	2.5
Fire hydrants and sprinklers	2.5
Service piping	2.5
Tanks	2.5
25 years:	
Mill machinery and equipment	4.0
Electric substation	4.0
Railroad and truck scales	4.0
Railroad track and switches	4.0
10 years:	
Office furniture and equipment	10.0
Lockers	10.0
Seed sample handling equipment	10.0
6 years: Trucks and autos	16.7

[1] Internal Revenue rates for 1949–50 served as basis.

TAX RATES

Tax charges were based on (1) the real property assessment ratios of assessed values to full market values and the (2) tax rates for all types of property taxes in given localities. These rates are shown in table 61 for specified mill areas.

TABLE 61.—*Property assessment ratios and tax rates applicable to cottonseed oil mills, by mill area, 1949–50*

Mill area	Assessment ratio [1]	Tax rate per $100 of assessed value
	Percent	*Dollars*
I—Southeastern N. C	40	3.12
II—North Delta, Ark	15	4.80
III—South Delta, La	20	4.07
IV—Eastern Okla	30	4.67
V—North Blacklands, Tex	60	4.71
VI—Central Calif	37	5.74

[1] Legal assessment as percentage of full value.

Source: County and city tax assessors.

INSURANCE RATES ON BUILDINGS AND EQUIPMENT

To minimize insurance costs, the mills in this report were designed as nearly as possible in accordance with the recommendations and regulations given by such sources as the National Electrical Code, Handbook of the National Fire

Protection Association, and the bulletins of the Associated Factory Mutual Fire Insurance Companies. Class III electrical equipment was used in the mechanical pretreatment department, class II equipment was used in the meal products manufacturing department, and class I, group D, equipment was used wherever necessary in the solvent extraction departments.

Principles of Fire Protection Design

The general principles of fire protection design are illustrated in figure 59. These principles are outlined as follows:

1. Structural Features of Buildings. The mill building, hull house, seed houses, linters warehouse, and general purpose building have steel frames and are ironclad. The office building has a wooden frame, asbestos siding, and an asphalt shingle roof. The vehicle shed has a wooden frame with siding and roof of sheet iron. Two fire walls were provided in the mill building; one separating the mechanical pretreatment department from the oil extraction or meal processing departments and the other separating the mechanical pretreatment department from the baling press room. A fire cut-off was provided between the meal processing department and the meal warehouse.

2. Fire Protection Water System:

(*a*) *Water supply.* The primary water supply for fire protection is assumed to come from an adequate municipal supply. The secondary water supply is an elevated water tank for all except solvent mills.

The municipal system and elevated tank were assumed not to have great enough pressure or water volume to operate an automatic deluge system needed for solvent extraction departments. Accordingly, both direct and prepress solvent mills were provided with fire pumps, having capacities from 1,000 to 2,500 gallons per minute, and with vertical steel tank reservoirs at ground level large enough to supply the fire pumps for 4 hours. The fire pump and reservoir necessary for a deluge system could usually be used as an alternate water supply.

(*b*) *Water mains.* As indicated in figure 59, an 8-inch water main, with a pressure of 50 pounds per square inch encircled the seed houses and the mill building, and paralleled the general purpose

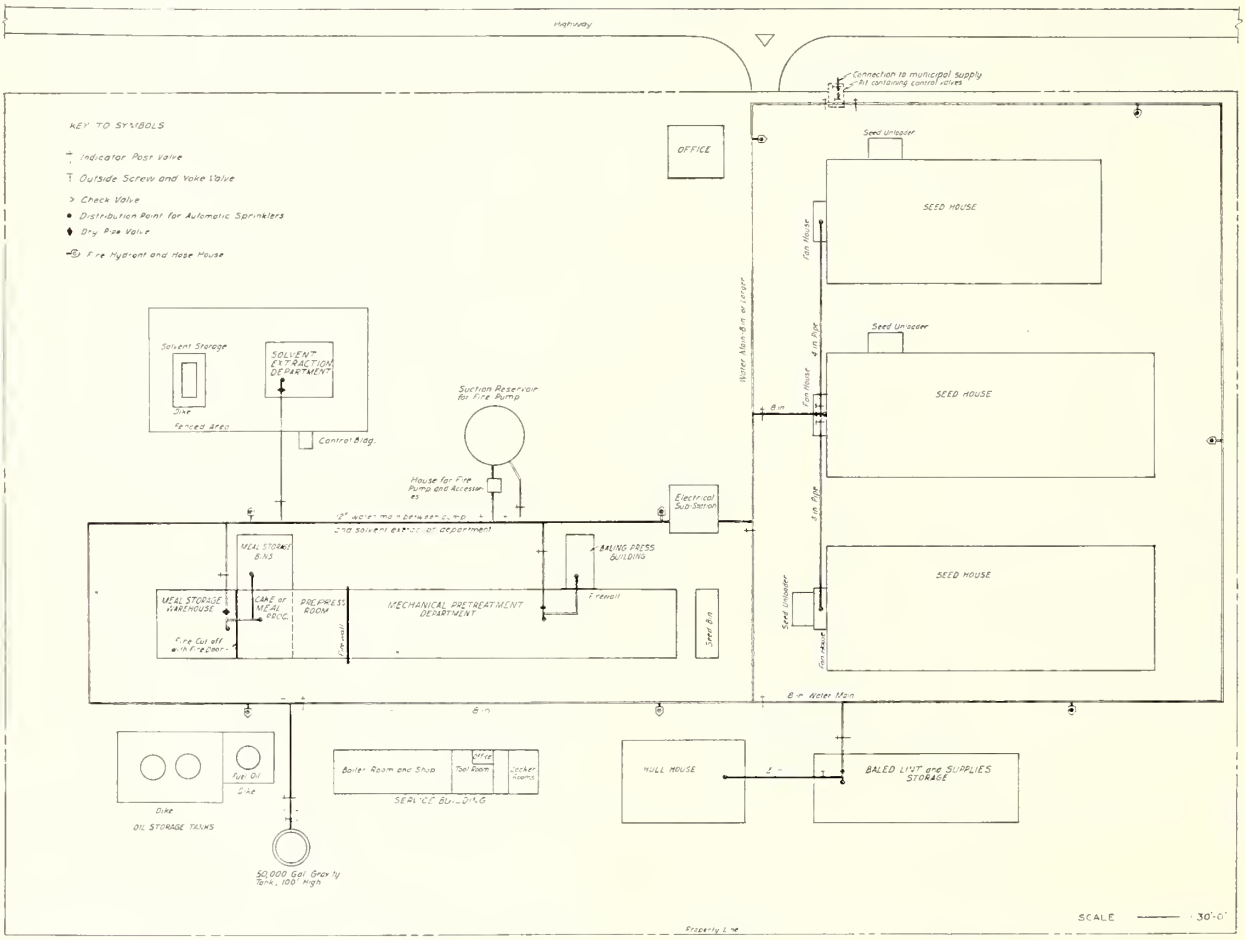

Figure 59.—Layout design of fire-protection equipment for cottonseed oil mills.
Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

building and the hull and linters warehouses. The mains were 25 feet from most buildings, or halfway between buildings 50 feet apart. The solvent extraction department and fire pump were connected with a 12-inch water main.

(c) *Hydrants.* Fire hydrants and hose houses were spaced approximately 300 feet apart along the entire 8-inch water main. (See fig. 59.) Each hydrant was provided with 2½-inch cotton rubber-lined hose. Hydrants, when they were not between buildings, were placed 50 feet from the buildings.

(d) *Automatic sprinkler system.* An automatic sprinkler system was provided throughout the mill building and all warehouses. In all buildings except seed houses, 1 sprinkler head was provided for every 70 square feet of floor space, with additional heads wherever the machinery would shield the water from the sprinklers. In the seed houses, sprinklers were provided in the tunnel and overhead in the monitor, as well as in the fan and conveyor houses at the ends.

One dry pipe valve was provided for the mechanical pretreatment department. One valve supplied both the linters warehouse and the hull house. The meal products warehouse, meal department, meal bins, and mechanical oil extraction pressroom were all connected to the same dry pipe valve. In large mills, the area to be protected exceeded 28,000 square feet and an additional dry pipe valve was necessary. Because of the small number of sprinkler heads in each seed house, up to three seed houses were connected to the same dry pipe valve, which was assumed to be located in the fanhouse of the center seed house.

3. Miscellaneous Items:

(a) *Boilers.* Boilers were the fire-tube package type, oil fired, and having 50 to 400 horsepower and 150 pounds pressure per square inch.

(b) *Oil storage tanks.* Fuel oil and cottonseed oil storage tanks of NFPA design and spacing, located outdoors, were used.

(c) *First aid appliances.* A standard complement of first aid appliances was provided in each building.

Fire Insurance Rates

On the basis of these principles of fire protection design, all-risk coverage insurance ratings on buildings and machinery were requested from the fire rating inspection bureaus in the various cotton-producing States and from the Protection Mutual Fire Insurance Co., a member of the Associated Factory Mutual Fire Insurance Cos.

Fire protection rating bureaus differed somewhat in their recommended fire protection design features. A uniform set of design principles was followed in this report, since otherwise complications would become unmanageable.

Many rating bureaus felt that they could make estimates only after contemplated plants were actually installed. However, subject to such final inspection, complete ratings were given by the Pacific Fire Rating Bureau and the Protection Mutual Fire Insurance Co. on the basis of information above.

The Factory Mutual Companies write a single policy form, blanketing in buildings and contents, including all property within plant yards having insurable values, without co-insurance requirements. The physical hazards covered are fire, wind, cyclone, lightning, smoke and water damage, 100 percent sprinkler leakage damage, falling aircraft, vehicle, riot, civil commotion, vandalism, malicious mischief, and explosion. Coverage includes underground facilities and installations. The quoted cost of this insurance, for hydraulic and screw-press mills built in line with plans and specifications used in this report, does not exceed 6 cents per $100 per year for blanket physical damage coverage and 3½ cents per $100 per year for use and occupancy insurance, or a total of 9½ cents per $100.

The Factory Mutual Cos. gave no ratings for solvent mills; and actually they insure very few, if any, cottonseed mills. Therefore, for these reasons, the ratings of the Pacific Rating Bureau have been used in this report.

It will be noted that the ratings vary by type of structure, as shown in table 62.

Table 62.—*Fire and extended coverage insurance rates for cottonseed oil mill buildings and equipment, 1949-50*

Building and equipment	Rate per $100 insured value		
	National board class 6 fire	Extended coverage	Total
	Dollars	*Dollars*	*Dollars*
Mechanical pretreatment department	0.266	0.060	0.326
Baling press room	.201	.036	.237
Oil extraction department:			
Solvent (direct or prepress)	.485	.209	.694
Hydraulic and screw press	.278	.060	.338
Meal-processing department	.278	.060	.338
Warehouses:			
Seed	.832	.022	.854
Hulls	.201	.020	.221
Linters	.201	.020	.221
Meal	.278	.060	.338
General purpose building:			
Boilerhouse section	.776	.044	.820
Locker room section	.776	.044	.820
Machine shop section	.776	.044	.820
Office building	.824	.078	.902
Electric power substation	.238	.022	.260
Oil tanks:			
Cottonseed oil	.728	.022	.750
Fuel oil	.728	.022	.750

Source: Based on information from Pacific Fire Rating Bureau.

Owing to the greater fire and explosion hazards, rates for solvent-extraction departments were \$0.694 per \$100 of investment as compared with \$0.338 for other types of mills.

OPERATING REQUIREMENTS AND COST RATES

SEED PROCUREMENT

Seed procurement costs included the purchase cost of seed f. o. b. gins, seed buyer costs, and a haul charge for trucking seed from gins to mills.

F. O. B. Gin Prices

As Moloney (*2*, p. 682) has well stated, cottonseed usually is purchased by mills on an f. o. b. gin basis, the mill paying the cost of hauling the seed. The prices actually paid by mills are the quoted f. o. b. gin prices for 100 grade seed adjusted to the grade actually purchased.

Seed grades vary from month to month, from year to year, and from area to area. The 1944–48 average seed grades were assumed for each area considered in this study (table 5). However, 1949–50 average prices of 100 grade seed were used (table 63), as the study employed cost-price relationships for that period as a basis of analysis. These prices were adjusted for grades of seed assumed purchased by mills in the different areas.

Seed Buyers

In this study, a seed-buying cost of 40 cents a ton was allowed for all crushes of 7,000 tons or over, except in the Far West, where usually no buying costs are incurred.

Limited inquiries of mill operators in the Delta, the Southwest, and Far West indicated no seed buyers were employed where the annual crush was less than 7,000 tons. Usually no seed buyers were employed in the Far West, irrespective of the size of crush. Elsewhere the sources indicated that mills crushing as much as 40,000 tons ordinarily employed 2 full-time buyers (no data were available for larger crushes).

Although seed buyers were employed on either a full-time or a part-time basis, the rate of pay, figured on either a weekly or monthly basis, was approximately the same in both cases. The 1949–50 rate was approximately \$300 per month for year-round buyers and \$65 per week for part-time buyers. In addition, both types of buyers received the use of a "company car" and travel expenses. Assuming 22 working days per month, and an average travel of 100 miles per day, "car expense" was calculated as \$110 per month. Assuming a per diem allowance of \$12 per day, "travel expense" was calculated at \$264 per month. Under these assumptions, total salary, car, and travel expense was \$674 per month per seed buyer. As mills crushing about 40,000 tons per season required 2 seed buyers, their seed-buying cost was approximately 40 cents per ton or $\left(\frac{674\times2\times12}{40{,}000}\right)$.

The data indicated that mills crushing from 7,000 to 40,000 tons usually employed at least one full-time buyer and varying amounts of services of part-time buyers; but they did not disclose a precise relationship between the actual amount of

TABLE 63.—*Average prices paid for "U. S. Standard basis grade" (100) cottonseed by cottonseed oil mills in specified States, by periods, 1949–50*

Period	Calculated percentage of seed received at oil mill [1]	Price per ton of cottonseed in—									
		N. C. and Va.	S. C.	Ga.	Ala. and Fla.	Ark., Tenn., and Mo.	Miss.	La.	Okla.	Tex.	Calif.
1949–50	*Percent*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
September 1 to 15	12. 3	50. 00	50. 00	48. 50	48. 50	49. 25	49. 25	48. 75	48. 00	48. 00	49. 58
September 16 to 30	17. 7	49. 50	50. 00	46. 85	46. 00	46. 00	46. 00	43. 75	44. 25	41. 75	49. 58
October 1 to 15	22. 3	47. 55	47. 00	45. 00	45. 00	45. 00	45. 00	42. 00	44. 25	41. 73	47. 94
October 16 to 31	15. 4	48. 53	49. 47	47. 97	47. 23	45. 00	45. 00	43. 50	45. 42	44. 25	47. 94
November 1 to 15	8. 8	50. 00	50. 00	46. 60	46. 60	45. 00	45. 00	42. 00	45. 73	43. 50	46. 45
November 16 to 30	8. 5	50. 00	50. 00	46. 10	45. 50	45. 00	45. 00	42. 00	43. 68	40. 50	46. 45
December 1 to 15	3. 5	50. 00	50. 00	48. 00	45. 00	45. 00	45. 00	42. 00	44. 33	41. 00	47. 92
December 16 to 31	1. 4	50. 00	50. 00	48. 40	47. 00	45. 00	45. 00	42. 00	45. 00	41. 00	47. 92
January 1 to 15	1. 4	50. 00	50. 00	50. 00	50. 00	45. 00	45. 00	42. 00	45. 00	40. 00	48. 00
January 16 to 31	2. 9	50. 00	50. 00	50. 00	50. 00	45. 00	45. 00	42. 00	45. 00	40. 00	48. 00
After January 31	5. 8	52. 67	53. 00	54. 50	49. 16	45. 00	47. 00	42. 00	45. 00	40. 00	48. 00
1949–50 average [2]	100. 0	49. 29	49. 42	47. 37	46. 62	45. 70	45. 82	43. 37	45. 06	43. 58	48. 18

[1] Based on 1943–47 average of total seed ginned in typical area.
[2] Prices weighted by corresponding percentages of seed received in each period.

Source: Compiled from *Cottonseed Review* publications, PMA, except for California prices which were obtained through special questionnaire.

part-time services and the size of annual crush. It is not certain, therefore, whether mills in this size range had a somewhat lower or higher seed-buying efficiency than did mills crushing about 40,000 tons. The same principle would apply to larger mills.

With this limitation in mind, the buying cost figure of 40 cents per ton was allowed in this report. It should be noted that this figure merely indicates the total cost per ton of seed-buying services, as it is immaterial whether the services representing this cost are all used in the relatively short seed harvest period or spread out over the whole operating season.

Seed Haul Charges

In a given locality, seed haul charges per ton vary with the length of haul, which, in turn, varies with the size of the annual crush. The bigger the crush, the farther a mill will have to haul its seed; hence, the higher its haul charge per ton. Haul charges tend to offset declining processing costs of larger scale operations. It should be noted in this connection, however, that although the haul charge increases with increasing length of haul, it does so at a decreasing rate, because the longer the haul the smaller the amount of seed loading and unloading time is required per mile of haul.

As the purpose of this report is to compare alternative mills crushing widely different tonnages in given locations, a uniform method was necessary for estimating the average haul distance and haul charges associated with each tonnage.

1. Variation of Length of Haul With Size of Crush. Ordinarily, if seed supply areas of individual mills did not overlap, there would be no competition for seed and therefore a mill would obtain its entire crush from the nearest gins as far out as necessary to meet its crushing requirement. Mill A, for example, would not get seed from gins which were closer to mill B than to mill A, and vice versa. Absence of competition would thus preclude "cross-haul" so that the average haul for any crush would tend to be the average distance between the mill and nearby gin centers as far out as necessary to supply the crush.

However, competition for seed usually precludes such minimum haul distances, as it commonly induces mill A to obtain seed from gins which are closer to mill B, and vice versa.

Given the haul distances which might be expected in the absence of competition, the average haul distances under competitive conditions could be calculated by use of prevailing crosshaul ratios. The following paragraphs describe the process by which such ratios were obtained and used.

During the 1947–48 cottonseed crushing season, the Cotton Branch of the Production and Marketing Administration made a survey of cottonseed oil mills which included the average haul distance and size of crush as reported by some 182 oil mills. From these data and census information on the 1949–50 cotton ginnings, the average seed-haul distances, as they would have tended to be in the absence of competition, were computed for each of these reported crushes. In making this computation, gins were first located in reference to each reporting mill, either by post office addresses or by centering them in townships. The 1949–50 average seed output per gin by counties was then calculated. By use of roadmap distances, the average length of haul between each mill and enough nearby gins was computed to cover the smallest area within which total seed ginned was equivalent to the mill's annual crush. This distance represented the seed haul (for each crush) which would tend to be the case in the absence of competition for seed. Dividing these distances into the actual average haul distances reported, gave the crosshaul ratios for individual mills. If, for example, a mill with a 10,000-ton crush reported having an average haul distance of 50 miles per ton, and a distance of 20 miles per ton was the average distance within which the amount of seed for this crush was produced, the crosshaul would be 2.5 or $\left(\frac{50}{20}\right)$.

Average relationships between individual crosshaul ratios and size of annual crushes were then developed for the six major cotton-producing regions—Coastal Plains, Eastern Hilly and Piedmont, Delta, Central Humid, Central Semi-Arid, and Irrigated (West).

These relationships were used in estimating the average haul distances for widely different crushes associated with various alternative mills for given localities. However, certain characteristics of these relationships should be noted.

In each region, on the average, the larger the crush, the smaller the crosshaul ratio. This might suggest that smaller mills are at a competitive disadvantage in getting seed, but this is not necessarily the case. A mill with a relatively small crush (for example, 4,000 tons) and a mill with a large crush (for example, 40,000 tons) may be subject to the same competitive conditions and have the same average haul distance but have different crosshaul ratios. For, even with a high crosshaul ratio, a small mill may obtain its seed within such a short distance that the increase in the haul charge, owing to a high crosshaul ratio, is relatively insignificant. Hence, there would be little or no incentive for management to make any serious effort to reduce its haul distance to the minimum that is actually possible under the given competitive conditions. In case of a large mill, however, the increase in its haul charge per ton of seed, which is owing to crosshaul, becomes a significant part of the total seed cost and hence a constant incentive to reduce the crosshaul to the lowest point which competition for seed will permit.

The same principle would tend to account for the sharp decline in the crosshaul ratio with increasing size of crush in the Coastal Plains, Eastern Hilly and Piedmont, and Central Humid regions. In these regions the great bulk of mills purchased only small crushes. These purchases were obtained within short distances, even though only a small fraction of seed was bought from the nearest gins. As the average haul cost was relatively small under such conditions, the incentive was absent for reducing it to the minimum actually permitted by prevailing competitive conditions. Because the reverse was true with respect to the small proportion of large mills in these regions, the average degree of crosshaul would tend to decline sharply as the size of crush increased.

A like decline would not be expected in the Delta, where seed production is commonly so dense that relatively larger crushes can be obtained in short distances. As a consequence, the part of haul cost due to a relatively high crosshaul ratio may well be too small to be a strong incentive to managers of relatively large mills to reduce their crosshaul ratios to the minimum possible under prevailing competitive conditions.

Two factors may explain the substantially lower average crosshaul ratios for all sizes of crush in the Central Semi-Arid and Irrigated regions (West and Far West). In both these regions over the last several years, cotton production has been expanding much more rapidly than cottonseed mill crushing capacity. Under such circumstances, less competition for seed would naturally result in correspondingly less crosshaul than in other regions where the pressure of crushing capacity on the seed supply is much greater. Also, it appears that competition for seed is geographically less possible in the Irrigated region than elsewhere. In other regions, competitive mills are located in every direction from a given mill site—north, south, east, and west. But in California, for example, both gins and mills run from north to south within a relatively narrow irrigated valley. Competition thus stems in from only 2 directions, instead of 4 as is normally the case elsewhere. The same principles apply to most other sections of the Irrigated region.

The reported relationships (fig. 60) between the competitive crosshaul ratios and size of crush were used in estimating the average haul distances of various sizes of crushes in given mill areas. However, no ratio of less than 2 was used. (This minimum is represented by the horizontal line in fig. 60.) The data offered no reasonable grounds for assuming a smaller minimum ratio, even though in some regions scattered instances reported ratios below this point.

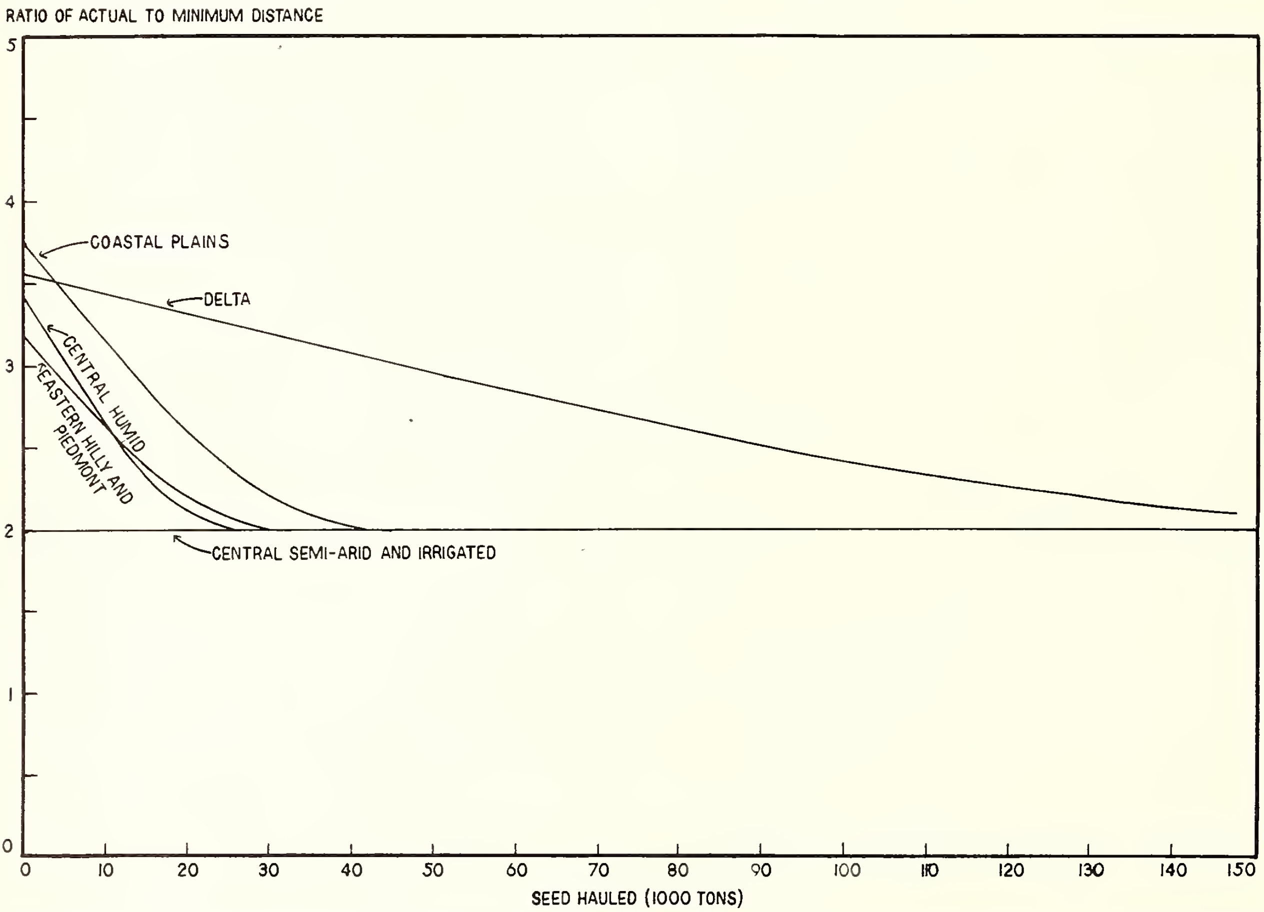

FIGURE 60.—Calculated relationship between degree of crosshaul and volumes of seed received at individual mills, by cotton-production regions, 1947–48.

Use of the minimum ratio means that the average seed haul distance for any given crush was always at least twice as great as the minimum haul distance within which the equivalent of the crush was actually produced. However, the total seed supply area for any average haul distance was at least four times the minimum area within which the equivalent of the crush was produce l, as the seed supply area increases as the square of the average haul distance increases.

The minimum ratio of 2 was used for all crushes in the Irrigated and Central Semi-Arid regions, the reason being that the actual ratios, for relatively small crushes, exceeded this minimum so slightly as to make no appreciable difference in the average haul distance.

Use of this minim a involved an extension of the Delta line (fig. 60) somewhat beyond the size of crushes actually reported. There was nothing in the data, however, to indicate that this line would not have extended to a minimum ratio of 2 had larger crushes been reported.

To sum up: Two steps were used in determining the average haul distances associated with specified annual crushes in given mill areas. (1) The average distance was computed between a given point and enough nearby gins to account for a given total crush in the absence of competitive conditions. (2) The estimated average haul, under competitive conditions, was then calculated by multiplying this first average by the appropriate regional crosshaul ratio in figure 60.

If, for example, the equivalent of a 21,000-ton crush were produced by the nearest gins within an average distance of 25 miles and the regional crosshaul factor were 2.5, the estimated average haul would be 62.5 miles.

As indicated in figure 61, the average haul for the same volumes of seed varied substantially from mill area to mill area, mainly owing to a similar variation in the density of the seed supply. For example, the average haul for 21,000 tons was 14 miles in mill area II, located in one of the heaviest producing regions in the Cotton Belt. The average haul for the same tonnage was 56 miles in mill area IV, located in one of the lightest producing areas in the Cotton Belt. (Fig. 61.)

The estimated haul distances are shown in figure

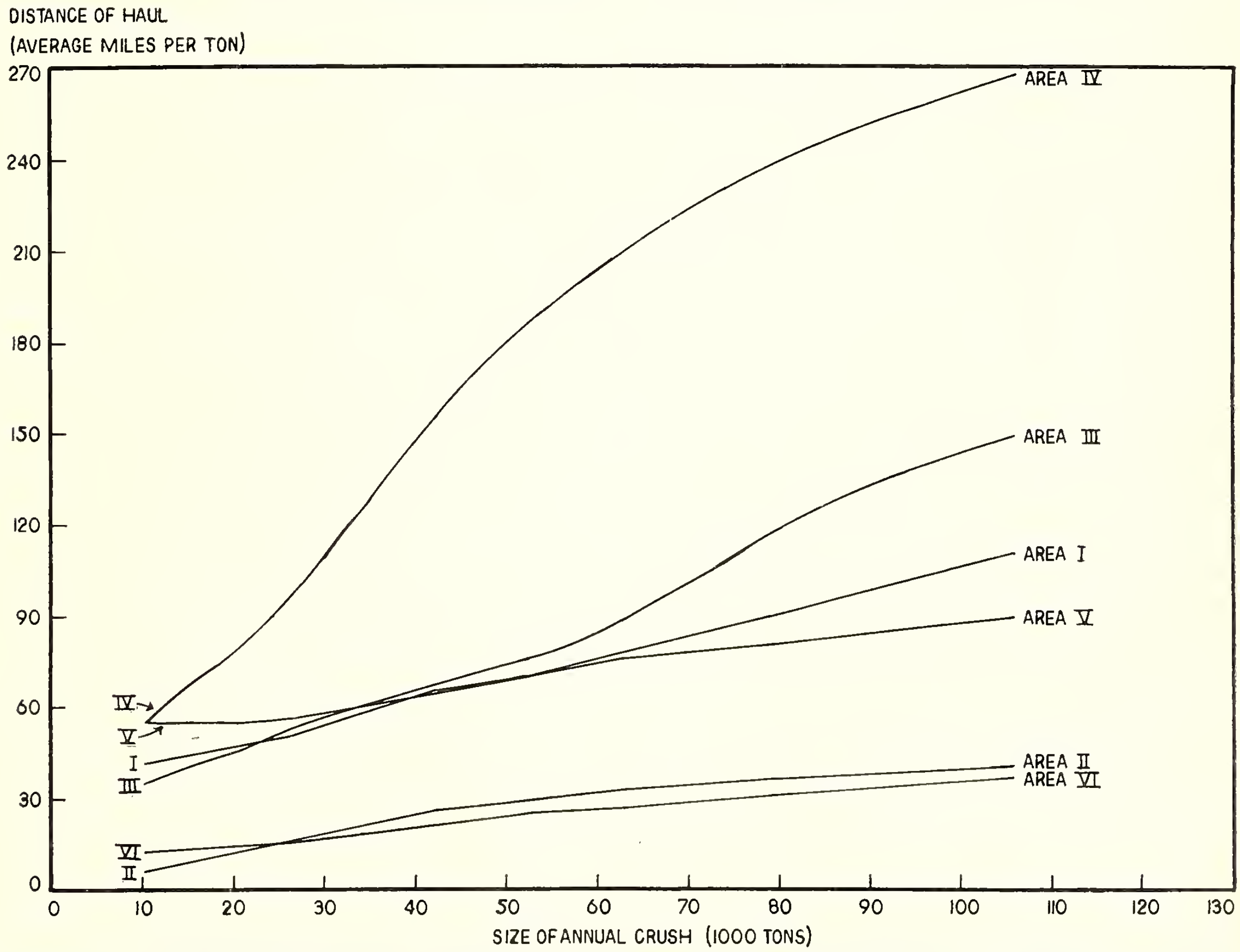

Figure 61.—Calculated average haul distance per ton of cottonseed, by size of annual crush, mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

61 for specified volumes of seed in six widely separated localities.

2. Variation of Haul Charge With Length of Haul. In the Cotton Branch survey of 1947, previously mentioned, cottonseed mills reported their average haul distance per ton of seed and also their estimated average haul allowance charges per ton of seed. The relationship between these reported haul charges and distances is shown in figure 62 for the Southeast, Valley, and Southwest cotton-producing regions.

The ends of the lines in figure 62 represent the minimum and maximum distances and sizes of crush corresponding to these average relationships. Were these limits sufficient to cover the widely different crushes (10,600 to 105,600 tons), the relationships, represented by lines in figure 62 would fully meet the needs of this report. This was not always the case, however. For example, in mill area III the estimated average haul distance for 10,600 to 105,600 tons of seed ranged from 36 to 150 miles, whereas the maximum distances reported were much less than 150 miles.

In seeking a way around this limitation, various State motor carrier rate schedules were compared with regional average haul distances and haul charge relationships. Such schedules have the merit of covering the full range of distances needed for the entire range of crushes involved in this study. In the Cotton Belt as a whole, over one-third of the seed was hauled by commercial trucks in 1947-48, 56 percent by gin and mill trucks, and 6 percent by rail, as pointed out by Whitten and Stevenson (*13*). Accordingly, the Arkansas motor carrier schedule was used because the height and slope of the line in this schedule were similar to those of the lines representing the reported haul charges throughout the range of distances covered by both, except that the average Valley rates were used for very short distances where the Arkansas rate schedule appeared to be lower.

In addition to being checked for reasonableness

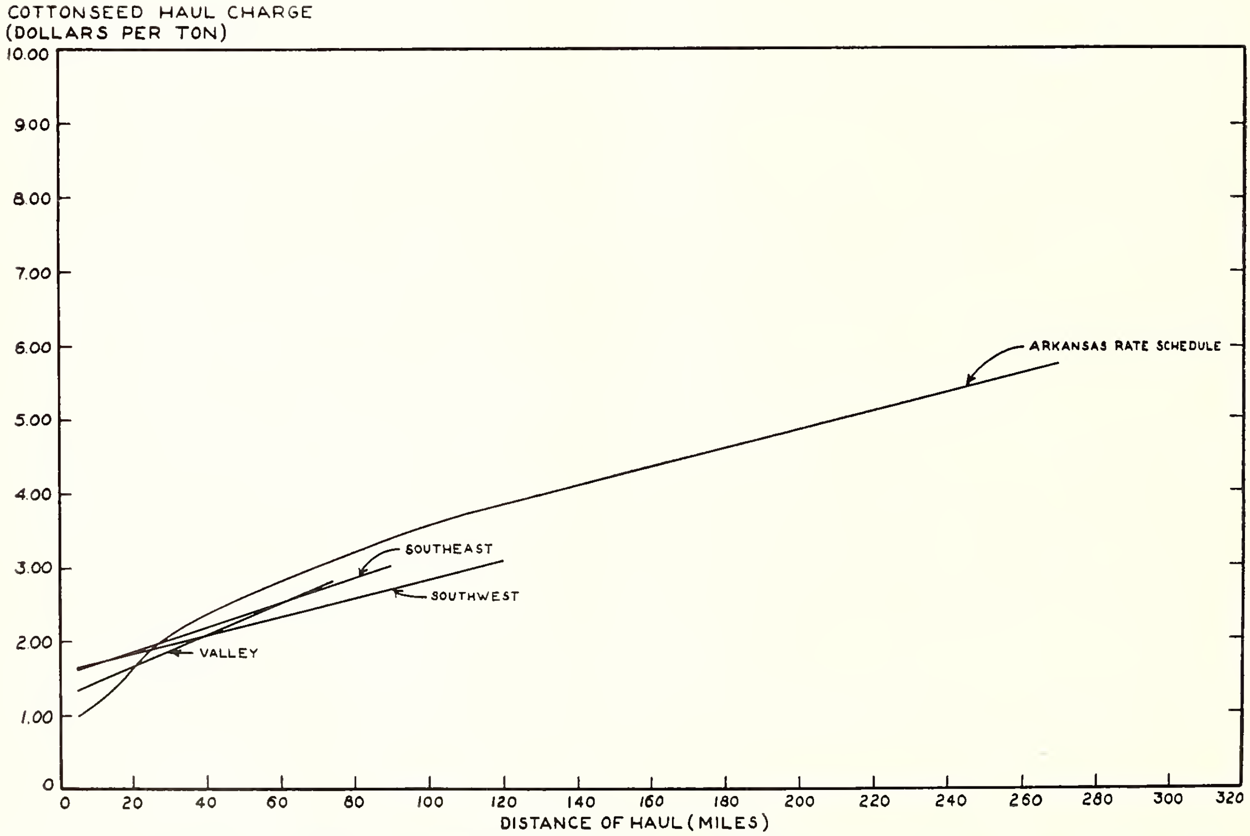

Figure 62.—Relationship between cottonseed haul charge per ton of seed and average distance of haul, by regions, and Arkansas motor carrier rate schedule, 1947–48.

Source: Regional relationships based on data from 1947–48 survey of cottonseed oil mills by the Cotton Branch of the Production and Marketing Administration, USDA.

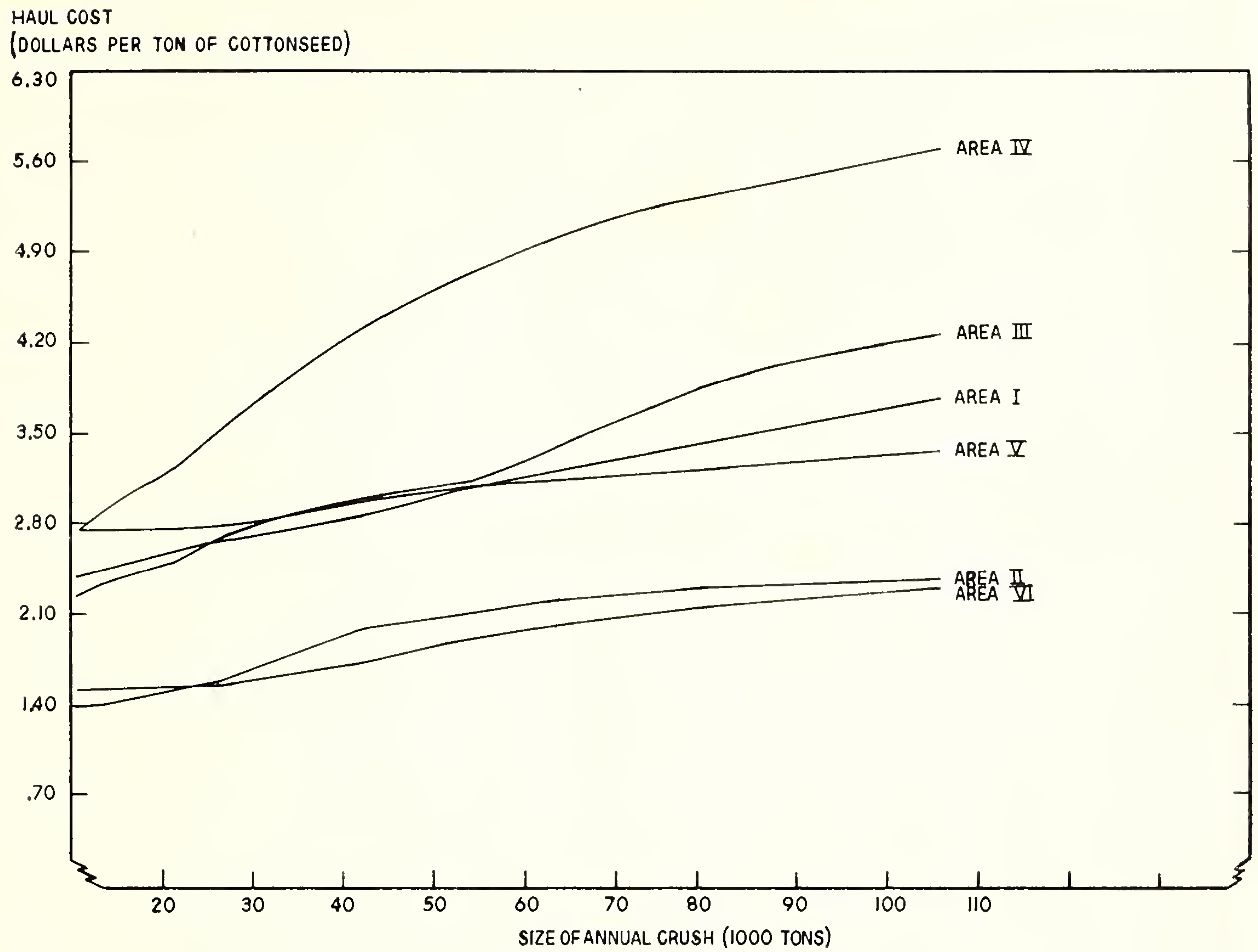

Figure 63.—Calculated average haul charges per ton of cottonseed from gin to oil mill, by size of annual crush, mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

with a number of mill operators, this 1949–50 schedule of haul costs was checked against the 1952–53 rates in effect between a Great Plains mill and some 57 gins located from 0 to 138 miles from the mill. In 75 percent of the cases the haul cost from each of these gins was within 32 cents of what was predicted from the schedule used in this report. On the average, the cost predicted by this schedule was 39 cents less than the cost actually incurred, which is largely accounted for by differences between 1949–50 and 1952–53 price levels.

On this basis, haul costs for widely different annual crushes are shown in figure 63 for the six widely separated mill areas.

Variations among mill areas in seed availability resulted in corresponding differences in average length of haul and, hence, in haul costs for any specified volume of seed.

LABOR

For purposes of this study, mill labor was classified into the following types: (1) Seed unloading; (2) production labor; (3) meal grinding (or pelleting) and sacking; and (4) product loading.

Seed Unloading Labor

A figure of 0.128 man-hour per ton was allowed for seed unloading.

This amount was based on the fact that two men were allowed for each unloader in handling seed into storage. Unloaders are commonly run for a maximum of 16 hours per day during the peak of the seed receipt season. The capacity of an unloader, under these circumstances, is 250 tons per day. Therefore, 0.128 man-hour is required for unloading 1 ton of seed.[7] This figure might have been somewhat different if dump instead of pneumatic unloaders had been provided. Primarily, to simplify analysis, only one type of unloader was used. The pneumatic unloader was selected because it was more commonly used in most sections of the Cotton Belt.

Production Labor

Production labor is defined as all man-hours, except meal grinding and sacking labor, which are required in handling seed from the point of storage up to and including the placement of products directly from the production line into truck or car for delivery purposes or in storage for later shipment.

Three main steps were involved in measuring production man-hour requirements. First, as machine and building layouts for different mills were developed, tentative specifications were made of production labor needs of each mill, operating at different extraction rates. These specifications were then checked for reasonableness with experienced managers of well-operated mills. Finally, the specifications for hydraulic mills were further checked: (1) Against tabulations of the 1949–50 labor force, broken down by type of job, for 9 sizes of hydraulic mills; (2) against the labor records for 16 hydraulic mills in the Mississippi Valley for each season from 1935–36 through 1939–40; and (3) against manpower studies of a number of other individual mills for different years. Except for the oil extraction department, the same checks were assumed to apply to all types of mills, because the equipment is the same in all mills except for the oil-extraction department. Contacts with individual operators of screw-press and solvent mills were relied on for checking the reasonableness of the labor needs of the oil-extraction departments of such mills.

Production labor requirements for various type mills, with daily crushes ranging from 20 through 560 tons, are shown in table 64 and in figures 64 through 67.

In terms of these schedules, a number of facts stand out. Up to within the neighborhood of a 250-ton crush per day, the screw-press mills required less labor per ton of seed than did any other type of mill. For larger crushes direct solvent mills had a slight advantage. Hydraulic mills, whatever their size, are conspicuous users of manpower.

Again, production man-hours per ton of seed crushed tended downward with increased volume throughout the whole range of daily crushes for each type of mill. However, the rate of decline was slight after the crush reached 200 tons per day.

Finally, as various sizes of hydraulic cookers accommodate different numbers of presses, as shown in table 64, the addition of cookers for additional presses results in the fact that some relatively big hydraulic mills require more man-hours per ton of seed crushed than do immediately smaller mills. For example, with 1 cooker, the daily crush could be increased from 20 to 176 tons per day. As this was done, man-hours per ton of seed decreased from 10.80 to 2.97. At this point a second cooker had to be added. As this was done man-hours per ton of seed increased to 3.11 and did not fall below 2.97 until the daily crush was expanded from 176 to 220 tons. As shown in table 64, and figure 64, the same principle applied in a much greater degree as the second pair of cookers was added.

From the standpoint of production man-hour requirements, 14-press and 28-press hydraulic mills should be avoided, as they require additional cookers and men without being able to crush enough additional seed to fully utilize the labor capacities of the needed additional men.

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[7] The equations are as follows:

$$\text{Number of seed unloaders} = \frac{\text{Tons of seed received per day}}{\text{250 tons for each unloader}} \quad (1)$$

Seed unloading man hours per day = 16 (No. unloaders) + 0.064 (tons of seed receipts per day), where 16 is the number of operating hours per day per unloader (2)

$$\text{Seed unloading man-hours per ton of seed} = \frac{\text{Seed unloading man-hours per day}}{\text{Tons of seed received per day}} \quad (3)$$

Hence, whatever the seed receipts per day, 0.128 seed-unloading man-hour per ton is required. For example, suppose seed receipts are 1,000 tons per day. Then seeding-unloading man-hours per ton of seed

$$= \frac{\frac{16\ (1{,}000\ \text{tons received per day})}{250\ \text{tons}} + 0.064\ (1{,}000\ \text{tons received per day})}{1{,}000\ \text{tons received per day}}$$

$$= \frac{\frac{16 \times 1{,}000\ \text{tons received per day}}{250} + \frac{16 \times 1{,}000\ \text{tons received per day}}{250}}{1{,}000\ \text{tons received per day}}$$

$$= \frac{1{,}000\ \text{tons received per day}\ (0.064 + 0.064)}{1{,}000\ \text{tons received per day}} = 0.128\ \text{man-hour per ton of seed unloaded}$$

TABLE 64.—*Production man-hour requirements calculated for different types of cottonseed oil mills, by size of daily crush*

Size of daily crush (tons of seed crushed per 24 hours)	Hydraulic [1]						Screw press		Direct solvent		Prepress solvent	
	1 cooker and 1 to 13 presses		2 cookers and 14 to 25 presses		4 cookers and 26 to 40 presses							
	Men per 24 hours	Man-hours per ton	Men per 24 hours	Man-hours per ton	Men per 24 hours	Man-hours per ton	Men per 24 hours	Man-hours per ton	Men per 24 hours	Man-hours per ton	Men per 24 hours	Man-hours per ton
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
20	27	10. 80					21	8. 40	24	9. 60	27	10. 80
30	30	8. 00					24	6. 40	27	7. 20	30	8. 00
40	30	6. 00					24	4. 80	27	5. 40	30	6. 00
50	33	5. 29					24	3. 84	27	4. 32	30	4. 80
60	36	4. 80					27	3. 60	30	4. 00	33	4. 40
70	39	4. 46					30	3. 43	33	3. 75	36	4. 11
80	42	4. 20					30	3. 00	33	3. 30	36	3. 60
90	45	4. 00					33	2. 93	36	3. 20	39	3. 47
100	48	3. 84					34	2. 72	36	2. 88	39	3. 12
110	51	3. 71					37	2. 69	39	2. 84	42	3. 06
120	51	3. 40	54	3. 60			37	2. 47	39	2. 60	42	2. 80
130	54	3. 33	57	3. 51			40	2. 46	42	2. 58	45	2. 77
140	57	3. 26	60	3. 43			40	2. 29	42	2. 40	45	2. 57
150	60	3. 20	63	3. 36			43	2. 29	45	2. 40	48	2. 56
160	60	3. 00	63	3. 15			43	2. 15	45	2. 25	49	2. 45
170	63	2. 97	66	3. 11			46	2. 16	48	2. 26	52	2. 45
180			69	3. 07			46	2. 04	48	2. 13	52	2. 31
190			72	3. 03			49	2. 06	51	2. 15	55	2. 32
200			78	3. 12			50	2. 00	51	2. 04	55	2. 20
210			81	3. 09	87	3. 31	53	2. 02	54	2. 06	58	2. 21
220			81	2. 95	87	3. 16	53	1. 93	54	1. 97	58	2. 11
230			84	2. 92	90	3. 13	56	1. 95	57	1. 98	61	2. 12
240			84	2. 80	90	3. 00	56	1. 87	57	1. 90	63	2. 10
250			87	2. 79	93	2. 98	60	1. 92	60	1. 92	66	2. 11
260			87	2. 68	93	2. 86	60	1. 85	60	1. 85	66	2. 03
270			90	2. 67	96	2. 84	63	1. 87	63	1. 87	69	2. 04
280			96	2. 74	102	2. 91	63	1. 80	63	1. 80	69	1. 97
290			99	2. 74	105	2. 90	66	1. 82	66	1. 82	72	1. 99
300			99	2. 64	105	2. 80	67	1. 79	66	1. 76	72	1. 92
310			102	2. 64	108	2. 79	70	1. 81	69	1. 78	75	1. 94
320			102	2. 56	108	2. 70	70	1. 75	69	1. 73	75	1. 87
330			105	2. 55	111	2. 69	73	1. 77	72	1. 75	78	1. 89
340			105	2. 47	111	2. 61	73	1. 72	72	1. 69	78	1. 84
350					120	2. 75	76	1. 74	75	1. 71	81	1. 85
360					120	2. 65	76	1. 69	75	1. 67	81	1. 80
370					123	2. 66	79	1. 71	78	1. 69	84	1. 82
380					123	2. 59	79	1. 66	78	1. 64	84	1. 77
390					126	2. 59	82	1. 68	81	1. 66	87	1. 78
400					126	2. 52	83	1. 66	81	1. 62	87	1. 74
410					141	2. 75	86	1. 68	84	1. 64	90	1. 76
420					141	2. 69	86	1. 64	84	1. 60	90	1. 71
430					144	2. 68	89	1. 66	87	1. 62	93	1. 73
440					144	2. 62	89	1. 62	87	1. 58	93	1. 69
450					147	2. 61	92	1. 64	90	1. 60	96	1. 71
460					147	2. 56	92	1. 60	90	1. 57	96	1. 67
470					150	2. 55	95	1. 62	93	1. 58	99	1. 69
480					150	2. 50	95	1. 58	93	1. 55	99	1. 65
490					153	2. 50	98	1. 60	96	1. 57	102	1. 67
500					153	2. 45	98	1. 57	96	1. 53	102	1. 63
510					156	2. 45	101	1. 58	99	1. 55	105	1. 65
520					156	2. 40	101	1. 55	99	1. 52	105	1. 62
530					159	2. 40	104	1. 57	102	1. 54	108	1. 63
540					159	2. 36	104	1. 54	102	1. 51	108	1. 60
550					162	2. 36	107	1. 56	105	1. 53	111	1. 61
560					162	2. 31	107	1. 53	105	1. 50	111	1. 59

[1] Hydraulic mills are classified here by number of cookers to show the sharp break in downward trend of labor requirements per ton of seed crushed that occurs with increase in number of cookers. With the other types of mills additional machines are associated with such small increments of labor that discontinuities in man-hours per ton of seed crushed are insignificant.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

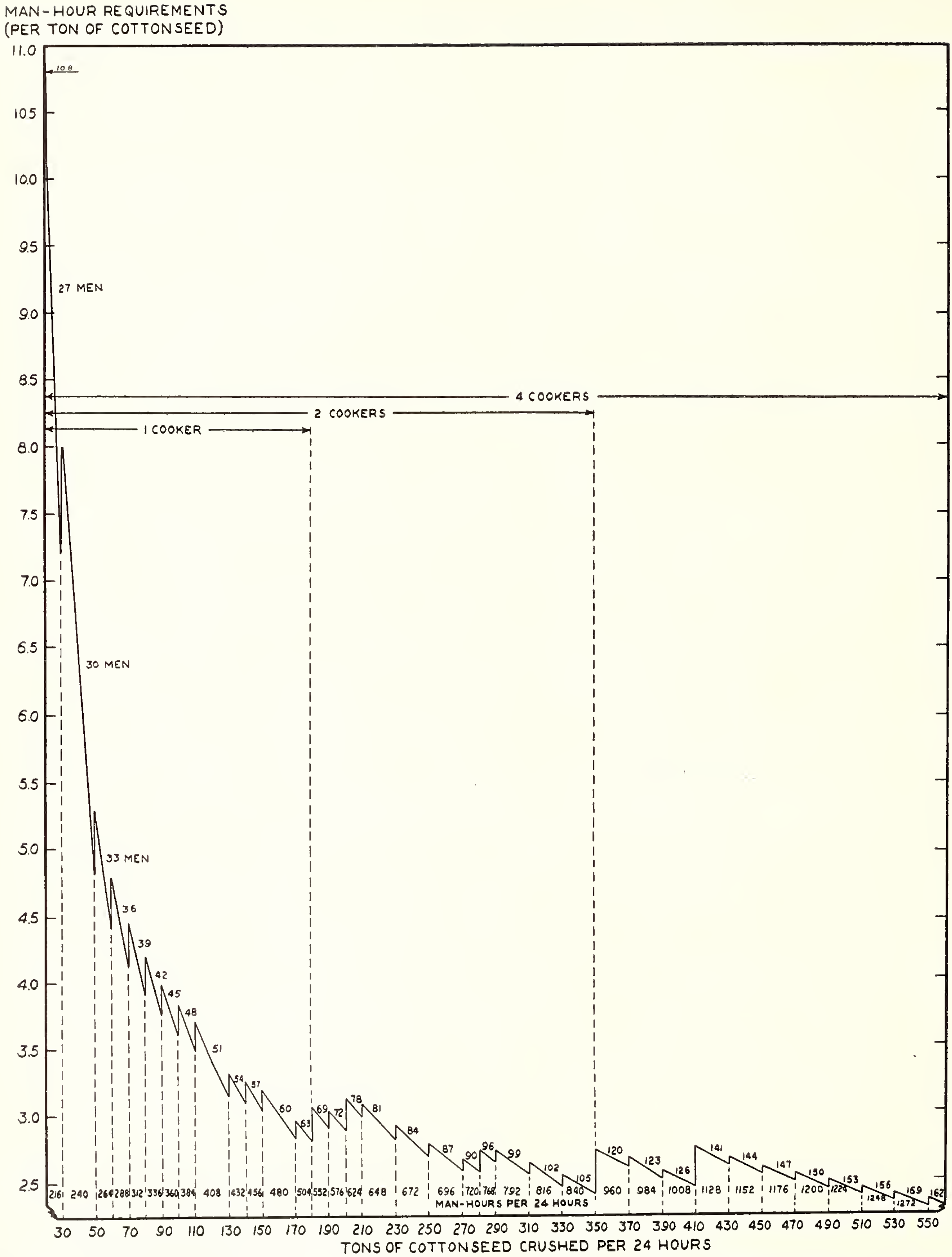

FIGURE 64.—Calculated production man-hour requirements for hydraulic cottonseed oil mills, by size of daily crush. (Includes supervisory labor, but excludes labor of superintendent, manager, and office force, and for seed unloading, storage, and packaging.)

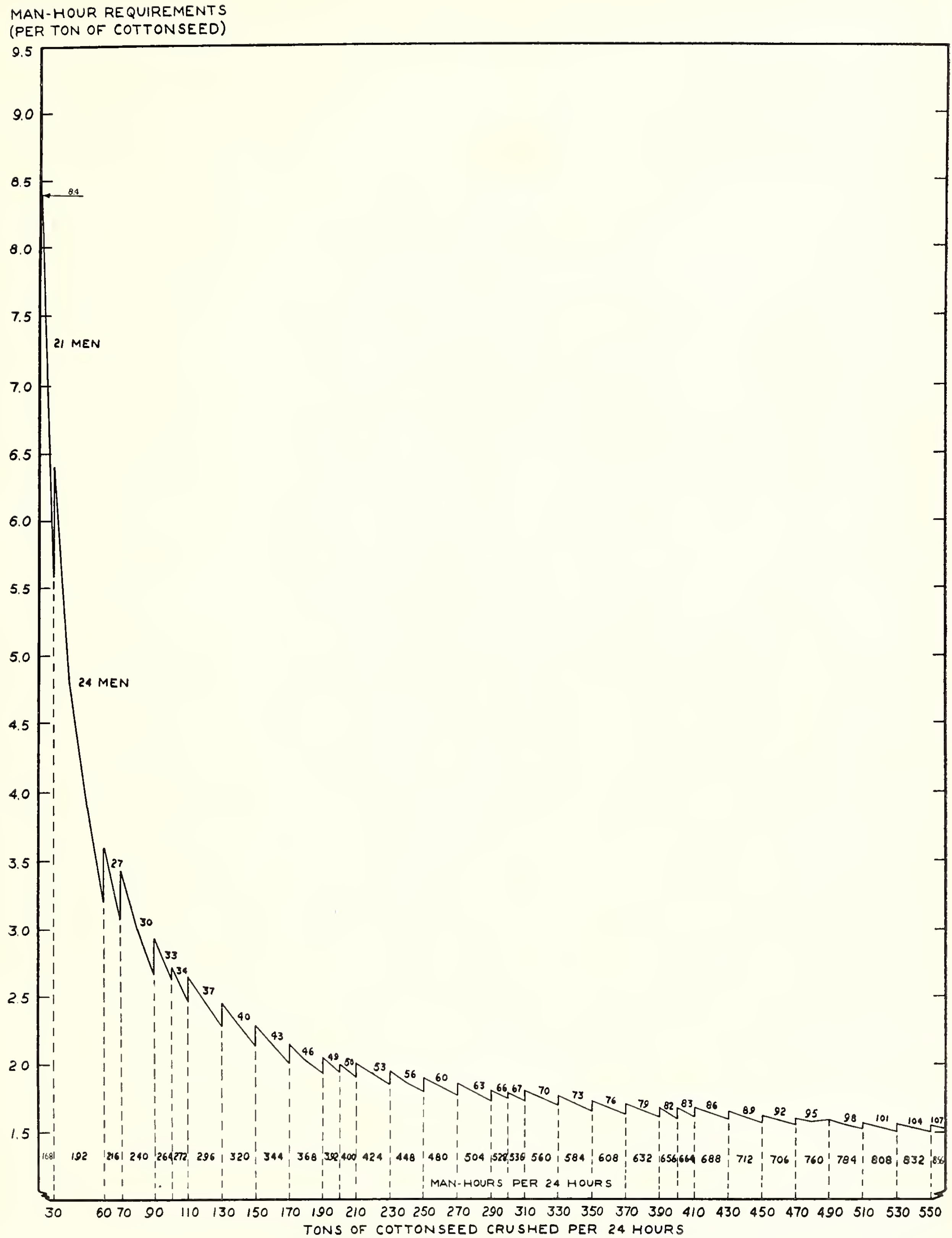

FIGURE 65.—Calculated production man-hour requirements for screw-press cottonseed oil mills, by size of daily crush. (Includes supervisory labor, but excludes labor of superintendent, manager, and office force, and for seed unloading, storage, and packaging.)

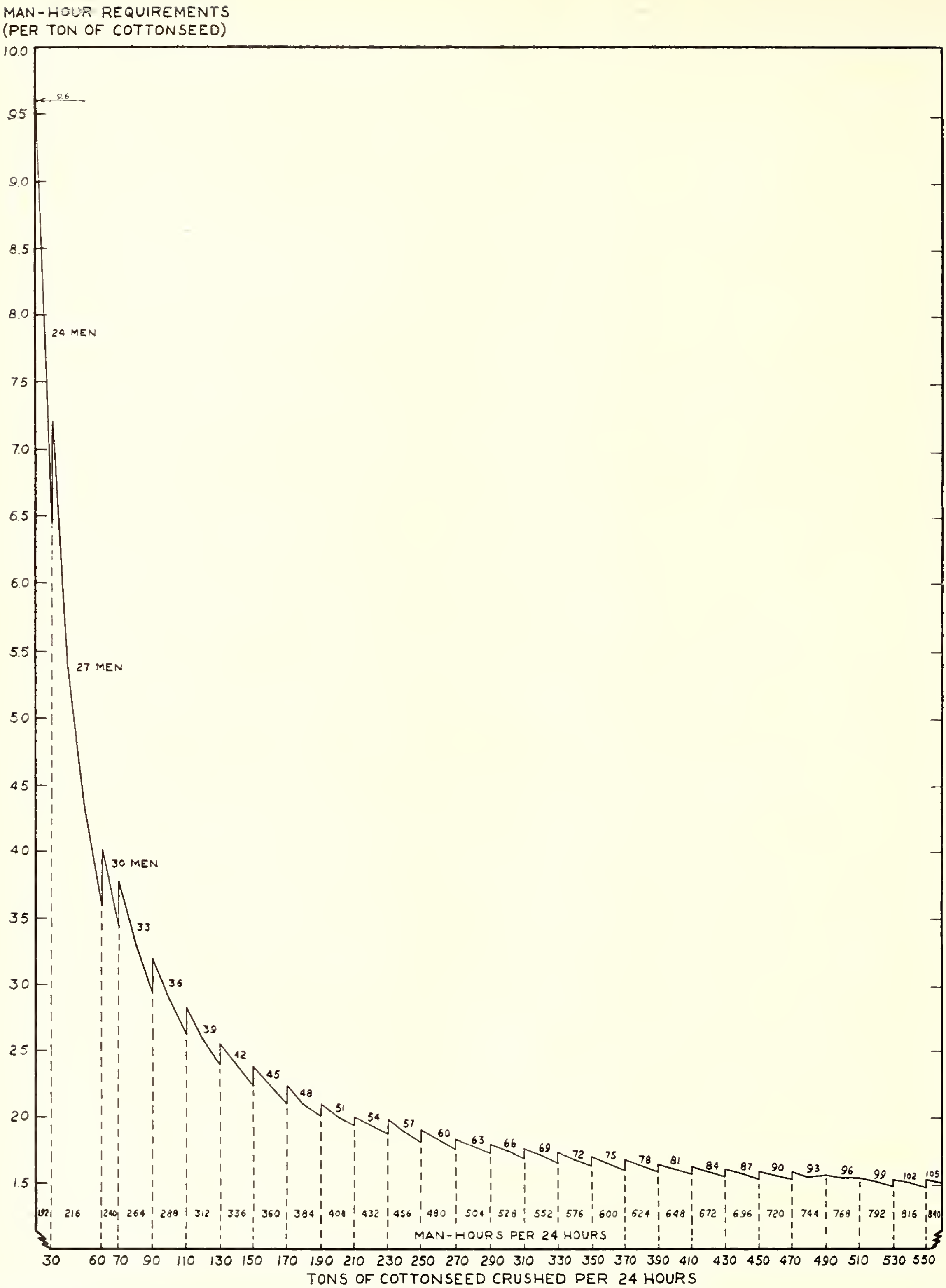

FIGURE 66.—Calculated production man-hour requirements for direct-solvent cottonseed oil mills, by size of daily crush (Includes supervisory labor, but excludes labor of superintendent, manager, and office force, and for seed unloading, storage, and packaging.)

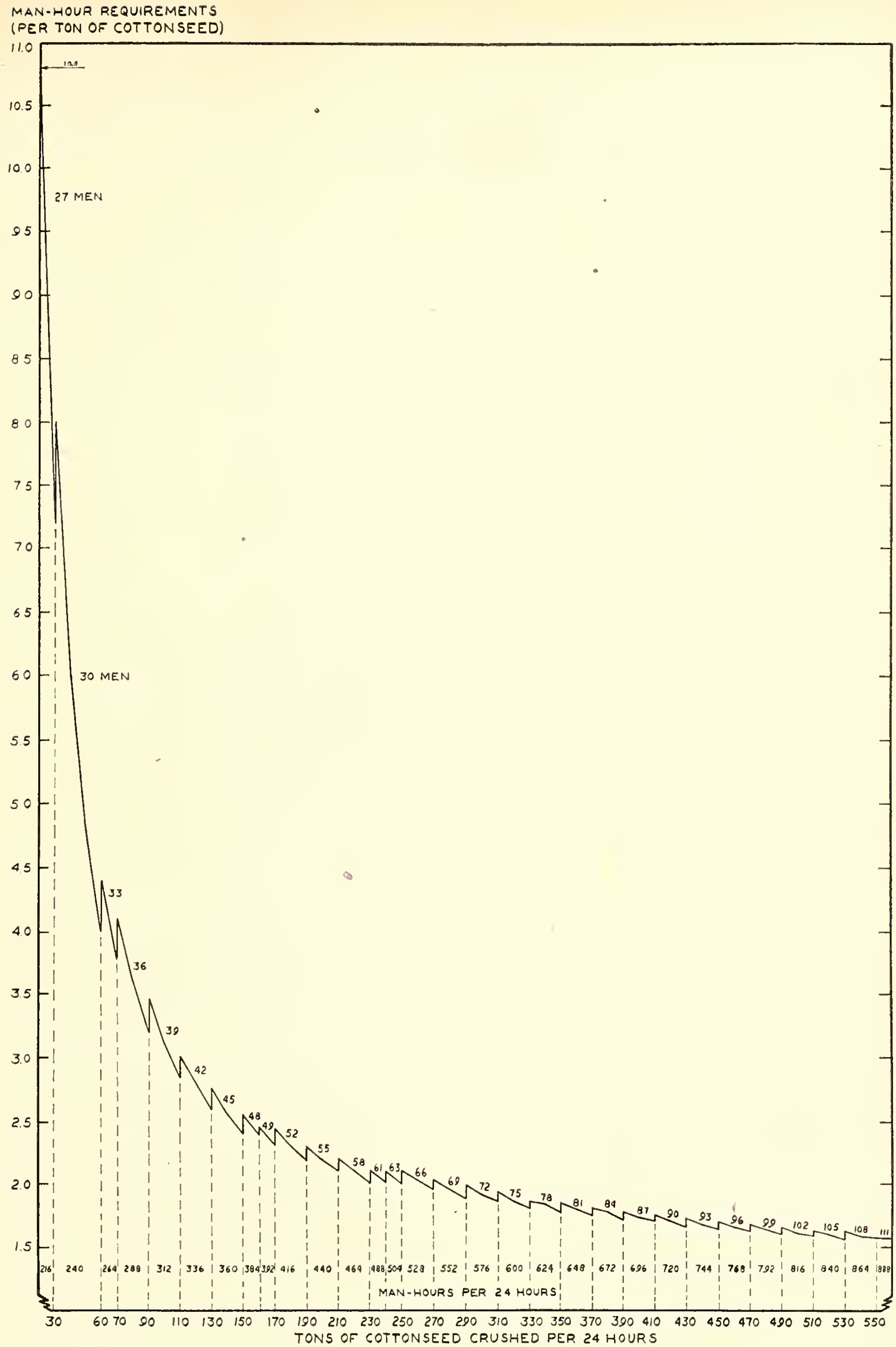

FIGURE 67.—Calculated production man-hour requirements for prepress-solvent cottonseed oil mills, by size of daily crush. (Includes supervisory labor, but excludes labor of superintendent, manager, and office force, and for seed unloading, storage, and packaging.)

In all other types of mills, machines may be added so as to permit the expansion of the labor force by a man at a time. As a result, small expansions of the daily crush may always be associated with increased output per man-hour.

Production man-hour requirements per ton of seed were the same in any area, varying only by type and size of mill. These variations are shown in figure 68 for mills in this report.

TABLE 65.—*Calculated production labor requirements for different types of cottonseed oil mills, by specified daily crushing capacities*

24-hour crushing capacity at normal operating rate (tons)	Hydraulic mill	Screw press mill	Direct solvent mill	Prepress solvent mill
	Man-hours	*Man-hours*	*Man-hours*	*Man-hours*
40	6.00	--------	--------	6.00
50	--------	3.84	4.32	--------
60	4.80	--------	--------	--------
75	--------	3.20	--------	--------
80	4.20	--------	--------	3.60
100	3.84	2.72	2.88	--------
120	3.40	--------	--------	--------
125	--------	2.37	--------	--------
160	3.15	--------	--------	2.45
175	--------	2.10	--------	--------
200	3.12	2.00	2.04	--------
220	2.95	--------	--------	--------
240	2.80	--------	--------	2.10
250	--------	1.92	--------	--------
300	2.80	1.79	1.76	--------
350	--------	1.74	--------	--------
360	2.67	--------	--------	--------
400	2.52	1.66	1.62	1.74

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

In general, there is little difference between the production labor requirements of the direct-solvent and screw-press processes. Below 250 tons per day, the screw-press process has an advantage, whereas above this point the direct-solvent shows a slight advantage. Both the screw-press and direct-solvent mills, whatever the size, show some advantage over corresponding size prepress-solvent mills. However, this advantage becomes slight for mills crushing 240 tons, or more, per day.

Although the smallest prepress-solvent mill has no labor advantage over a 4-press hydraulic mill, all larger prepress mills, beginning with a 50-ton crush per day, showed increasing labor economies over corresponding-size hydraulic mills.

Meal Grinding (or Pelleting) and Sacking Labor

Man-hour requirements for grinding and sacking meal were calculated on the basis of 6 man-hours per 250 bags of meal (100 pounds per bag), plus an allowance of 3 man-hours "set-up" time per grinding period (8 hours or less). A 6-man crew was thus considered as grinding and sacking meal at the rate of 12.5 tons per hour or 100 tons per 8-hour day. In other words, 48 man-hours were consumed per 100 tons of meal ground. One setup time (3 man-hours) was allowed for each 100 tons of meal ground or sacked. A total of 51 man-hours was thus needed per 100 tons of meal ground or sacked (48 for grinding and 3 for setup time) or 0.51 man-hour per ton.

Product Loading Labor

Product loading labor is defined as man-hours required for removing linters, hulls, slab cake, and bagged meal from storage into truck or car for delivery purposes. All quantities of these products which were not stored but loaded directly from the production line were considered as not requiring any "product loading" labor.

On the basis of data from 16 Valley mills in 1939, the products differed somewhat in their loading labor requirements. On the average, however, this requirement was 0.5 man-hour per ton of products loaded. Since changes in product loading methods have been negligible in recent years, this average was used.

Calculating total product loading man-hours is further dependent on how much of each product is stored, as the amount which goes directly from the production line into the truck or car for delivery requires no loading labor.

It was considered necessary to store all locally sold products for short periods, since local customers come in for them at will. All linters were considered as being stored prior to being loaded out, as the rate of linters production was not considered sufficient to justify having a freight car on dock for loading linters directly off the production line. It was also considered desirable to load all bulk meal directly after grinding, as it would have to be sacked before storage. (See p. 80.)

As available shipping facilities would permit direct loading from the production line, 50 percent of all wholesale sacked meal, 75 percent of wholesale slab cake, and 75 percent of all hulls sold wholesale would be loaded directly. Product loading labor was therefore allowed for 50 percent of wholesale sacked meal and 25 percent of wholesale slab cake and hulls.

Seed unloading labor requirements per ton of seed are the same irrespective of type of mill, size of mill, or mill location. However, meal grinding (and sacking) and product loading labor may vary somewhat by location for any type and size of mill, owing to differences in meal and hull yields per ton of seed, forms of meal produced, and the amount of meal and hulls which are sold locally and wholesale.

Wage Rates

As previously stated, it is common knowledge that mill wages are highest in the Far West, next highest in the Southwest, and elsewhere they are approximately equivalent to the minimum wage

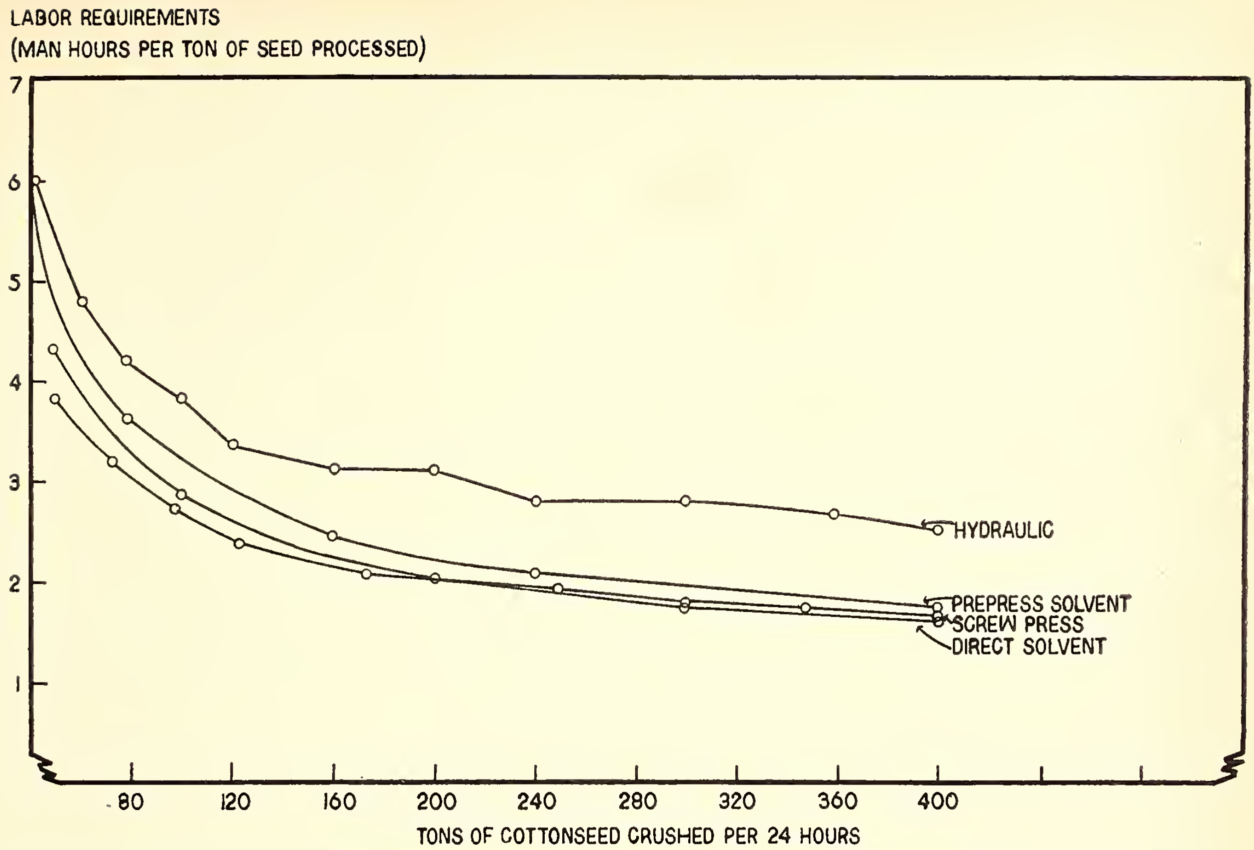

FIGURE 68.—Calculated production labor requirements per ton of seed processed for specified daily crushes, by type of cottonseed oil mill and size of daily crush.

law except for certain big-city mills. This common knowledge was checked against information from 24 widely scattered mills as to 1949–50 average wage rates after the minimum wage law went into effect in January 1949. The rates are shown in table 66 for the widely separated mill areas in this report.

Are wage differentials associated with different types of cottonseed mills? If so, what are they? There were so few localities with different types of mills that a definitive answer was not possible. However, data from such localities indicated that the average wage rate for screw-press mills was approximately 5 cents higher than that for hydraulic mills, and that the rate for direct- and prepress-solvent mills was about 5 cents higher than the rate for screw-press mills. These differentials were used.

TABLE 66.—*Hourly wage rates for different types of cottonseed oil mills, by mill area, 1949–50*

Mill area	Type of mill			
	Prepress solvent	Direct solvent	Screw press	Hydraulic
	Dollars	*Dollars*	*Dollars*	*Dollars*
I—Southeastern N. C.	0. 86	0. 86	0. 81	0. 76
II—North Delta, Ark.	. 87	. 87	. 82	. 77
III—South Delta, La.	. 90	. 90	. 85	. 80
IV—Eastern Okla.	1. 00	1. 00	. 95	. 90
V—North Blacklands, Tex.	1. 05	1. 05	1. 00	. 95
VI—Central Calif.	1. 60	1. 60	1. 55	1. 50

Source: Based on reports from cottonseed oil mill operators.

Dormant Labor

To handle maintenance and upkeep, and especially to assure themselves of a supply of competent workmen during the operating season, mills which operate less than a full 12-month season usually employ a skeleton crew of keymen throughout their shutdown periods. Such labor is defined as dormant labor. How much of this labor it is economical to employ differs widely among mill areas, depending on the difficulty of obtaining seasonal workers. Because of the greater overhead burden, a mill which operated only 6 months would keep a smaller proportion of its total labor during its dormant period than would a mill which operated for a 10-month season.

Data were not sufficiently complete for an exact measure of dormant labor requirements. In view of that fact, two practices were followed in making this study. First, on the basis of informal observation and discussion with 8 or 10 widely scattered mill operators, dormant labor was calculated on the basis of the following assumed relations between the length of operating season and the ratio of dormant to active labor requirements:

Length of season	*Ratio of dormant to active labor*
Months	*Percent*
6	33⅓
7	33⅓
8	33⅓
9	66⅔
10	75
11	90

No dormant labor was calculated for seasons of less than 6 months as that was the shortest season used in this study.

Second, to enable local judgment to adjust this relationship to its own unique situations, tables 98 through 103 were developed to show costs and returns both with and without the inclusion of dormant labor.

SALARIES

As used here, salaries refer to payments for managerial services and office help. The rates of pay for these services were developed from the 1949–50 reports of 90 mills throughout the Cotton Belt on total salaries paid and total tons crushed.[8]

The average relationship between these salaries per ton of seed crushed and total tons crushed was measured by classifying all the mills in size groups of 4,000-ton intervals and then fitting a curve (parabola) to these group averages. This relationship is shown in figure 69.[9]

The size of crush on which this average relationship was based did not extend beyond 90,000 tons. As this study considered crushes up to 105,600 tons, it was assumed that the increase beyond 90,000 tons would not be accompanied by any further decline in the cost per ton of managerial and office labor, at least up to a 105,600-ton crush.

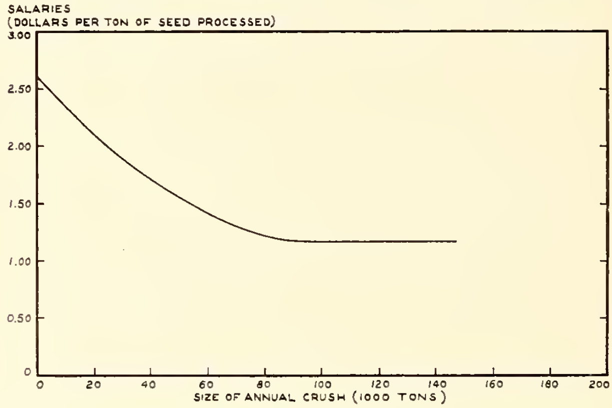

FIGURE 69.—Calculated salaries paid by cottonseed oil mills per ton of seed crushed, by size of annual crush, 1949–50.

According to the relationship thus developed, the cost of managerial and office force gradually fell from $2.62 per ton, for mills under a 4,000-ton crush, to as low as $1.17 per ton for mills with a crush of 90,000 tons and more.

UTILITIES

Electric power and water were included in the utilities category as the cost rates of both are affected by public authorities.

Electric Power Requirements

Mills described in this report, were completely electrified. Electric power rates vary somewhat over large geographical areas and among power companies serving the same general region. In most localities power charges depend on: (1) The total kilowatt-hour consumption; and (2) the maximum kilowatt demand during any 15-minute portion of the power billing period.

POWER CONSUMPTION. Power requirements were grouped into four categories to facilitate calculation of consumption and demand: (1) Seed processing; (2) seed unloading; (3) seed cooling; and (4) meal processing. The last of these categories was omitted from power demand because meal grinding and pelleting operations were assumed to be performed during periods of lessened demand from the other operations so as not to increase the total demand for any billing period.

Electric power requirements for seed processing were divided into two categories: (1) Delinting; and (2) producing. Delinting requirements included the power for operating the linters, the flue system for collecting the lint, the lint cleaners, and the lint-baling press.

[8] Data provided by the National Cottonseed Products Association.

[9] According to the usual procedure in problems like this, a line representing the average relationship between salaries per ton crushed and total tons crushed would have been developed on the basis of all the mills, rather than on the averages of each particular size group. However, in calculating the salaries for any particular size of mill, a line based only on averages of mills in each size group was more realistic than a line that was influenced at every point by all individual mills outside each given size group.

Producing requirements included the requirements for conveying seed from storage, cleaning seed, conditioning (for direct solvent mills) and rolling or flaking meats, extracting the oil, and handling cake or meal to bins.

The same power requirements for delinting of 0.2 kilowatt-hour per pound of linters were used for all types of mills. This was based on the 1937–38 experience of six hydraulic mills in the Mississippi Valley.

For different processing rates in a given mill, the greater the rate the greater the throughput per linter, the smaller the lint yield per ton, and the smaller the power requirement per ton of seed. Therefore the power requirements per ton of seed vary as shown in table 67. This table presents power requirements for delinting and producing for all four oil extraction processes.

Producing power requirements for hydraulic mills were derived from the same source as described above for delinting. Production power requirements for the other three processes were based on the requirements for the hydraulic process with estimated adjustments where the operations were not the same.

The electric power requirements of different type plants per ton of seed may vary somewhat by size of mill and rate of operation, being higher for small mills with lower operating rates than for large mills with high operating rates.[10] Except for screw press mills, no attempt was made to measure the effect of variation in rate of operation on producing power requirements as good data were not available for this purpose.

In screw-press mills presses are usually set so that the motors are fairly well loaded, regardless of the tonnage being run through the presses; hence, the power requirement per ton of seed varies with the processing rate. This fact was incorporated into the estimates of power required for oil extraction in the screw-press process. Power requirements for the oil extraction department in screw-press mills were based on observations under controlled conditions in an operating mill over a 3-month period in 1951.

Estimated requirements for the oil extraction department in prepress-solvent plants agreed with published figures. No published figures were available on the power requirements for the direct-solvent process.

Based on the 1937–38 experience of the 6 Valley mills, previously mentioned, 3 kilowatt-hours per ton of seed were allowed for seed unloading operations, 15 kilowatt-hours per ton of meal ground or pelleted were allowed for meal-processing operations; and 7 kilowatt-hours per ton of seed cooled were allowed for all seed placed in storage.

Power Demand. Maximum electric power demand represents the maximum rate at which power is used during any 15-minute interval of the billing period. Power demand can be derived from power consumption figures by multiplying the kilowatt-hours per ton of seed processed by the tons of seed processed per hour, to give a demand in kilowatts. When this is done for all the operations which are assumed to be carried on at the same time, the maximum demand may be determined. For this study the maximum demand was assumed to be determined by the seed unloading, seed cooling, delinting, and producing operations.

Table 67 shows the demand per ton of seed processed per hour for delinting and producing operations. The producing demand requirements

Table 67.—*Processing power demands of cottonseed oil mills, by type of mill and operating rate* [1]

Type of mill and rate of operation	Power demand per ton of seed per hour for—		
	Producing [2]	Delinting	Total [3]
	Kilowatts	*Kilowatts*	*Kilowatts*
Direct solvent:			
Plant 1—			
Minimum	32	44.5	76.5
Normal	32	35.6	67.6
Maximum	32	27.4	59.4
Plants 2 through 5—			
Minimum	32	47.5	79.5
Normal	32	35.6	67.6
Maximum	32	28.5	60.5
Prepress solvent:			
Plants 1 through 4—			
Minimum	56	47.5	103.5
Normal	56	35.6	91.6
Maximum	56	28.5	84.5
Plant 5—			
Minimum	56	52.7	108.7
Normal	56	35.6	91.6
Maximum	56	31.6	87.6
Screw press:			
20 tons per press per 24 hours	78	44.5	122.5
25 tons per press per 24 hours	70	35.6	105.6
30 tons per press per 24 hours	64	29.7	93.7
35 tons per press per 24 hours	59	25.4	84.4
Hydraulic:			
8 tons per press per 24 hours	36	44.5	80.5
10 tons per press per 24 hours	36	35.6	71.6
12 tons per press per 24 hours	36	29.7	65.7
14 tons per press per 24 hours	36	25.4	61.4

[1] Does not include seed unloading and seed cooling power demand.

[2] Includes demand for conveying seed from storage, cleaning, hulling, conditioning (for direct-solvent mills only), baling linters, rolling or flaking meats, oil extraction operations, and handling cake or meal to bins.

[3] These kilowatts per hour equal power consumption per ton of seed.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

[10] The same principle may apply to steam, water, and solvent requirements. However, as data were not available for determining these variations, steam, water, and solvent requirements were assumed to be the same for any given type of plant irrespective of size or rate of operation. It may be added that these operating costs would probably vary more from mill to mill than by size of mill and rate of operation.

are lowest for the direct-solvent process, where no presses are involved, and highest by a substantial margin for screw-press plants. The other two processes fall in between these extremes.

Figure 70 illustrates the relative processing power demands for the various mills included in this report. In this illustration, it was assumed that each mill was operating at its normal rate. At this rate, the lint yield was 178 pounds per ton of seed processed for all plants.

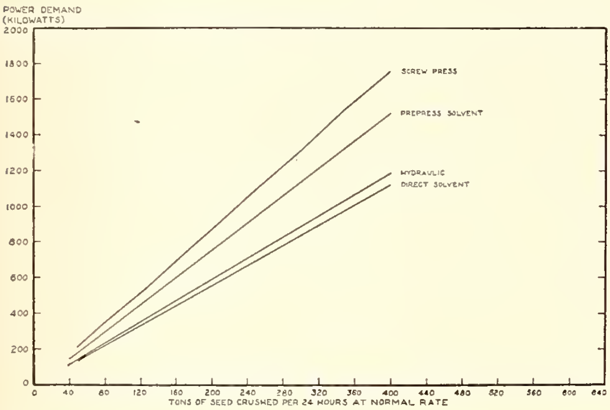

FIGURE 70.—Calculated power demand for cottonseed processing, by type of cottonseed oil mill and size of daily crush.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

Seed unloading power demand was calculated on the basis of a maximum power demand of approximately 50 kilowatts per seed unloader and an allowance of 1 pneumatic unloader per 250 tons of seed received per day. If, for example, any plant unloaded seed at a rate of 2,500 tons per day during any month, it would have used 10 unloaders simultaneously for at least a 15-minute period during the day; hence, its seed unloading demand for that period would be 500 kilowatts (10 unloaders x 50 kilowatts per unloader).

The allowance of 1 seed unloader per 250 tons of seed received per day was based on the fact that the hourly capacity of an unloader was approximately 16 tons and that unloading operations may be carried on for approximately 16 hours per day during the peak seed receipts season.

Unlike extraction and mechanical pretreatment department power demands, seed unloading demand is the same for all types of plants processing the same amount of seed per day and having the same length of operating season. Seed unloading demand is also independent of the rate of operations in the extraction and mechanical pretreatment department. These same principles also apply to seed cooling demand.

For purposes of plant design this report allowed 1 cooling fan for each 7,500 tons of seed stored. However, for operating purposes, it was assumed that on the average 1 cooling fan would be operated if 1 to 5,000 tons of seed were in storage, 2 if 5,001 to 10,000 tons were in storage, and so forth. The maximum power demand of a fan was 50 kilowatts.

Under this operating assumption, if a plant had 8,000 tons of seed in storage during any month, its cooling power demand was considered to be 100 kilowatts for that month (2 cooling fans x 50 kilowatts per fan).

This assumption was used in calculating seed cooling power demand for all plants, except as adjustments were necessary in line with the number of fans actually provided by the plant design assumption, mentioned above.

The maximum demand as defined above for the various mills in this study is shown in table 52.

POWER RATES. Using the power demand and consumption information in the two preceding sections, power costs were computed on the basis of rate schedules of power companies servicing the mill localities in which mills described in this study were considered as being operated. The most favorable power rate schedule was used for each mill.

Power rates for the same volume of power services varied somewhat among widely separated mill localities, as illustrated in figure 71.

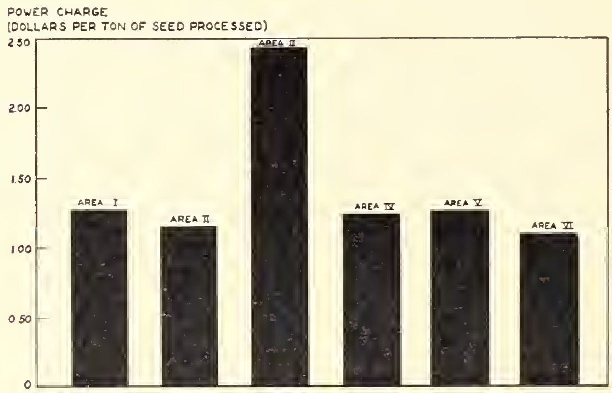

FIGURE 71.—Calculated power charge per ton of seed processed by 4-press screw-press mill operating at normal rate for 12-month season, mill areas I through VI (I—southeastern N. C.; II—Delta, northeastern Ark.; III—Delta, southern La.; IV—eastern Okla.; V—north Tex. Blacklands; VI—central Calif.), 1949–50.

Water

WATER REQUIREMENTS. Charges are incurred for quantities of water actually used in seed processing and quantities which may be used for fire-protection purposes.

Water has four types of processing uses: (1) Sanitary; (2) steam production; (3) condensing vaporized solvent; and (4) moistening cottonseed meats and cake.

Ten gallons per ton of seed processed were allowed for each type of mill for sanitary and miscellaneous purposes. This amount was estimated by assuming a requirement of 30 gallons per man per 8-hour shift for a 40-press hydraulic mill, operating at 10 tons per press per 24 hours.

Hydraulic, screw press, and solvent mills require water for generating steam for heating ("cooking") cottonseed meats. Both direct and prepress solvent plants require large amounts of water to condense the solvent vaporized during the desolventizing of the extracted solids and oils. To reduce these cooling water usages to a minimum, all solvent mills were provided with a recirculating water system and cooling towers in the extraction department.

Water requirements for cooling purposes were calculated from the heat load to be dissipated and an assumed rate of fresh water fed into the system to prevent dissolved solids from building up. These figures were in line with the limited data which were available from actual experience.

All mills, except direct solvents, require water for moistening cottonseed meats and cake. Although difficult to measure from available data, the requirement of hydraulic mills for this purpose was estimated as being 7 gallons per ton, and for screw-press and prepress solvent mills, 11 gallons.

These water requirements are summarized in table 68 by type of mill and type of water use.

TABLE 68.—*Water requirements per ton of cottonseed processed in different types of mills, by type of water use*

Type of water use	Hydraulic	Screw press	Prepress solvent	Direct solvent
	Gal.	*Gal.*	*Gal.*	*Gal.*
Sanitary and miscellaneous	10	10	10	10
Steam production	5	5	27	37
Cooling and condensing	-------	30	173	274
Moistening meats and/or cake or meal	7	11	11	-------
Total	22	56	221	321

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

WATER RATES. Mills commonly provide their own sources of water supply through well and pump installations. To calculate water costs on this basis, however, would complicate rather than contribute to the purposes of this study. As an alternative, such costs were calculated from municipal rate schedules in localities where mills included in this report were considered as being located.

In any locality, these costs vary with the total amount of water used. Two types of rates are usually available—one called the calculated cost per number of gallons or cubic feet actually used and the other called the minimum meter charge. The actual charge is whichever of these rates gives the larger charge. The following data were used in determining the size of the meter involved in the minimum meter charge: (These data were based on the flow of water in pipes at 3 feet per second velocity.)

Water consumption per day (24 hours) Gallons	*Meter size* Inches
4,100	½
7,200	¾
11,600	1
19,800	1¼
27,400	1½
45,200	2
99,300	3
171,000	4

Water charges for private fire protection connections also were computed from municipal rate schedules.

FUEL

As all mills described in this study were considered as electrically powered, fuel was required only for generating steam needed for cooking cottonseed meats or desolventizing oil and meal. Only fuel oil was considered, although natural gas is used in some localities.

According to Ayres (*1*), 6 boiler horsepower-hours per ton of seed processed are required by the hydraulic mills for cooking cottonseed meats. The same figure was assumed to hold for screw-press mills.

A steam requirement of 550 pounds was allowed per ton of seed for the prepress-solvent process, which is in substantial agreement with the findings of Moore (*7*) and Dunning (*3*). This is equivalent to about 16.2 boiler horsepower-hours per ton of seed. No published figures on steam requirements for direct extraction were available, but a few operating mills reported 760 pounds per ton of seed as in the range of consumption. This is equivalent to about 22.4 boiler horsepower-hours per ton of seed.

According to tests conducted on boilers of the type used in this report, slightly less than 2.25 pounds of No. 3 fuel oil (18,500 British thermal units per pound) are consumed per boiler horsepower, which is equivalent to 0.324 gallon. (A gallon of fuel oil weighs 6.944 pounds.)

In terms of these units, the fuel requirements per ton of seed processed by type of mill are shown in table 69.

TABLE 69.—*Steam and fuel oil requirements per ton of cottonseed processed, by type of mill*

Type of mill	Steam	Boiler horse-power-hours	Fuel oil [1]
	Pounds	*Number*	*Gallons*
Hydraulic	205	6	2
Screw press	205	6	2
Direct solvent	760	22.4	7
Prepress solvent	550	16.2	5

[1] 2.25 pounds or 0.324 gallon of No. 3 fuel oil consumed per boiler horsepower-hour (1 gallon of fuel oil weighs 6.944 pounds).

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

For purposes of estimating fuel costs, these figures may be considered as appropriate for either No. 3 or No. 2 fuel oil, as the British thermal units per pound of either oil are approximately the same, 18,500 for No. 3 and 18,667 for No. 2. Commercial companies reported that "No. 2 and No. 3 fuel oil are now the same," "No. 3" being the "old designation" for present "standard specifications" of No. 2 oil. The 1949–50 price of fuel oil was 12.5 cents per gallon.

SUPPLIES

Five items are usually included in the supply category: (1) Linters bagging and ties; (2) lubricants and cleaning materials; (3) meal bags; (4) press cloth and mending; and (5) solvent. The first three items are used by all types of mills; the fourth is used only by hydraulic mills; and the fifth is used only by solvent mills.

Linters Bagging and Ties

Bagging cost of linters was calculated at 8.2 cents per 100 pounds of linters produced. This calculation was based on the assumption that the average bale of linters produced weighted 625 pounds, exclusive of 15 pounds of bagging and ties. As 6 yards of linters covering were allowed per bale of linters (0.96 yard per 100 pounds of linters produced) and the price of 8-ounce linters covering in the fall of 1949 was 8.5 cents per yard, the calculated cost of linters bagging was 8.2 cents per 100 pounds of linters.

In addition, 11.7 cents per 100 pounds of linters produced was allowed for cost of linters ties. This figure was based on the fact that eight ties were required per bale, which is equivalent to 1.28 ties per 100 pounds of linters. The price of 45-pound new cotton ties during the fall of 1949 was $2.75 per bundle of 30 ties (including freight) or 9.16 cents per tie. Therefore, the calculated cost of ties was 11.7 cents per 100 pounds of linters.

Lubricants and Cleaning Materials

Costs for lubricants and cleaning materials were calculated on the basis of 5 cents per ton of seed crushed.

Press Cloth and Mending

It was assumed that hydraulic mills would use 0.4 pound of press cloth per ton of seed. A wool press cloth price of $1.63 per pound was used. This figure was based on a price of $1.60 per pound of cloth f. o. b. Columbia, S. C., plus $3.01 freight charges per hundredweight. The $1.63 per pound of cloth was equivalent to 65.2 cents per ton of seed crushed. Allowing a cloth mending charge of 3.5 cents per ton, the total press cloth and mending cost was 69 cents per ton of seed crushed.

Meal Bags (Including Twine and Tags)

Meal bag costs were calculated on the basis of $4.50 per ton of sacked meal or pellets produced. This cost figure was obtained by averaging the 1949–50 monthly prices of bags for linseed meal. The same kind of sacks are used for both linseed and cottonseed meal, and the density of both meals is approximately the same.

Solvent

Although the same solvent may be used many times, some solvent is lost with each use. Because of a different structure of the flaked meats, arising from the prepress operation, the rate of solvent loss is lower for the prepress than for direct-solvent mills.

As present solvent mills are all relatively new, the art of getting the best possible performance is still being mastered. Consequently, the actually experienced solvent loss rate is probably higher now than may be expected in the future as more experience and mastery of the new process are gained. The hoped-for rate is approximately 1 gallon per ton for the prepress-solvent process and somewhat higher for the direct-solvent. In practice, however, 3 direct-solvent mills, having a combined crush of over 70,000 tons, had an average solvent loss of approximately 5 gallons per ton in the 1949–50 season. A prepress-solvent mill, representing a crush of nearly 40,000 tons, reported a loss of nearly 3.5 gallons per ton for the 1950–51 season.

It did not appear feasible to analyze the comparative economies of different types of mills, on the basis of either the hoped-for low solvent loss rate after the new technique is thoroughly mastered, or the much higher actual rate in the early years of experience with the new process. As a consequence, this study has used an intermediate solvent loss rate of 2 gallons per ton for prepress-solvent mills and 3 gallons for direct-solvent mills. The 1949–50 cost of solvent was 16 cents per gallon.

TABLE 70.—*Cost of supplies per ton of cottonseed processed or products produced, by type of mill and supply item, 1949–50*

Type of mill and supply item	Cost		
	Per ton of seed	Per 100 lb. of linters	Per ton of meal
All types of mills:	*Dollars*	*Dollars*	*Dollars*
Linter bags		0.08	
Linter ties		.12	
Lubricants and cleaning materials	0.05		
Meal bags			4.50
Hydraulic mills: Press cloth and mending materials	.69		
Direct-solvent mills: Hexane	.48		
Prepress-solvent mills: Hexane	.32		

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

MILL EXPENSE

The mill expense category included repairs, linter room upkeep, and other mill expenses.

Repairs

Differences in types or sizes of mills were not assumed to have any appreciable effect on repair cost per ton of seed processed. The 1947–50 average repair cost of $1.35[11] per ton of seed processed for Valley mills was used for the mills considered in this report, although the repair cost was a little higher in the Southeast probably because mills in that region were older and the cost was somewhat lower in the Southwest for the opposite reason.

Linter Room Expense

Linter room expense included maintenance costs for: (1) Linter saws; (2) bristle strips; (3) linter saw files or gummers; and (4) miscellaneous items such as belts, brooms, repairs to saw filing machines, and other small items. Costs of each of these maintenance items were calculated per 100 pounds of linters produced, as shown in table 71.

TABLE 71.—*Cost of linter room maintenance and repair expense per 100 pounds of linters produced, 1949–50* [1]

Cost item	Expense
	Cents
Linter saws	4. 64
New bristle strip	2. 92
File or gummer	3. 78
Belts, brooms, and miscellaneous	5. 00
Total	16. 34

[1] Prime Mississippi Valley cottonseed assumed.

Source: Data obtained through contract under Agricultural Marketing Act of 1946 (RMA, Title II).

The bases of the calculations were as follows:

LINTER SAWS. A set of 141 linter saws will produce 125,000 pounds of linters from Mississippi Valley cottonseed during their useful life. A set of saws costs $58 (1949–50), including delivery charges. In these terms, linter saw cost was equivalent to 4.64 cents per 100 pounds of linters produced.

BRISTLE STRIPS. New bristle strips (85 strips per brush) costing $73 (1949–50), including delivery charges, are required every other time new saws are put on; hence, 1 set of strips produces 250,000 pounds of linters. This cost was equivalent to 2.92 cents per 100 pounds of linters produced.

FILE OR GUMMER. Under average conditions with prime Mississippi Valley cottonseed, a file or gummer will be worn out for each 100 saws sharpened. When producing linters at a rate of 1,000 pounds per 24 hours, a 141-saw linter saw cylinder, working on prime Mississippi Valley cottonseed, will require 2 sharpenings per 24 hours. The average price for files and gummers, in the quantities usually purchased, was 13.42 cents each, including delivery charges. Under these conditions, the file and gummer cost was equivalent to 3.78 cents per 100 pounds of linters.

MISCELLANEOUS ITEMS. Belts, brooms, repairs to filing machines, and other small items of expense will run about 5 cents per 100 pounds of linters.

Total linter room expense was thus estimated at 16.34 cents per 100 pounds of linters. As previously indicated, the linters yield was 178 pounds per ton of seed for all types of mills when operating at their normal rates. In these terms, linter room expense was 29.1 cents per ton of seed. At other operating rates, the cost would be somewhat different, owing to variation of linters yield with operating rates.

Other Mill Expense

Other mill expenses include such items as light bulbs, cleaning supplies, janitor work, brooms, belts, and the like for other parts of the mill than the linter room. These costs were estimated indirectly as follows:

The 1947–50 average total mill expense (including linter room expense) for Valley mills was 53.5 cents per ton of seed processed.[12] For all practical purposes, this mill expense may be considered as applying exclusively to hydraulic mills as the number of other types of mills in this area was negligible in relation to the total number of mills. Since linter room expense was calculated above as 29.1 cents per ton of seed, 24.4 was used for "other mill expense" for all types of mills, except screw press.

A large number of operators, having experience with both screw-press and hydraulic mills, reported that the cost of barrel bars, worms, filter cloth, and the like for screw-press mills ran about the same as the cost for press cloth and mending in hydraulic mills. In these terms, "other mill expense" for screw-press mills was considered to be 69 cents higher per ton than that for hydraulic mills or a total of 93.4 cents per ton of seed processed.

LABORATORY SERVICES

Chemical analysis of both cottonseed and cottonseed products is a well established, though not universal, practice in the industry.

These analyses fall into three groups, according to the purpose they serve.

Cottonseed Analysis

In order to purchase seed on a grade basis, 1 sample is made of each 25-ton lot of seed when received at mills. The normal charge (1949–50) for this service was $4 per sample, $3.75 of which went to the commercial laboratory performing the service and 25 cents went to the Government

[11] Data from the National Cottonseed Products Association.

[12] Data from National Cottonseed Products Association.

whose chemical supervisors assured an impartial analysis of purchased seed for both the grower and miller.

Analytical Control Work

Samples are also made for controlling the day-to-day efficiency of mill operations. Three samples are involved: One of seed processed per 24-hour production period; 1 of cake produced each shift (3 samples per day for mills in this report); and 1 of hulls produced each 24 hours.

Comparison of these analyses of seed processed with seed product yields provided a measure of day-to-day operating efficiency.

Some mills do their own control analysis work. In this report, however, it was assumed that such work was done by commercial laboratories. Charges for such services are so much per sample, minus a discount where the mill contracts all its services with a given laboratory. Both the charge per sample and the discount rate vary somewhat. This report has used a figure of $6.70 as the daily charge for analytical control work, whatever the size of crush.

Product Analysis

To check the quality of cottonseed products being marketed, 3 additional analyses have been provided: 1 sample per tank of oil for determining refining loss; 1 sample per cake or meal shipment (60,000 lb.); and 1 linter sample per week (second cut) for determining cellulose yield.

Although such charges vary somewhat among laboratories, this report allowed $5 per tank of oil sample, $3 for one linter analysis per week, and $1.25 per cake shipment analysis, assuming that the mill contracts analysis of all cake shipments with a given laboratory.

The foregoing services are summarized in table 72.

TABLE 72.—*Cottonseed oil mill laboratory services and charges, 1949-50*

Service	Charge	
	Per sample	Per day
	Dollars	*Dollars*
One seed sample per 25-ton lot of seed purchased	4.00	--------
Analytical control work:		
3 samples per day of cake produced (one per shift).		
1 hull sample per 24-hour day.		
1 sample per day of seed processed.		
Total of five samples per day	--------	6.70
One oil sample per tank car of oil [1]	5.00	--------
One cake or meal sample per cake shipment [1]	1.25	--------
One linter sample per week	3.00	--------

[1] 60,000 pounds per car used in determining total number of samples.

Source: Based on information from commercial cottonseed oil mill laboratories.

INSURANCE ON STOCKS

Insurance charges were allowed for the average number of tons of seed stored per month and for the maximum amount of each product stored.

Insurance ratings depended on the fire protection principles already described. The insurance rates per $100 value of seed and seed products stored are shown in table 73 and are based on data from the Pacific Fire Rating Bureau.

TABLE 73.—*Calculated fire and extended coverage insurance rates for stored cottonseed and cottonseed products, 1949–50*

Insured item	Rate per $100 insured value		
	Fire	Extended coverage	Total
	Dollars	*Dollars*	*Dollars*
Stored seed	1.430	0.022	1.452
Stored products:			
Oil	.728	.022	.750
Meal	.355	.060	.415
Linters	.278	.020	.298
Hulls	.278	.020	.298

Source: Based on information from Pacific Fire Rating Bureau.

BROKERAGE FEES

The general practice of cottonseed oil mill operators is to sell through a broker all their oil and linters as well as all meal and hulls which are shipped in carlots. The operator himself usually conducts all the bargaining transactions on all meal and hulls which are "sold locally."

These general practices have been assumed for all mills considered in this study. Accordingly, brokerage charges have been allowed for all product sales except for those portions of total meal and hull sales which were considered as being sold by the mill operator to his local customer.

After checking with a number of brokers, the fee rates shown in table 74 were used.

TABLE 74.—*Brokerage fees on cottonseed products sold wholesale, 1949–50*

Product	Unit	Fee
		Dollars
Oil	Tank car [1]	25.00
Meal (any form)	Ton	.50
Linters	100 pounds	.05
Hulls	Ton	.50

[1] Capacity approximately 60,000 pounds of oil.

Source: Based on reports of cottonseed oil mill products brokers.

OFFICE, TRAVEL, AND AUTO EXPENSE

As used in this report, office expense included office communications (such as telegraph, telephone, and postage) and supplies (such as writing paper, ink, and various types of forms).

Estimates of these expenses were based on 1949–50 information from the National Cottonseed Products Association. They were estimated on a per ton basis and size of crush in the same way as salaries, mentioned previously, were estimated.

The line in figure 72 was used in estimating office expense, whereas the line in figure 73 was used for estimating travel and auto expense.

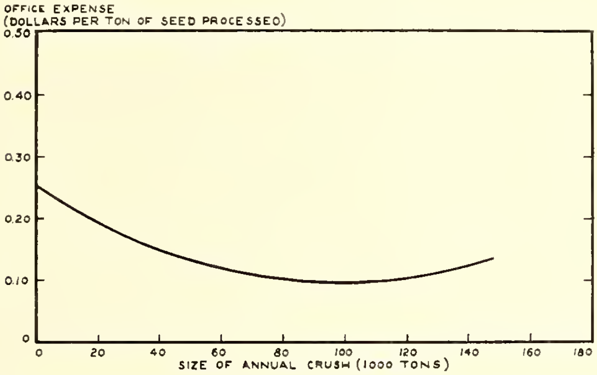

FIGURE 72.—Calculated office expense of cottonseed oil mills per ton of seed processed, by size of annual crush, 1949–50.

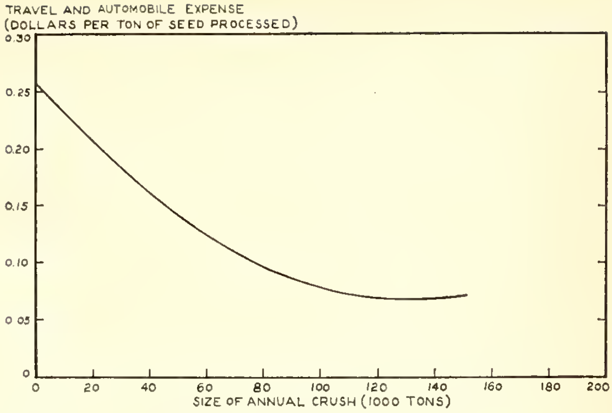

FIGURE 73.—Calculated travel and automobile expense of cottonseed oil mills per ton of seed processed, by size of annual crush, 1949–50.

WELFARE RISKS

Three types of costs were included in the category of welfare risks: (1) Social security; (2) workmen's compensation; and (3) general liability. The rate of 3 percent of the total payroll for social security and unemployment insurance is the same in all the States, as it is fixed by Federal statute.

For purposes of determining worker compensation rates, employees fall into two classes—plant workers and office workers. Compensation rates for plant workers are much higher than those for

TABLE 75.—*Workmen's compensation, general liability, social security, and unemployment insurance rates, for cottonseed oil mills in specified States, by type of insurance, 1951*

[Dollars per $100 of payroll]

Type of insurance	Ark.	Ala.	Ariz.	Calif.	Ga.	La.	Miss.	Mo.	N. C.	Okla.	S. C.	Tenn.	Tex.
Workmen's compensation:	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Plant workers—													
Solvent mills	4.22	2.02	[1] 6.31	[1] 7.17	2.91	[1] 4.40	4.57	4.44	3.43	7.20	4.62	2.94	5.23
All other mills	3.94	1.74	6.31	7.17	2.66	4.40	4.25	4.16	3.24	7.54	3.70	2.57	5.33
Office workers	.08	.04	.11	.07	.05	.07	.06	.08	.07	.05	.09	.07	.08
General liability:													
Visitors injured around plant—													
Bodily injury [2]	.038	.038	.044	.044	.044	.044	.038	.064	.044	.057	.044	.044	.044
Property damage [3]	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
Visitors injured in office buildings—bodily injury and property damage	.013	.013	.013	.013	.013	.013	.013	.013	.013	.013	.013	.013	.013
Social security and unemployment insurance (3 percent of total payroll)	------	------	------	------	------	------	------	------	------	------	------	------	------

[1] State rating manual reads "applicable to cottonseed-oil manufacture." Presumption was that rate applied to solvent as well as other types of mills.

[2] Limit of $100,000 for any one person, $300,000 maximum for 3 or more persons.

[3] Limit of liability $10,000 per $25,000 of property damage.

Source: State rating manuals.

office workers, owing to greater accident risks in the plant. For similar reasons, the rate for direct and prepress solvent plant workers is somewhat higher, in most States, than for other mills. Moreover, these rates vary widely among the various States, ranging from $1.74 per $100 of plant payroll (for hydraulic and screw-press mills), in Alabama, to $7.54 in Oklahoma. A similar variation also holds for rates on office workers.

General liability covers accident risks of bodily injury or property damage to visitors. The rate of such insurance is higher with respect to plant risks than the rate with respect to office risks, although the liability rates in either case are low in comparison with those for welfare risks. For any given plant the rate is based on its last 3-year history and, if the accident rate is high, the actual insurance rate may be considerably higher than the quoted basic rate. It was assumed that the accident rate of mills included in this report would be low enough to receive the quoted rates.

As costs of workmen's compensation insurance and social security depend in part on the total payroll, such costs are affected somewhat by the amount of dormant labor employed. However, in calculating these costs, dormant labor was disregarded because it was not enough to make any appreciable difference in total processing costs.

V. COTTONSEED PRODUCT PRICES

The ways in which average annual cottonseed product prices (1949–50) were calculated in this study are described under the headings which follow.

COTTONSEED OIL PRICES

Cottonseed (crude) oil is sold on a grade basis, the price of any grade being derived from the price of 100 grade oil.[13] Oil price varies seasonally as a result of change in (1) the market demand and (2) the grade of oil produced.

The average annual oil price received by any mill was obtained by weighting the monthly prices of 100 grade oil by (1) the calculated grade and (2) the amount of oil produced each month. These average annual prices are shown in table 76 by different lengths of seasons for the six widely separated mill areas included in the report.

[13] Crude cottonseed oil is called 100 grade if (1) its free fatty acid content does not exceed 3.25 percent, if (2) its refining loss is 9 percent, and if (3) it has a color not to exceed 7.6 red. The term "grade", as employed here, is not commonly used as a means of describing crude cottonseed oil. (See Rules Governing Transactions Between the Members of the National Cottonseed Association, 1952. Rule 142, p. 61.)

TABLE 76.—*Calculated average cottonseed oil prices per pound received by mills operating for different lengths of season in six mill areas, 1949–50* [1]

Length of operating season [2] (months)	Cottonseed oil price per pound in—					
	Area I	Area II	Area III	Area IV	Area V	Area VI
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
4.8	11.238	11.670	11.442	11.710	11.710	11.775
6.0	11.238	11.715	11.481	11.759	11.759	11.823
6.4	11.236	11.731	11.485	11.776	11.776	11.841
7.2	11.245	11.783	11.502	11.831	11.831	11.899
7.5	11.244	11.795	11.503	11.844	11.844	11.913
7.7	11.236	11.800	11.498	11.850	11.850	11.919
8.0	11.231	11.810	11.496	11.863	11.863	11.932
8.7	11.203	11.816	11.479	11.869	11.869	11.942
9.0	11.196	11.819	11.474	11.873	11.873	11.946
9.6	11.166	11.813	11.452	11.870	11.870	11.944
10.0	11.147	11.809	11.437	11.867	11.867	11.942
10.3	11.130	11.812	11.426	11.870	11.870	11.944
10.9	11.113	11.821	11.415	11.880	11.880	11.956
11.0	11.111	11.822	11.414	11.882	11.882	11.957
11.5	11.104	11.828	11.399	11.886	11.886	11.971
12.0	11.089	11.835	11.391	11.893	11.893	11.981

[1] Based on 1949–50 monthly price of oil, monthly grade of oil, and proportion of total oil produced each month.
[2] Averaging 22 24-hour working days per month.

MONTHLY PRICES OF 100 GRADE OIL

The monthly prices of 100 grade oil (1949–50) which were used in obtaining the average annual prices are shown in table 77.

TABLE 77.—*Calculated monthly price of prime crude cottonseed oil at Memphis, Tenn., 1949–50*

[Monthly price index applied to average 1949-50 price]

Month	Price index [1]	Price (index ×11.67) [2]
		Cents per lb.
September	99.5	11.61
October	95.9	11.19
November	95.7	11.17
December	98.2	11.46
January	99.3	11.59
February	101.6	11.86
March	103.2	12.04
April	102.1	11.92
May	100.9	11.78
June	99.5	11.61
July	101.8	11.88
August	102.3	11.94

[1] Computed from 1921–39 cottonseed oil prices f. o. b. Southeastern points.

[2] This 11.67 cents was the average 1949–50 price per pound for prime crude cottonseed oil, Memphis, monthly prices weighted by United States total monthly productions.

GRADES OF OIL PRODUCED

The oil grades used in obtaining the above average annual prices of oil were calculated by using standard formulas based on the free fatty acid content of seed at the time it was processed. This involved consideration of the free fatty acid content of seed when received and how it was affected by length of storage time.

Free Fatty Acid Content of Seed as Affected by Length of Storage Time

At the time the seed is processed, the amount of free fatty acid is equal to the amount of acid in the seed when first received plus the increase of the acid during the period the seed is stored before it is crushed.

Under controlled conditions, Alderks (*2*, p. 586) estimated that the free fatty acid content of seed, as received by mills, increases at the rate of 10 percent per month, if it is stored when the seed has 10- to 11-percent moisture and is stored at an average temperature of 50° F. Seed of higher moisture content, however, would deteriorate somewhat faster than seed with 10- to 11-percent moisture. Also, seed stored at higher than 50° temperatures would be expected to deteriorate faster than the rate indicated for 50°. However, a mill would probably work the highest-moisture seed first and store the seed having the lowest moisture content. Also, it would likely work first the highest-temperature seed in storage. As a consequence, trying to correct the above deterioration rate for actual temperatures would be difficult, with data available, and also complicate the problem more than contribute to its solution. Therefore, the 10-percent rate of increase per month of storage was used in calculating the free fatty acid content of seed at time of processing.

Length of Storage Time Per Ton of Seed Crushed Used In Calculating Free Fatty Acid Content of Seed Processed

The amount of time each ton of seed remains in storage before being crushed is dependent on a mill's crushing schedule and its total volume of seed receipts.

In developing such schedules, this report has used all the assumptions which were previously employed (pp. 68, 70–81) in determining the maximum seed-storage requirement of each mill. In addition, it further assumed that, whenever seed receipts in any given month were greater than the seed crushed in that month, (1) the excess seed would be kept in storage until the first following month in which seed receipts were less than the amount of seed crushed, and (2) that the seed which had been stored the longest would be crushed first. These steps are illustrated in table 78 for a 22-press hydraulic mill operating at 10 tons per press per 24 hours during an 8-month season. December is the first month in which the amount crushed was greater than the amount received. The December crush was 5,280 tons and receipts were 1,901 tons, leaving 3,379 tons which had to be drawn from storage. This entire remainder was taken from 6,336 tons of seed which had been stored in September and which had been in storage longer than any other seed on hand.

Through the use of such crushing schedules, the number of storage months per ton of seed were calculated for the volume of seed crushed each month, as shown in table 79. These storage times were then used in computing the free fatty acid content of seed crushed each month.

Grade of Oil Calculations

Crude oil settlements are made on the basis of direct analysis of oil for its color red and refining loss, in line with Rule 142 of the National Cottonseed Products Association. Obviously, this procedure could not be used in this study. But the same result could be accomplished in another way: Grades may be calculated directly from the free fatty acid content of seed at the time they are processed. Multiplying these grades by the quantity of oil and its basis price will give approximately the same values as those determined by the above-mentioned trade rule. The procedure for calculating crude oil grades directly from their free fatty acid content is given in the following definitions and equations:

A *standard grade of oil* is considered to be 100 grade if (1) its free fatty acid (FFA) content does not exceed 3.25 percent, if (2) its refining loss is 9 percent, and if (3) it has a color not to exceed 7.6 red.

TABLE 78.—*Calculated volumes of cottonseed received, stored, crushed, and grade of oil produced each month by 22-press hydraulic mills operating for 8 months at 10 tons of seed per press per 24 hours, by month of operation* [1]

Month of operation	Volume of seed handled						Seed crushed				Grade of oil produced [2]
	Received		Crushed		Stored (seed crushed subtracted from seed received)		Month received	Amount	Months stored		
	Monthly	Cumulative	Monthly	Cumulative	Monthly	Cumulative			Total	Average	
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*		*Tons*	*Number*	*Number*	*Percent*
September	11, 616	11, 616	5, 280	5, 280	6, 336	6, 336	September	5, 280	0	0	102. 3
October	14, 597	26, 213	5, 280	10, 560	9, 317	15, 653	October	5, 280	0	0	102. 3
November	6, 699	32, 919	5, 280	15, 840	1, 419	17, 072	November	5, 280	0	0	102. 3
December	1, 901	34, 813	5, 280	21, 120	0	13, 693	December	1, 901	0	1.92 or 2	102. 0
							September	3, 379	3		
								5, 280			
January	1, 665	36, 478	4, 400	25, 520	0	10, 958	January	1, 665	0	2.49 or 2	102. 0
							September	2, 735	4		
								4, 400			
February	2, 242	38, 720	4, 400	29, 920	0	8, 800	February	2, 242	0	2.01 or 2	102. 0
							September	222	5		
							October	1, 936	4		
								4, 400			
March	0	38, 720	4, 400	34, 320	0	4, 400	October	4, 400	5	5	101. 4
April	0	38, 720	4, 400	38, 720	0	0	October	2, 981	6	5.68 or 6	101.2
							November	1, 419	5		
								4, 400			

[1] Based on standardized schedule of operations.

[2] Based on grade of oil produced in mill area II, table 80.

Table 79.—*Calculated number of months of storage for seed crushed each month, by length of operating season* [1]

Length of operating season [2] (months)	Months of storage for seed crushed in—											
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
4.8	0	0	0	2	2	0	—	—	—	—	—	—
6.0	0	0	0	2	2	2	—	—	—	—	—	—
6.4	0	0	0	2	2	2	5	—	—	—	—	—
7.2	0	0	0	2	2	2	5	5	—	—	—	—
7.5	0	0	0	2	2	2	5	5	—	—	—	—
7.7	0	0	0	2	2	2	5	6	—	—	—	—
8.0	0	0	0	2	2	2	5	6	—	—	—	—
8.7	0	0	0	2	3	2	5	6	6	—	—	—
9.0	0	0	0	2	3	2	5	6	6	—	—	—
9.6	0	0	0	2	2	2	5	6	7	7	—	—
10.0	0	0	0	2	2	2	5	6	7	7	—	—
10.3	0	0	0	2	2	2	6	6	7	8	8	—
10.9	0	0	0	2	2	2	6	6	7	8	8	—
11.0	0	0	0	2	2	2	6	6	7	8	8	—
11.5	0	0	0	1	2	2	6	6	7	8	9	9
12.0	0	0	0	1	2	2	6	6	7	8	9	9

[1] Based on standardized schedule of operations.
[2] Averaging 22 24-hour working days per month. 22 working days may fall in more than 1 calendar month when not enough seed is available for continuous operation.

As shown by Bailey (*2*, pp. 366–367), FFA content of extracted oil from a given cottonseed can be converted into percent refining loss (RL) and color red (CR) as follows:

$$RL = 2.1 \times FFA + 4 \quad (1)$$

$$CR = 1.1 \times FFA + 4 \quad (2)$$

The *Quality Index* of crude oil is determined by FFA and CR, and is considered 100 if (1) FFA is not greater than 3.25 percent, and if (2) the oil refines with a CR not greater than 7.6. If CR is darker than 7.6, the quality index is lower than 100 by one-half of 1 percent for each 1 point excess, as follows:

$$\text{Quality Index} = 100 - [(CR - 7.6) \times 0.5] \quad (3)$$

If FFA exceeds 3.25 percent, the quality index is reduced by an additional 1.5 percent, as follows:

$$\text{Quality Index} = [100 - 1.5] - [(CR - 7.6) \times 0.5] \quad (4)$$

The *Quantity Index* is determined by the extent of the oil's refining loss, and is considered 100 if the refining loss is 9 percent. If the refining loss is less than 9 percent:

$$\text{Quantity Index} = 100 + (9 - \text{Ref. loss}) \times 0.75 \quad (5)$$

If the refining loss is greater than 9 percent:

$$\text{Quantity Index} = 100 - (\text{Ref. loss} - 9) \times 0.75 \quad (6)$$

Any grade of crude cottonseed oil is the product of the quality index and the quantity index divided by 100, as follows:

$$\text{Grade} = \frac{\text{Quality index} \times \text{quantity index}}{100} \quad (7)$$

To illustrate the use of these formulas, take the December production of a 22-press hydraulic mill operating 8 months. The seed crushed in this month has been stored for an average of 2 months (table 79). The FFA content of such seed was 1.1 percent, as the FFA was 0.9 when the seeds were received and was assumed to increase at the rate of 10 percent per month of storage. Substituting this figure in formulas (1) and (2) above, we have

$$RL = 2.1 \times 1.1 + 4 = 6.3$$

$$CR = 1.1 \times 1.1 + 4 = 5.2$$

Hence, by definition, the Quality Index of this oil is 100.

Substituting 6.3 in formula (5), we have

$$\text{Quantity Index} = 100 + (9 - 6.3) \times 0.75 = 102$$

Finally, by substituting these index numbers in formula (7), we have

$$\text{Grade of oil} = \frac{100 \times 102}{100} = 102$$

Through the use of the preceding tables and formulas, the grades of oil are shown in table 80 by lengths of operating seasons for the mill areas studied in this report.

TABLE 80.—*Calculated average percentage of "U. S. Standard" grade cottonseed oil produced from seed stored for specified number of months, by mill areas I through VI, 1944–48* [1]

Mill area	Grade of oil from seed stored for months numbering—									
	0	1	2	3	4	5	6	7	8	9
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
I	99. 2	98. 7	96. 6	95. 8	95. 2	94. 1	93. 3	92. 1	91. 1	89. 8
II	102. 3	102. 2	102. 0	101. 9	101. 7	101. 4	101. 2	100. 9	100. 8	100. 4
III	100. 4	100. 2	99. 8	99. 3	98. 9	96. 8	96. 1	95. 4	94. 6	93. 7
IV	102. 6	102. 5	102. 5	102. 3	102. 2	102. 0	101. 9	101. 6	101. 4	101. 0
V	102. 6	102. 5	102. 5	102. 3	102. 2	102. 0	101. 9	101. 6	101. 4	101. 0
VI	103. 2	103. 2	103. 0	103. 0	102. 8	102. 8	102. 6	102. 5	102. 3	102. 3

[1] Based on free fatty acid content of seed (2. 9, 0.9, 2.1, 0.7, 0.7, 0.4 percentages in areas I through VI, respectively) increasing at the rate of 10 percent for each month the seed is stored before crushing.

COTTONSEED LINTERS PRICES

As this study involved consideration of mills operating at different linter machine rates, a formula was developed for calculating linters returns in terms of differences in linters yields resulting from different linter machine rates.

In the 1949–50 survey, mentioned in connection with linters yields (p. 15), approximately $40 was the average revenue for linters produced by each linter machine per day operating at the rate of 5 tons of seed per 24 hours.

Assuming that the quality of linters will remain the same and all changes in linters revenue owing to changes in throughput will be owing to changes in linters yield, revenue per linter machine per 24 hours can then be converted to linters revenue per ton of seed by the following relationship:

$$\frac{\text{Revenue per linter per 24 hours}}{\text{Tons of seed per linter per 24 hours}} = \text{Dollars per ton of seed}$$

The revenue per linter machine would differ for different prices of linters. The figure of $40, used in this analysis, was the 1949–50 average for the mills surveyed. At the normal rate of operation (5 tons of seed per 24 hours), the linters revenue per ton of seed crushed was calculated to be $8 $\left(\frac{\$40}{5}\right)$.

COTTONSEED MEAL PRICES

Meal-marketing practices are especially complex, as a given mill may produce as many as 5 types of meal and sell each type at a different price in 2 markets—one called retail, or local, where the buyer picks up the meal, and the other wholesale, where the miller ships it to the customer. Actually, the market for any particular mill is never this complicated but it is always far from being simple. Adding to the complication is the fact that each mill locality is more or less its own price basing point, as there is no central meal market so that the price at any particular mill is the central market price minus freight. The matter of calculating a local and a wholesale price for each mill area in a given region is further complicated by the fact that individual mills commonly sell 1 type of meal in only 1 market, either local or wholesale. As previously indicated (p. 12), prices of different types of meal in different markets were calculated from 1949–50 reports of 172 mills on their meal market patterns and prices. Certain assumptions were used in making these calculations, as follows:

Rule One: On the price equivalence of sacked meal and cracked or sized cake. It was assumed that the prices of cracked or sized cake were the same as the prices of sacked meal in any locality. This assumption was based on the reports of 46 mills which sold both types of meal. In no case was there more than a nominal difference between the price of sacked meal and cracked or sized cake in either the local or the wholesale market.

Rule Two: On the wholesale price of sacked meal. With only minor exceptions, sacked meal is the most commonly produced form of meal in all regions. The wholesale price of sacked meal (as well as other forms of meals) varied from $1 to $5 per ton among mills in any cotton production region. This variation resulted partly from the fact that mills may receive different prices for meal because they operate for different lengths of season and partly from the fact that each mill center is its own pricing center, as previously stated.

In view of these conditions, the wholesale prices of sacked meal for small mill areas (table 5) were calculated by obtaining the average price of a very small (never less than 3 nor more than 7) number of mills in closest possible proximity to each other. This procedure tended to counteract the effect of varying lengths of operating season with respect to the normal price received by individual mills.

Rule Three: On the wholesale prices of nonsacked types of meal. Except for sacked meal, none of the five types of meal was customarily produced in every cotton production region (fig. 74). (Five percent of the total production was used as a measure of "customarily produced.")

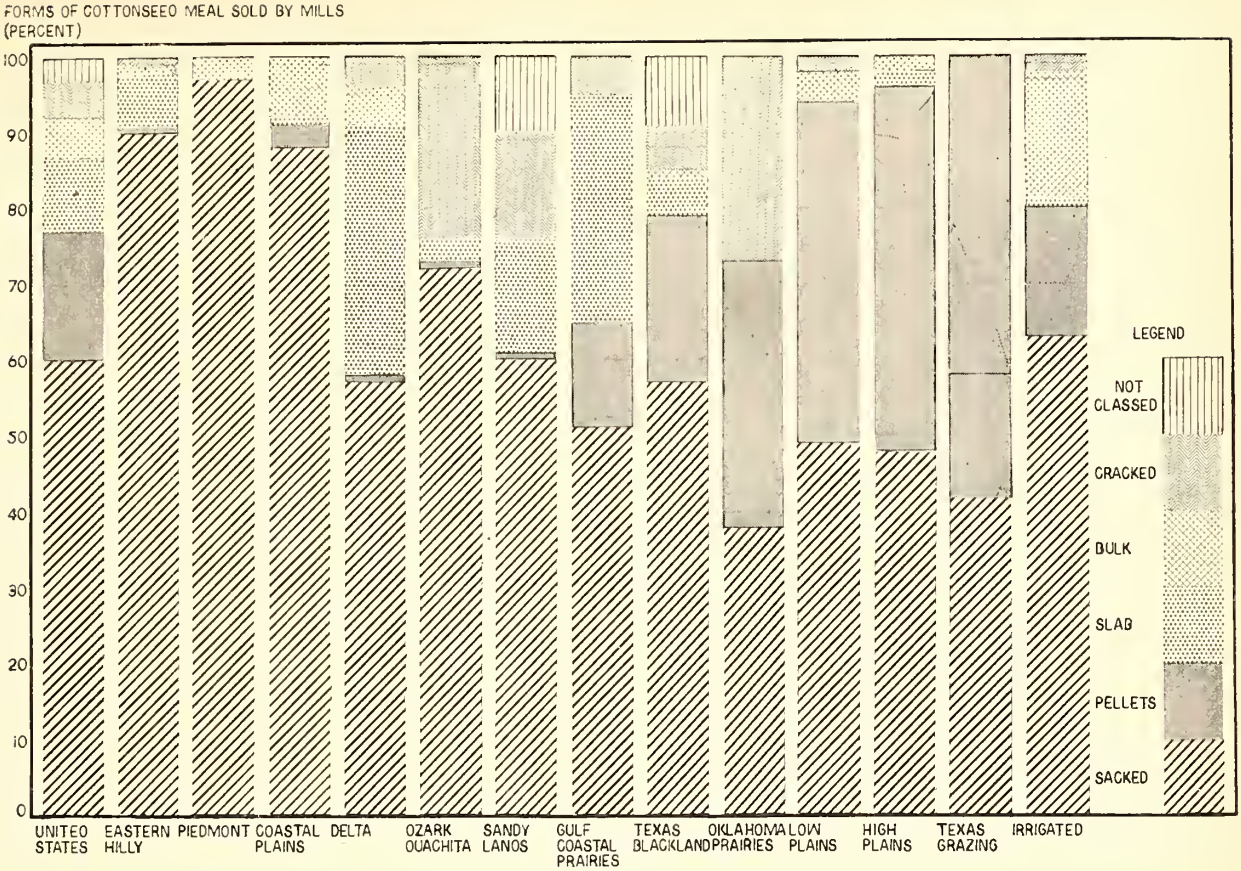

FIGURE 74.—Distribution of forms of cottonseed meal sold by cottonseed oil mills, United States and cotton-production regions, 1949–50.

For example, there were appreciable markets for slab meal in only 5 of the 13 cotton production regions; bulk meal in only 3 regions; and pellets in only 7 regions (fig. 74). Moreover, in most regions the number of mills producing slab, bulk, and pellet meal was much smaller than the number producing sacked meal.

In view of these facts, the wholesale prices, used for nonsacked forms of meal, were obtained through two steps: (1) The average price differentials between wholesale sacked meal and each other type of wholesale meal were calculated in each region for mills producing two or more forms of wholesale meal, as shown in table 81. (2) The wholesale prices of slab, bulk, and pellet meals were then obtained for each small mill area by adding these differentials to the wholesale price of sacked meal in the small mill areas. For example, the wholesale price of sacked meal for mill area II in the north Delta region was $59.30 per ton. As slab meal was calculated to sell for $5.45 less per ton than wholesale sacked meal on the average in the Delta region as a whole, the wholesale price per ton of slab for mill area II was considered as $53.85. The same principle was applied to wholesale bulk and pellets in any region where these types of meal were customarily produced.

Rule Four: On local prices of sacked meal. Local prices of sacked meal for small mill areas were obtained through two steps: (1) The average regional wholesale-local price differential was calculated on sacked meal for all mills in a given region selling such meal, both locally and wholesale (table 82). (2) This differential was then added to the wholesale sacked meal prices for individual localities, as shown in table 5.

For example, the wholesale price per ton of sacked meal in mill area II was $59.30 and the wholesale-local sacked price differential for 11 Delta mills, selling sacked meal both locally and wholesale, was $1.85. Accordingly, the local price per ton of sacked meal used for this locality was $61.15 (or $59.30+$1.85).

By this rule, mills in a given region were considered as receiving different local prices for sacked meal, although their local-wholesale price differential was the same. It was necessary to calculate this differential on a regional rather than a smaller area basis, since the mills selling sacked meal both locally and wholesale were much less numerous than those selling it only wholesale.

TABLE 81.—*Calculated wholesale price differentials between slab and sacked meal, bulk and sacked meal, and sacked and pellet meal, sold by cottonseed oil mills in specified cotton production regions, 1949–50*

Region, subregion, and United States	Price differentials [1]					
	Slab and sacked meal		Bulk and sacked meal		Sacked and pellet meal	
	Mills reporting	Amount	Mills reporting	Amount	Mills reporting	Amount
	Number	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Coastal Plains			6	3. 85		
Delta	4	5. 45	3	2. 85		
Central Humid:						
Oklahoma Prairies					3	2. 30
Texas Blacklands	[2] 9	4. 30			10	1. 95
Central Semi-Arid:						
Low Plains			[3] 8	3. 55	10	2. 05
High Plains					5	2. 00
Irrigated (West)			4	4. 05	11	2. 25
United States	13	4. 90	21	3. 85	39	2. 10

[1] Slab, bulk, sacked and pellet forms of meal rank in price from the lowest to highest, respectively.

[2] Includes 1 mill in Gulf Coastal Prairies subregion and 1 mill in Sandy Lands subregion.

[3] Includes 2 mills in Texas Blacklands subregion and 2 mills in High Plains subregion.

Source: Based on 1949–50 "Cottonseed Meal and Hull Sales" survey made by PMA, Fats and Oils Branch.

TABLE 82.—*Price differentials between local and wholesale cottonseed sacked meal sales, by cotton production regions, 1949–50*

Region and United States	Mills reporting sacked meal sold both locally and wholesale	Local-wholesale sacked meal price differential [1]
	Number	*Dollars*
Coastal Plains	15	2. 60
Eastern Hilly and Piedmont	12	3. 00
Delta	11	1. 85
Central Humid	27	2. 55
Central Semi-Arid	15	2. 10
Irrigated	12	1. 30
United States	92	2. 25

[1] Local-wholesale price differential is equal to local price minus wholesale price.

Source: Based on 1949–50 "Cottonseed Meal and Hull Sales" survey made by Fats and Oils Branch, PMA.

Rule Five: On prices of nonsacked types of locally sold meal. In all regions, slab meal was either not sold locally or sold in negligible quantities. Only in the West was bulk meal sold both locally and wholesale in any appreciable quantities. The same was true of pellets. Moreover, the price differentials between sacked meal and pellets in both the wholesale and local markets were approximately the same in all regions, although the absolute prices varied somewhat from region to region (table 5).

Local prices for pellets were, therefore, obtained by adding the regional differential between wholesale sacked and pellets to the local sacked prices received in individual localities within the region. For example, the price of local sacked meal in mill locality 44 in the Low Plains region (table 5) was $60.18, and the sacked-pellet differential was $2.05 (table 81); hence, the local price of pellets was estimated as $62.23.

The same principle was used for obtaining the price of local bulk meal in the West, the only region in which this form of meal was sold both locally and wholesale in any appreciable quantities.

COTTONSEED HULL PRICES

Since only one type of product was involved, the problem of calculating local and wholesale prices of hulls and the local-wholesale price differential for each mill area in a given region, as shown in table 83, was much simpler than in the case of meal. Local hull prices for small mill areas were the averages of a very small number (never less than 3 nor more than 7) of mills in closest possible proximity to each other. Wholesale hull prices for small mill areas were then obtained through (1) computing average local-wholesale hull price differential for all mills in each region selling hulls both locally and wholesale, and (2) then adding these differentials to local hull prices of small mill areas. These differentials ranged from $1.95 in the Central Semi-Arid region to $2.70 in the Eastern Hilly and Piedmont region.

A few mills reported that normally there was no local-wholesale hull price differential in their localities. Wherever such localities were used in this study, the same price was used for both local and wholesale hulls.

TABLE 83.—*Price differentials between local and wholesale cottonseed hull sales, by cotton production regions, 1949–50*

Region and United States	Mills reporting hulls sold both locally and wholesale			Local-wholesale hull price differential [1]
	Total	Without price differential	With price differential	
	Number	*Number*	*Number*	*Dollars*
Coastal Plains	14	2	12	2.20
Eastern Hilly and Piedmont	10	2	8	2.70
Delta	14	0	14	2.25
Central Humid	25	5	20	2.50
Central Semi-Arid	10	4	6	1.95
Irrigated	3	1	2	2.15
United States	76	14	62	2.35

[1] Local-wholesale price differential is equal to local price minus wholesale price.

Source: Based on 1949–50 "Cottonseed Meal and Hull Sales" survey made by Fats and Oils Branch, PMA.

VI. COMPARATIVE ECONOMIES OF DIFFERENT TYPES AND SIZES OF MILLS

Cost and revenue items per ton of seed were computed, as shown in tables 98 through 103,[14] for different mills for each of specified volumes of seed. These tables provided the information required for resolving the first major question of this study: What is the most economical type and size of mill for specified volumes of seed (crush) throughout the industry?

For reasons previously stated (pp. 4 and 5), 9 different volumes of seed were selected for this analysis. As shown in table 2 these volumes represented a 12-month season for 23 different mills: 5 direct-solvent, 5 prepress-solvent, 5 screw-press, and 8 hydraulic. But this total was expanded (table 3) to 67, by varying the length of season, in order to determine the optimum mill of each type for each of the 9 volumes of seed.

In the tables, the numerous cost and revenue items per ton of seed fell into four groups: (1) Those which remained the same for any type and size of mill or volume of seed crushed; (2) those which varied with the volume of seed crushed; (3) those which varied with type of mill; and (4) those which varied with both size and type of mill and volume of seed crushed.

In handling the problem, 2 questions must first be considered concerning the relative profitabilities of mills in 6 widely separated mill areas, representing the extremes of all important cost and revenue variables of the industry (pp. 7–12). In each of these areas and for each of the specified crushes, (1) what is the optimum mill of each type, and (2) how does change in type of optimum mill affect total cost and net revenue per ton of seed processed?

As these questions are resolved, the ground is prepared for the query: (3) What is the most economical type and size of mill for the specified annual crushes for any mill area (keeping in mind that this question is handled in terms of new mills and other basic assumptions set forth on pages 2 and 3)?

The final section of this chapter deals with the effect of change in size of specified crushes on revenue and costs. (A preliminary report, Agriculture Information Bulletin No. 103, dated June 1953, showed a somewhat higher linters revenue for some screw-press mills than for other mills. These differences have been corrected in this publication. Discrepancies between the two reports are owing to such corrections.)

PROFITABILITY OF DIFFERENT MILLS OF EACH TYPE FOR DIFFERENT VOLUMES OF SEED IN MILL AREAS I THROUGH VI

Four important conclusions may now be drawn concerning the relative economies of the different types of mills in the specified mill areas, and in the third section of this chapter similar conclusions may be drawn for the industry as a whole.

First, in general, prepress solvent mills ranked highest in net revenue yield from any of the specified volumes of seed; direct solvent mills ranked second; screw press mills ranked third; and hydraulic mills ranked fourth. (Table 84.)

There were a few minor exceptions to this general trend in mill area VI in connection with the 52,800- and 79,200-ton crushes, representing a full 12-month operation for the *third* and *fourth* largest *direct*-solvent mills, respectively. In the other five mill areas, these crushes were handled somewhat more economically by prepress-solvent mills, working less than a full season (tables 98 through 102). The reverse was true in mill area VI, however (table 103), because of a combination of high wage rates with the relatively large labor requirements of prepress-solvent mills during their dormant season. Wherever prepress- and direct-solvent mills of the same daily crushing capacity operated for the same length of season, the former always yielded the greater net revenue, even in the highest wage rate areas. However, the daily crushing capacity of both solvent processes was identical for only the largest mills (400 tons per 24 hours).

[14] These tables were placed at the end of the chapter because they are essentially reference materials on which the whole analysis of the chapter is based. To show how change in type and size of mill affected individual costs, it was necessary to carry the quantities to three decimal points, using dollars per ton of seed as the unit in all cases.

Table 84.—*Cottonseed oil mills and optimum mill of each type ranked in the order of calculated profitability for specified volumes of seed crushed annually in mill areas I through VI, 1949–50*

Mill	Crushing capacity per 24 hours	Length of operating season	Order of profitability (1 is most profitable) in—					
			Area I	Area II	Area III	Area IV	Area V	Area VI
ANNUAL CRUSH: 10,600 TONS								
	Tons	*Months*						
Prepress solvent:								
Plant 1	40	12.0						
Plant 2	80	6.0	1	1	1	1	1	1
Direct solvent:								
Plant 1	50	9.6		2	2	2	2	2
Plant 2	100	4.8	2					
Screw press:								
2 press	50	9.6		3		3	3	
3 press	75	6.4	3		3			3
Hydraulic:								
4 press	40	12.0						
6 press	60	8.0	4	4	4	4	4	4
8 press	80	6.0						
ANNUAL CRUSH: 13,200 TONS								
Direct solvent:								
Plant 1	50	12.0		2		2	2	2
Plant 2	100	6.0	2		2			
Prepress solvent: Plant 2	80	7.5	1	1	1	1	1	1
Screw press:								
2 press	50	12.0		3		3	3	3
3 press	75	8.0	3		3			
4 press	100	6.0						
Hydraulic:								
6 press	60	10.0						
8 press	80	7.5	4	4	4	4	4	4
ANNUAL CRUSH: 21,100 TONS								
Prepress solvent:								
Plant 2	80	12.0		1		1	1	1
Plant 3	160	6.0	1		1			
Direct solvent: Plant 2	100	9.6	2	2	2	2	2	2
Screw press:								
4 press	100	9.6		3		3	3	
5 press	125	7.7	3		3			3
Hydraulic:								
8 press	80	12.0		4		4	4	4
10 press	100	9.6						
12 press	120	8.0	4		4			
ANNUAL CRUSH: 26,400 TONS								
Direct solvent:								
Plant 2	100	12.0		2		2	2	2
Plant 3	200	6.0	2		2			
Prepress solvent: Plant 3	160	7.5	1	1	1	1	1	1
Screw press:								
4 press	100	12.0	3	3	3	3	3	3
5 press	125	9.6						
Hydraulic:								
10 press	100	12.0	4	4	4	4	4	4
12 press	120	10.0						

Table 84.—*Cottonseed oil mills and optimum mill of each type ranked in the order of calculated profitability for specified volumes of seed crushed annually in mill areas I through VI, 1949–50*—Continued

Mill	Crushing capacity per 24 hours	Length of operating season	Order of profitability (1 is most profitable) in—					
			Area I	Area II	Area III	Area IV	Area V	Area VI
ANNUAL CRUSH: 42,200 TONS								
	Tons	*Months*						
Prepress solvent: Plant 3	160	12. 0	1	1	1	1	1	1
Direct solvent: Plant 3	200	9. 6	2	2	2	2	2	2
Screw press:								
7 press	175	11. 0	----	3	----	3	3	3
8 press	200	9. 6	3	----	3	----	----	----
Hydraulic:								
16 press	160	12. 0	----	4	----	4	4	4
22 press	220	8. 7	----	----	----	----	----	----
24 press	240	8. 0	4	----	4	----	----	----
ANNUAL CRUSH: 52,800 TONS								
Direct solvent: Plant 3	200	12. 0	2	2	2	2	2	1
Prepress solvent: Plant 4	240	10. 0	1	1	1	1	1	2
Screw press:								
8 press	200	12. 0	3	3	3	3	3	3
10 press	250	9. 6	----	----	----	----	----	----
Hydraulic:								
20 press	200	12. 0	----	4	----	4	4	4
22 press	220	10. 9	----	----	4	----	----	----
24 press	240	10. 0	4	----	----	----	----	----
ANNUAL CRUSH: 63,400 TONS								
Prepress solvent: Plant 4	240	12. 0	1	1	1	1	1	1
Direct solvent:								
Plant 4	300	9. 6	----	2	----	2	2	2
Plant 5	400	7. 2	2	----	2	----	----	----
Screw press:								
10 press	250	11. 5	3	3	3	3	3	3
12 press	300	9. 6	----	----	----	----	----	----
Hydraulic: 24 press	240	12. 0	4	4	4	4	4	4
ANNUAL CRUSH: 79,200 TONS								
Direct solvent:								
Plant 4	300	12. 0	----	2	----	2	2	1
Plant 5	400	9. 0	2	----	2	----	----	----
Prepress solvent: Plant 5	400	9. 0	1	1	1	1	1	2
Screw press:								
12 press	300	12. 0	3	3	3	3	3	3
14 press	350	10. 3	----	----	----	----	----	----
Hydraulic:								
30 press	300	12. 0	----	4	----	4	4	4
36 press	360	10. 0	----	----	----	----	----	----
40 press	400	9. 0	4	----	4	----	----	----
ANNUAL CRUSH: 105,600 TONS								
Prepress solvent: Plant 5	400	12. 0	1	1	1	1	1	1
Direct solvent: Plant 5	400	12. 0	2	2	2	2	2	2
Screw press: 16 press	400	12. 0	3	3	3	3	3	3
Hydraulic: 40 press	400	12. 0	4	4	4	4	4	4

In figure 75, the relative heights of the lines show the calculated effect of change in type of optimum mill at specified crushes. These differences were due entirely to variation in certain processing costs and product returns. The significance of the slopes of the lines in figure 75 is discussed in the final section of this chapter.

A word of caution is required against an attitude of over-precision in connection with the above rankings of the optimum mills, for two reasons. First, the net revenue advantage of the prepress-solvent process over the direct solvent may not be as important as it appears to be in this report. The advantage rests mainly on an estimated 7-pound difference in oil yield per ton of seed as the total processing costs were not significantly different. In recent months, some operators reported distinct improvements in oil yields by the direct-solvent process. Also, some operators of direct-solvent mills believe that improvements in oil quality are associated with higher residual oil in meal, and that the greater ease of pelleting with higher residual oil counterbalances the greater oil yield by the prepress-solvent process.

The second needed caution concerns the findings on the optimum mill of a particular type for some of the specified crushes. This caution stems from the lack of any exact knowledge of a mill's dormant season labor requirements. For this reason this report shows calculations of net revenues both before and after payments for dormant season labor, so as to enable local judgment to make whatever adjustments might be justified by unique local situations. The point here is that downward adjustments may modify the report's findings as to which particular mill of a given type represents the optimum for some crushes. For example, inspection of tables 98 through 103 shows, at a 10,600-ton crush, the 6-press hydraulic mill as somewhat more profitable than the 8-press mill (from 3 to 40 cents per ton) in all 6 areas. As the 8-press mill handled this crush in a 2-month shorter season, it had from 45 to 90 cents per ton more dormant-season labor cost, depending on the mill area. As a consequence, the 6-press mill turned out to be more economical by the calculations of this report.

The second general conclusion was that if widely different volumes of seed can be obtained at the same cost f. o. b. gins, a full 12-month season is most profitable for any given mill, whatever the type. For example, table 99 shows that varying the length of season of an 8-press hydraulic mill in area II had the following results:

Season	Cost per ton (dollars)	Revenue per ton: Total (dollars)	Revenue per ton: Net (dollars)
6-month operation	66.72	70.63	3.91
8-month operation	65.18	70.88	5.70
12-month operation	63.05	71.01	7.96

The same principle applied, generally, to all types and sizes of mills in all areas. However, if the amount of seed which can be obtained at the "going price" is very limited, the optimum mill (whatever the type), is sometimes not the one requiring the longest possible season, but a larger mill operating a shorter season. The main reason for this is that the greater savings in current cost per ton of the larger mill will more than offset its fixed charges, even though it operated for a shorter period. This fact was particularly true for the 10,600-ton crush.

This crush represented a 12-month season for 4-press hydraulic mills; 8 months for 6-press mills; and 6 months for 8-press mills. Without exception, the 6-press mill was the most economical. It was able to process the 10,600 tons of seed in area I, for example, at a total cost of $68.98 per ton as compared with $69.22 per ton for the 4-press mill. Also, the 6-press mill received 45 cents more oil revenue per ton of seed, for reasons previously stated. As the other product returns per ton of seed were the same in both cases, the 6-press mill realized 69 cents more net revenue per ton of seed than the 4-press mill and 3 cents more than the 8-press mill (table 98). Again, the same crush represented a full season for the smallest prepress solvent mill of 40 tons per 24 hours but, in all 6 mill areas, the second smallest mill, crushing 80 tons per day and operating only 6 months, realized a greater net revenue per ton, primarily because of its lower labor cost per ton (tables 98 through 103). The same principle generally held for the screw-press and direct-solvent processes.

Third, as shown in figure 76 and table 85, the range of calculated differences in net revenue per ton of seed, arising from a change in type of mill at specified crushes, varied substantially among the six widely separated mill areas. Broadly speaking, among these six areas the advantage of shifting from hydraulic to screw-press operations was about $1 per ton in the area least favorable to such a shift and about $2 per ton in the area most favorable. In like manner, the advantage of a shift from the hydraulic to the direct-solvent process was from approximately $2.25 to $3.75 (depending on the size of mill or crush) in the area least conducive to the change, and about $3.25 to $4.75 in the area most favorable to the change. The same principle applied to a shift from hydraulic to prepress-solvent, except that the margin of advantage was greater.

The advantage (whether minimum or maximum) of shifting from the hydraulic to screw-press process showed no general tendency to change with size of mill. However, in shifting from the hydraulic to either of the solvent processes, the advantage tended to increase as the size of crush increased. For example, shift from the hydraulic to prepress-solvent process at 13,200 tons showed a minimum advantage of approximately $3 per ton, as compared with approximately $4 at 79,200 tons.

The same principle applied to a shift from the screw press to either of the solvent processes.

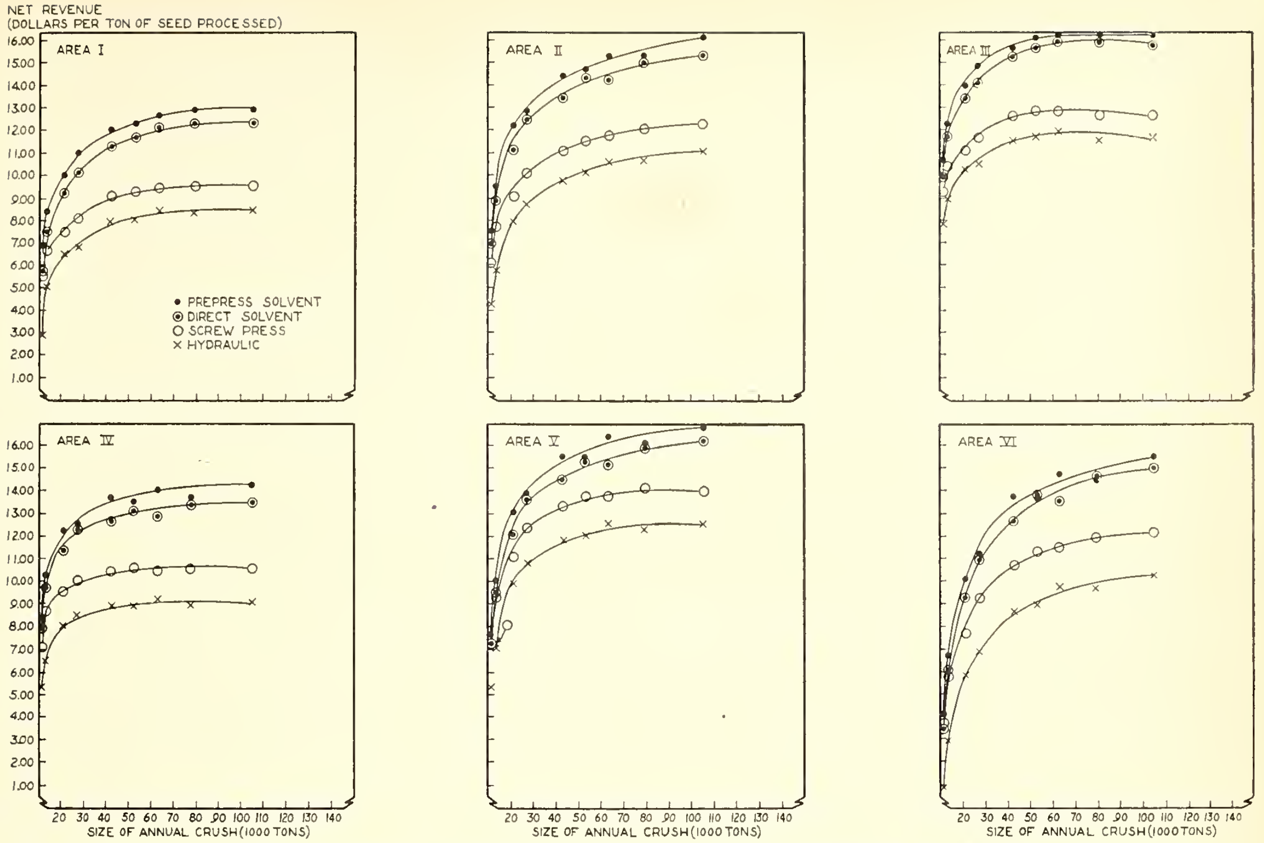

FIGURE 75.—Calculated net revenue of optimum mill for each type of cottonseed oil mill at different volumes of seed crushed annually, mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

TABLE 85.—*Calculated minimum and maximum differences in net revenue per ton of seed crushed resulting from changes in types of cottonseed oil mills at specified annual crushes, in six widely separated mill areas, 1949–50*

Annual crush (tons)	Minimum or maximum difference in net revenue	Gain in net revenue through shifting from— Hydraulic to— Screw press	Hydraulic to— Direct solvent	Hydraulic to— Prepress solvent	Screw press to— Direct solvent	Screw press to— Prepress solvent
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
10,600	Minimum	1.13	1.91	2.30	0.24	0.63
	Maximum	2.42	2.71	3.30	1.28	1.89
13,200	Minimum	.99	2.33	2.93	.57	1.17
	Maximum	2.61	3.23	3.87	1.70	2.37
21,100	Minimum	1.05	2.28	3.12	1.05	2.09
	Maximum	1.98	3.37	4.25	2.25	2.81
26,400	Minimum	1.08	2.82	3.09	1.25	1.52
	Maximum	2.28	4.09	4.31	2.50	3.23
42,200	Minimum	.89	2.66	3.75	1.32	2.46
	Maximum	1.81	3.93	5.00	2.81	3.59
52,800	Minimum	1.08	3.25	3.49	1.59	1.83
	Maximum	2.37	4.81	4.68	2.85	3.27
63,400	Minimum	.86	2.64	3.84	1.43	2.63
	Maximum	1.72	4.02	4.98	3.16	3.71
79,200	Minimum	1.15	3.65	3.87	2.03	2.25
	Maximum	2.28	4.92	4.86	3.15	3.58
105,600	Minimum	.98	3.68	4.36	2.29	2.97
	Maximum	1.98	4.72	5.34	3.15	3.81

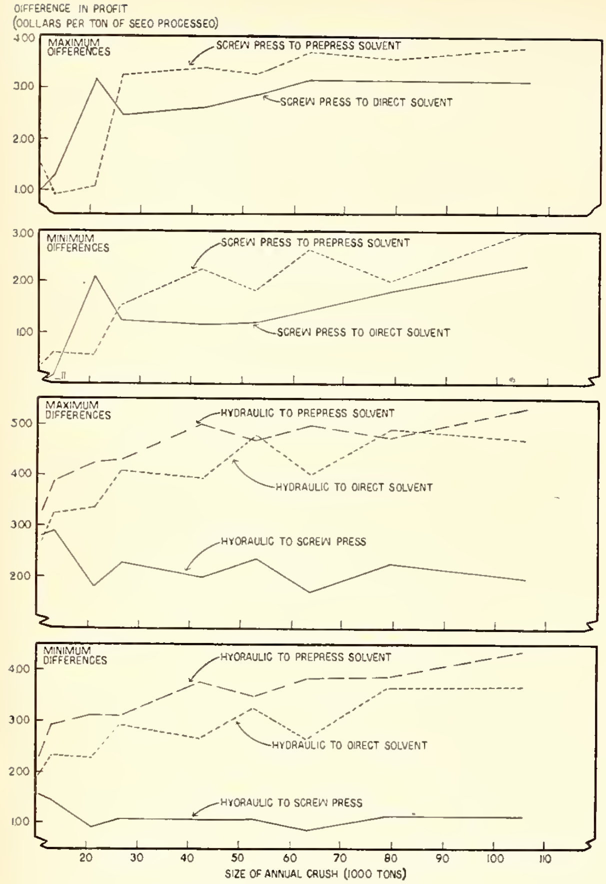

FIGURE 76.—Calculated minimum and maximum profit differences resulting from a shift from lower to higher oil-yielding types of cottonseed oil mills, 1949–50. (Calculations based on estimated profits in six widely separated mill areas.)

EFFECT OF CHANGE IN TYPE OF MILL ON TOTAL REVENUE AND COSTS PER TON OF SEED

Before drawing any conclusions as to the relative economies of the different types of cottonseed processes for mill areas generally, it is necessary to examine the way in which variation in type of mill in the six widely separated areas affected revenue and cost per ton of seed.

REVENUE

Whatever the volume of seed crushed, change in type of mill affects total revenue per ton of seed through (1) always altering (*a*) oil and (*b*) hull yields, and (2) possibly altering the type of meal produced.

The most important of these, by all odds, is the effect on oil revenue, the extent of which depends on the differences (1) in oil yields of various types of mills and (2) in the price of oil.

Using 1949–50 average oil prices (adjusted for seasonal change and grade of oil produced in individual areas), the extent of the effect of change in type of mill in the six widely separated mill areas on oil revenue per ton of seed is shown in table 86.

These calculated differences in oil revenue in each area were owing solely to the relative oil extraction efficiencies of various types of mills, because each mill was considered as operating a full 12-month season and processing seed of the same quality. The price of oil varied somewhat by areas because of corresponding variations in the free fatty acid content of seed and hence in the grade of oil produced. The lower the free fatty acid, the higher the grade and price of oil. Therefore, the incentive for change in type of mill is greater in areas of low free fatty acid seed. For example, the calculated oil price in mill area I was only 11.089 cents per pound as compared with 11.981 cents in area VI, because of differences in the acid content of seed. As a consequence, the calculated effect of shifting from a hydraulic to a prepress-solvent mill was only $4.68 per ton in area I as compared with $5.06 in area VI. And the higher the price of oil the greater would be this difference.

According to the formula used for measuring hull yields (p. 15), shifting from lower to higher oil-yielding processes results in a reduction of hull revenue equivalent to the differential oil yield multiplied by the price of hulls per ton of seed. However, this reduction is very slight, owing to the relatively small differences in hull yields and their low value. For example, shifting from the hydraulic to the prepress-solvent process resulted in 42.2 less pounds of hulls, assuming both processes to be operating at their normal rates. Cal-

TABLE 86.—*Calculated differences in total oil revenue per ton of cottonseed in mill areas I through VI, by type of mill, 1949–50*

Type of mill	Difference in oil yield per ton of seed	Difference in oil revenue per ton of seed in—					
		Area I (11.089¢ per lb.)	Area II (11.835¢ per lb.)	Area III (11.391¢ per lb.)	Area IV (11.893¢ per lb.)	Area V (11.893¢ per lb.)	Area VI (11.981¢ per lb.)
	Pounds	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic	0. 0	0	0	0	0	0	0
Screw press	8. 2	. 91	. 97	. 93	. 98	. 98	. 98
Direct solvent	35. 2	3. 90	4. 17	4. 01	4. 19	4. 19	4. 22
Prepress solvent	42. 2	4. 68	4. 99	4. 81	5. 02	5. 02	5. 06

culated local hull prices varied from \$3.05 to \$15.10 per ton among the 6 widely separated mill areas, and wholesale prices varied from \$3.05 to \$12.95. As a consequence, the calculated reduction of hull revenue from local sales resulting from a shift from the hydraulic to the prepress solvent process, varied from 6 cents per ton in mill area II $\left(\frac{42.2 \text{ lb.}}{2{,}000 \text{ lb.}}\times\$3.05\right)$ to 32 cents in mill area VI. The same principle applied to meal sold wholesale.

Finally, change in type of mill may also affect average meal revenue in two ways, depending on the prevailing forms of meal produced in a given locality. In areas I, II, and IV change in type of mill had no effect on meal revenue, as all types of mills produced the same forms of meal. In localities where pellets were produced by either hydraulic or screw-press mills, it was assumed that a shift to either of the solvent processes would involve a shift to the next highest valued type of meal for which there was an established market in the area. As this was always sacked meal, the reduction in total revenue per ton of seed, arising from such a shift, was considered as equal to the percent pellets were of total meal, multiplied by total meal yield per ton of seed and the price differential between pellets and sacked meal. For example, suppose that pellets were 25 percent of total meal, that the price differential between pellets and sacked meal was \$2.50 per ton, and that meal yield was 0.45 ton per ton of seed. Then a shift from the hydraulic or screw-press processes to either of the solvent processes would reduce average meal revenue per ton of seed by 28 cents (0.45 ton×25 percent×\$2.50).

Relatively few areas now produce slab cake. In this study mill area III had a large slab cake market. As this type of meal can be produced only by hydraulic mills, it was assumed that a shift to any other type of mill would involve a shift to the highest valued type of meal for which there was an established market in the given mill area. As this was sacked meal, the amount of increase in total revenue per ton of seed processed was calculated by the above formula after making a slight change in terms. At none of the 9 crushes was this increase more than \$1.93 per ton of seed. However, this increase in total revenue did not result in a like increase in net revenue owing to the high costs of meal bags in producing sacked meal.

Linters revenue was the same for all types of mills.

In line with these methods of calculation, the relative heights of the lines in figure 77 show the change in total revenue arising from corresponding change in type of mills at specified crushes in each of the widely separated mill areas.

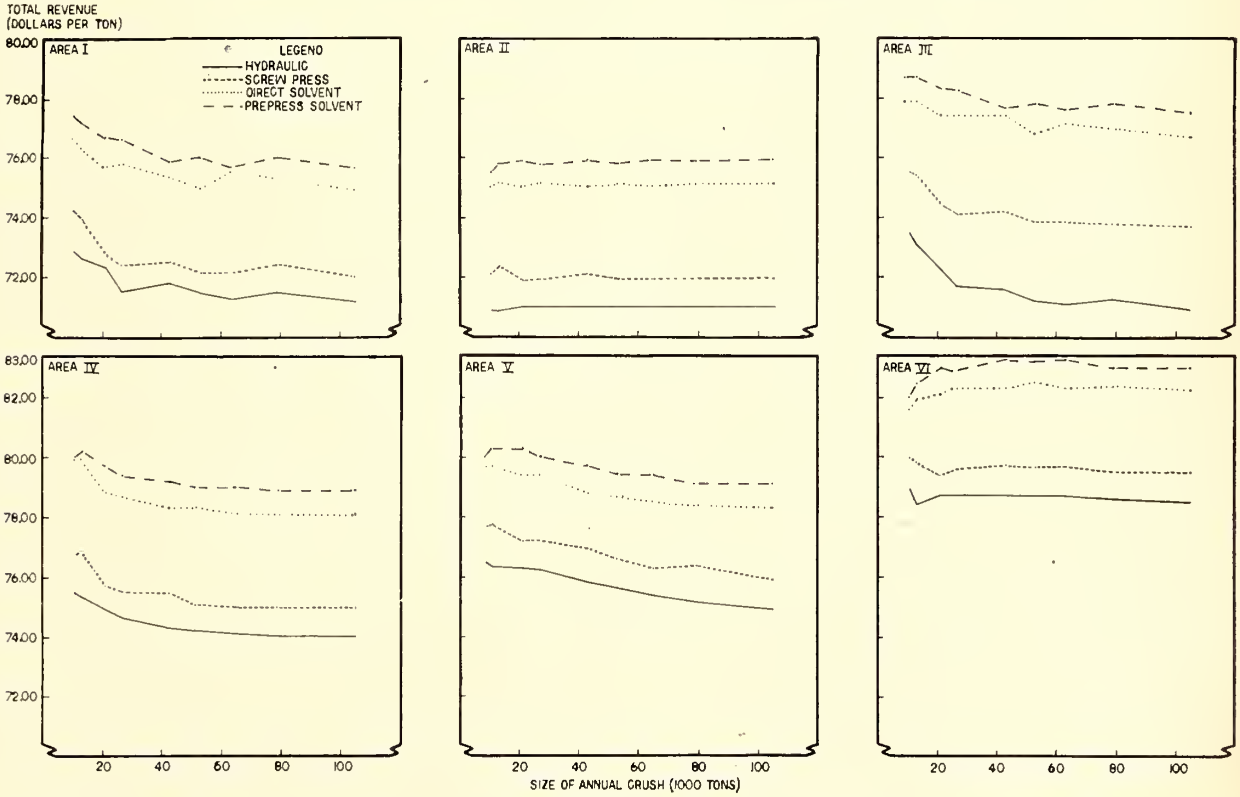

FIGURE 77.—Calculated effect of change in type of cottonseed oil mill on total revenue per ton of seed at specified crushes in mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

COSTS

Not all costs (such as seed procurement) are affected by change in type of mill. Those costs which are affected fall into two groups. The first group included press cloth and mending, hexane, fuel oil, and miscellaneous mill expense. These were called "constant" costs, because their total per ton of seed for any given type of mill is the same for any size of crush, although their total varies by type of mill, as shown in tables 98 through 103. The second group of costs, by far the most important, was called "variable costs," as they varied (1) by type of mill for any given crush and (2) by size of mill and crush and type of mill. The individual items in this category were plant costs (depreciation, interest on initial capital, taxes, and insurance), labor, electric power, water, meal bags, laboratory services, brokerage fees, insurance on stocks, social security, workmen's compensation, and general liability. By far the most important of these items were plant costs, labor, and electric power.

Tables 87 through 92 show the extent to which each of these costs was affected by change in type of optimum mill for each specified crush. Figure 78 shows the effect of such change on total processing cost per ton of seed.

This relationship between type of mill and cost per ton of seed has a number of important characteristics:

First, because of its relatively low labor cost, the screw-press process had the lowest total cost at any given crush except in area III. Here the hydraulic process had the lowest total cost (1) because it produced mostly slab cake, thereby incurring no costs for meal sacks, and (2) because the difference in power cost for hydraulic and screw-press mills was much greater here than elsewhere, owing to the unusually high power rates and the lower power requirements of the hydraulic process.

Second, because of its low capital requirements, the hydraulic process usually had the second lowest total cost per ton of seed for most crushes. However, in area VI it had the highest cost, beginning with a crush of 26,000 tons, because of a combination of its high man-hour requirements per ton of seed and the unusually high wage rates in area VI.

Third, the direct-solvent process had the second highest total cost because capital and labor requirements were somewhat lower than those of the prepress-solvent process, which had the highest total cost.

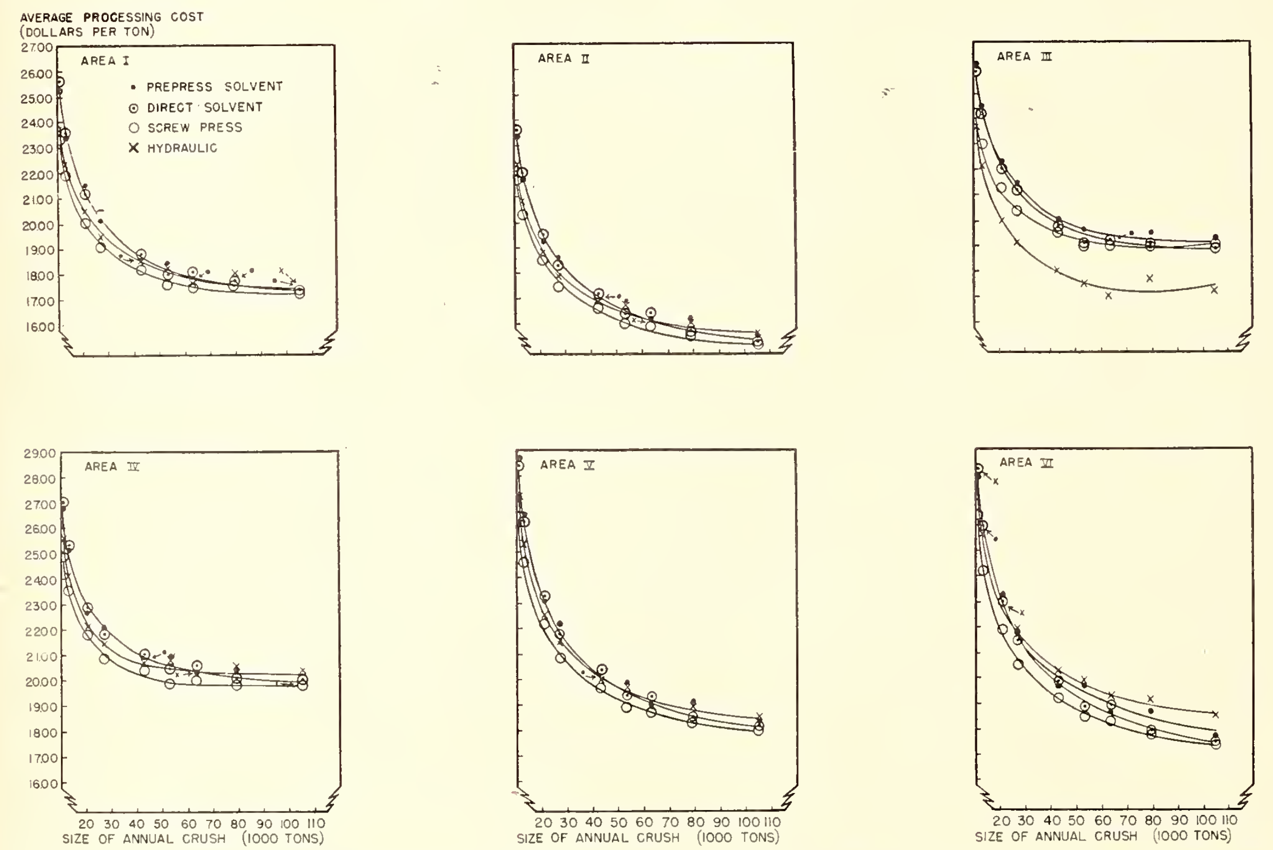

FIGURE 78.—Calculated effect of change in type of cottonseed oil mill on processing costs per ton of seed at specified crushes in mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

TABLE 87.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area I, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on invest-ment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8. 0	54. 865	6. 031	4. 661	0. 943	2. 478	68. 978	72. 829	3. 851	5. 9
Screw press: 3 press	75	6. 4	54. 865	6. 268	3. 784	1. 215	2. 328	68. 460	73. 728	5. 268	7. 8
Direct solvent: Plant 2	100	4. 8	54. 865	8. 228	4. 193	. 846	2. 731	70. 863	76. 643	5. 780	6. 6
Prepress solvent: Plant 2	80	6. 0	54. 865	7. 551	4. 597	1. 039	2. 426	70. 478	77. 397	6. 919	8. 6
ANNUAL CRUSH: 13,200 TONS											
Hydraulic: 8 press	80	7. 5	54. 827	5. 138	4. 214	0. 901	2. 442	67. 522	72. 602	5. 080	9. 2
Screw press: 3 press	75	8. 0	54. 827	5. 201	3. 438	1. 240	2. 414	67. 120	73. 444	6. 324	11. 3
Direct solvent: Plant 2	100	6. 0	54. 827	6. 646	3. 748	. 805	2. 814	68. 840	76. 375	7. 535	10. 7
Prepress solvent: Plant 2	80	7. 5	54. 827	6. 161	4. 160	1. 076	2. 502	68. 726	77. 151	8. 425	12. 8
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 12 press	120	8. 0	54. 750	4. 316	3. 370	0. 875	2. 389	65. 700	72. 159	6. 459	13. 9
Screw press: 5 press	125	7. 7	54. 750	4. 483	2. 649	1. 148	2. 388	65. 418	73. 058	7. 640	15. 9
Direct solvent: Plant 2	100	9. 6	54. 750	4. 525	3. 364	. 898	2. 943	66. 480	75. 719	9. 239	19. 2
Prepress solvent: Plant 3	160	6. 0	54. 750	5. 389	3. 205	. 952	2. 391	66. 687	76. 727	10. 040	17. 5
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12. 0	54. 679	3. 261	3. 261	0. 988	2. 538	64. 727	71. 575	6. 848	19. 4
Screw press: 4 press	100	12. 0	54. 679	3. 345	2. 574	1. 280	2. 495	64. 373	72. 446	8. 073	22. 3
Direct solvent: Plant 3	200	6. 0	54. 679	4. 718	2. 737	. 758	2. 782	65. 674	75. 839	10. 165	20. 4
Prepress solvent: Plant 3	160	7. 5	54. 679	4. 485	2. 918	1. 027	2. 444	65. 553	76. 615	11. 062	23. 2
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 24 press	240	8. 0	54. 532	3. 304	2. 812	0. 812	2. 390	63. 380	71. 824	7. 974	22. 4
Screw press: 8 press	200	9. 6	54. 532	3. 157	2. 258	1. 176	2. 406	63. 529	72. 496	8. 967	26. 4
Direct solvent: Plant 3	200	9. 6	54. 532	3. 321	2. 444	. 846	2. 876	64. 019	75. 384	11. 365	32. 1
Prepress solvent: Plant 3	160	12. 0	54. 532	3. 188	2. 487	1. 117	2. 524	63. 848	75. 858	12. 010	35. 2

See footnote at end of table.

TABLE 87.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area I, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost: Constant	Cost: Variable: Plant	Cost: Variable: Labor	Cost: Variable: Power	Cost: Variable: Other	Cost: Total	Revenue: Gross	Revenue: Net	Net return on investment
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 52,800 TONS											
Hydraulic: 24 press	240	10.0	54.519	2.839	2.769	0.886	2.442	63.455	71.491	8.036	26.2
Screw press: 8 press	200	12.0	54.519	2.728	1.968	1.237	2.437	62.889	72.178	9.289	31.5
Direct solvent: Plant 3	200	12.0	54.519	2.853	2.129	.910	2.905	63.316	75.046	11.730	38.5
Prepress solvent: Plant 4	240	10.0	54.519	3.209	2.447	1.061	2.465	63.701	75.999	12.298	35.8
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12.0	54.483	2.513	2.446	0.940	2.462	62.844	71.262	8.418	30.9
Screw press: 10 press	250	11.5	54.483	2.663	1.965	1.221	2.422	62.754	72.181	9.427	36.8
Direct solvent: Plant 5	400	7.2	54.483	3.261	2.074	.778	2.786	63.382	75.550	12.168	35.0
Prepress solvent: Plant 4	240	12.0	54.483	2.822	2.176	1.111	2.486	63.078	75.745	12.667	41.8
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 40 press	400	9.0	54.509	2.858	2.657	0.843	2.398	63.265	71.556	8.291	26.9
Screw press: 12 press	300	12.0	54.509	2.574	1.791	1.225	2.413	62.512	72.088	9.576	34.4
Direct solvent: Plant 5	400	9.0	54.509	2.798	2.070	.809	2.786	62.972	75.334	12.362	41.3
Prepress solvent: Plant 5	400	9.0	54.509	3.038	2.197	.989	2.411	63.144	76.085	12.941	39.8
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12.0	54.767	2.388	2.226	0.929	2.440	62.750	71.173	8.423	32.5
Screw press: 16 press	400	12.0	54.767	2.425	1.682	1.221	2.404	62.499	72.044	9.545	36.4
Direct solvent: Plant 5	400	12.0	54.767	2.347	1.756	.895	2.859	62.624	74.912	12.288	48.7
Prepress solvent: Plant 5	400	12.0	54.767	2.529	1.858	1.101	2.453	62.708	75.657	12.949	47.6

[1] Averaging 22 24-hour working days per month.

TABLE 88.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area II, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8. 0	52. 593	5. 849	4. 623	0. 862	2. 722	66. 649	70. 928	4. 279	6. 4
Screw press: 2 press	50	9. 6	52. 593	5. 633	4. 045	1. 182	2. 731	66. 184	71. 894	5. 710	8. 9
Direct solvent: Plant 1	50	9. 6	52. 593	6. 573	4. 735	. 898	3. 253	68. 052	75. 042	6. 990	9. 5
Prepress solvent: Plant 2	80	6. 0	52. 593	7. 309	4. 491	. 950	2. 654	67. 997	75. 509	7. 512	9. 1
ANNUAL CRUSH: 13,200 TONS											
Hydraulic: 8 press	80	7. 5	52. 535	4. 995	4. 188	0. 820	2. 639	65. 177	70. 881	5. 704	10. 0
Screw press: 2 press	50	12. 0	52. 535	4. 683	3. 482	1. 238	2. 754	64. 692	71. 965	7. 273	13. 5
Direct solvent: Plant 1	50	12. 0	52. 535	5. 446	4. 069	. 950	3. 276	66. 276	75. 119	8. 843	14. 4
Prepress solvent: Plant 2	80	7. 5	52. 535	5. 959	4. 068	. 974	2. 688	66. 224	75. 794	9. 570	14. 2
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 8 press	80	12. 0	52. 418	3. 504	3. 535	0. 898	2. 692	63. 047	71. 006	7. 959	19. 8
Screw press: 4 press	100	9. 6	52. 418	3. 838	2. 950	1. 101	2. 573	62. 880	71. 894	9. 014	20. 5
Direct solvent: Plant 2	100	9. 6	52. 418	4. 344	3. 261	. 807	3. 057	63. 887	75. 042	11. 155	22. 8
Prepress solvent: Plant 2	80	12. 0	52. 418	4. 107	3. 435	1. 050	2. 740	63. 750	75. 937	12. 187	26. 1
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12. 0	52. 347	3. 143	3. 255	0. 880	2. 645	62. 270	71. 006	8. 736	24. 2
Screw press: 4 press	100	12. 0	52. 347	3. 222	2. 554	1. 158	2. 594	61. 875	71. 965	10. 090	27. 3
Direct solvent: Plant 2	100	12. 0	52. 347	3. 616	2. 807	. 850	3. 077	62. 697	75. 119	12. 422	30. 5
Prepress solvent: Plant 3	160	7. 5	52. 347	4. 301	2. 850	. 918	2. 539	62 955	75. 794	12. 839	26. 5
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 16 press	160	12. 0	52. 390	2. 744	2. 721	0. 848	2. 560	61. 263	71. 006	9. 743	31. 0
Screw press: 7 press	175	11. 0	52. 390	2. 915	2. 191	1. 053	2. 494	61. 043	71. 923	10. 880	32. 7
Direct solvent: Plant 3	200	9. 6	52. 390	3. 175	2. 385	. 748	2. 936	61. 634	75. 042	13. 408	37. 4
Prepress solvent: Plant 3	160	12. 0	52. 390	3. 050	2. 429	1. 017	2. 585	61. 471	75. 937	14. 466	41. 8

See footnote at end of table.

TABLE 88.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area II, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost: Constant	Cost: Variable: Plant	Cost: Variable: Labor	Cost: Variable: Power	Cost: Variable: Other	Cost: Total	Revenue: Gross	Revenue: Net	Net return on investment
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 52,800 TONS											
Hydraulic: 20 press	200	12. 0	52. 287	2. 555	2. 696	0. 834	2. 543	60. 915	71. 006	10. 091	34. 4
Screw press: 8 press	200	12. 0	52. 287	2. 604	1. 959	1. 094	2. 487	60. 431	71. 965	11. 534	38. 7
Direct solvent: Plant 4	200	12. 0	52. 287	2. 724	2. 071	. 803	2. 956	60. 841	75. 119	14. 278	46. 3
Prepress solvent: Plant 3	240	10. 0	52. 287	3. 052	2. 392	. 940	2. 516	61. 187	75. 844	14. 657	42. 4
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12. 0	52. 241	2. 391	2. 449	0. 829	2. 509	60. 419	71. 006	10. 587	38. 5
Screw press: 10 press	250	11. 5	52. 241	2. 534	1. 958	1. 079	2. 464	60. 276	71. 942	11. 666	40. 2
Direct solvent: Plant 4	300	9. 6	52. 241	2. 844	2. 096	. 740	2. 887	60. 808	75. 042	14. 234	44. 3
Prepress solvent: Plant 4	240	12. 0	52. 241	2. 683	2. 121	. 982	2. 528	60. 555	75. 937	15. 382	50. 4
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 30 press	300	12. 0	52. 157	2. 468	2. 449	0. 823	2. 496	60. 393	71. 006	10. 613	37. 5
Screw press: 12 press	300	12. 0	52. 157	2. 446	1. 785	1. 083	2. 447	59. 918	71. 965	12. 047	43. 0
Direct solvent: Plant 4	300	12. 0	52. 157	2. 453	1. 825	. 792	2. 906	60. 133	75. 119	14. 986	53. 9
Prepress solvent: Plant 5	400	9. 0	52. 157	2. 878	2. 147	. 898	2. 445	60. 525	75. 880	15. 355	47. 1
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12. 0	52. 145	2. 263	2. 232	0. 819	2. 471	59. 930	71. 006	11. 076	42. 6
Screw press: 16 press	400	12. 0	52. 145	2. 299	1. 678	1. 080	2. 429	59. 631	71. 965	12. 334	46. 8
Direct solvent: Plant 5	400	12. 0	52. 145	2. 224	1. 702	. 789	2. 885	59. 745	75. 119	15. 374	60. 7
Prepress solvent: Plant 5	400	12. 0	52. 145	2. 397	1. 807	. 972	2. 478	59. 799	75. 937	16. 138	59. 1

[1] Averaging 22 24-hour working days per month.

TABLE 89.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area III, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8. 0	49. 622	5. 746	4. 883	1. 580	3. 915	65. 746	73. 469	7. 723	11. 8
Screw press: 3 press	75	6. 4	49. 622	5. 984	4. 013	2. 223	4. 351	66. 193	75. 040	8. 847	13. 1
Direct solvent: Plant 1	50	9. 6	49. 622	6. 453	5. 103	1. 724	5. 042	67. 944	77. 891	9. 947	13. 9
Prepress solvent: Plant 2	80	6. 0	49. 622	7. 197	4. 850	1. 911	4. 443	68. 023	78. 764	10. 741	13. 4
ANNUAL CRUSH: 13,200 TONS											
Hydraulic; 8 press	80	7. 5	49. 644	4. 898	4. 395	1. 577	3. 634	64. 148	73. 120	8. 972	16. 2
Screw press: 3 press	75	8. 0	49. 644	4. 954	3. 661	2. 320	4. 418	64. 997	74. 960	9. 963	17. 8
Direct solvent: Plant 2	100	6. 0	49. 644	6. 318	3. 974	1. 481	4. 812	66. 229	77. 885	11. 656	16. 7
Prepress solvent: Plant 2	80	7. 5	49. 644	5. 872	4. 405	1. 983	4. 506	66. 410	78. 735	12. 325	18. 8
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 12 press	120	8. 0	49. 577	4. 139	3. 455	1. 575	3. 293	62. 039	72. 291	10. 252	22. 0
Screw press: 5 press	125	7. 7	49. 577	4. 272	2. 820	2. 181	4. 389	63. 239	74. 592	11. 353	23. 6
Direct solvent: Plant 2	100	9. 6	49. 577	4. 300	3. 530	1. 673	4. 948	64. 028	77. 431	13. 403	28. 0
Prepress solvent: Plant 3	160	6. 0	49. 577	5. 144	3. 395	1. 840	4. 399	64. 355	78. 312	13. 957	24. 4
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12. 0	49. 616	3. 096	3. 324	1. 808	3. 292	61. 136	71. 694	10. 558	30. 0
Screw press: 4 press	100	12. 0	49. 616	3. 175	2. 737	2. 441	4. 503	62. 472	47. 116	11. 644	32. 3
Direct solvent: Plant 3	200	6. 0	49. 616	4. 502	2. 902	1. 447	4. 804	63. 271	77. 410	14. 139	28. 3
Prepress solvent: Plant 3	160	7. 5	49. 616	4. 281	3. 090	1. 949	4. 458	63. 394	78. 267	14. 873	31. 1
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 24 press	240	8. 0	49. 569	3. 151	2. 826	1. 548	2. 973	60. 067	71. 640	11. 573	32. 5
Screw press: 8 press	200	9. 6	49. 569	3. 010	2. 397	2. 278	4. 419	61. 673	74. 130	12. 457	36. 6
Direct solvent: Plant 3	200	9. 6	49. 569	3. 167	2. 587	1. 633	4. 896	61. 852	77. 120	15. 268	43. 2
Prepress solvent: Plant 3	160	12. 0	49. 569	3. 042	2. 632	2. 171	4. 541	61. 955	77. 674	15. 719	46. 0

See footnote at end of table.

TABLE 89.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area III, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost: Constant	Cost: Variable: Plant	Cost: Variable: Labor	Cost: Variable: Power	Cost: Variable: Other	Cost: Total	Revenue: Gross	Revenue: Net	Net return on investment
ANNUAL CRUSH: 52,800 TONS											
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
Hydraulic: 22 press	220	10. 9	49. 476	2. 609	2. 772	1. 648	2. 988	59. 493	71. 249	11. 756	39. 8
Screw press: 8 press	200	12. 0	49. 476	2. 600	2. 092	2. 407	4. 451	61. 026	73. 867	12. 841	43. 6
Direct solvent: Plant 3	200	12. 0	49. 476	2. 721	2. 255	1. 768	4. 928	61. 148	76. 841	15. 693	51. 5
Prepress solvent: Plant 4	240	10. 0	49. 476	3. 053	2. 587	2. 063	4. 487	61. 666	77. 779	16. 113	47. 1
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12. 0	49. 590	2. 396	2. 426	1. 762	2. 954	59. 128	71. 086	11. 958	43. 9
Screw press: 10 press	250	11. 5	49. 590	2. 539	2. 086	2. 380	4. 438	61. 033	73. 852	12. 819	44. 5
Direct solvent: Plant 5	400	7. 2	49. 590	3. 108	2. 195	1. 503	4. 817	61. 213	77. 194	15. 981	46. 0
Prepress solvent: Plant 4	240	12. 0	49. 590	2. 684	2. 303	2. 170	4. 509	61. 256	77. 569	16. 313	54. 0
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 40 press	400	9. 0	49. 876	2. 729	2. 641	1. 538	2. 855	59. 684	71. 266	11. 582	37. 5
Screw press: 12 press	300	12. 0	49. 876	2. 451	1. 902	2. 403	4. 430	61. 062	73. 783	12. 721	45. 8
Direct solvent: Plant 5	400	9. 0	49. 876	2. 668	2. 190	1. 586	4. 850	61. 170	77. 052	15. 882	53. 1
Prepress solvent: Plant 5	400	9. 0	49. 876	2. 894	2. 324	1. 991	4. 440	61. 525	77. 830	16. 305	50. 2
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12. 0	50. 184	2. 279	2. 184	1. 752	2. 861	59. 260	70. 912	11. 652	44. 9
Screw press: 16 press	400	12. 0	50. 184	2. 315	1. 786	2. 401	4. 423	61. 109	73. 742	12. 633	48. 1
Direct solvent: Plant 5	400	12. 0	50. 184	2. 237	1. 860	1. 760	4. 894	60. 935	76. 716	15. 781	62. 6
Prepress solvent: Plant 5	400	12. 0	50. 184	2. 410	1. 968	2. 165	4. 482	61. 209	77. 486	16. 277	59. 9

[1] Averaging 22 24-hour working days per month.

TABLE 90.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area IV, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8.0	54.878	6.130	5.623	0.946	2.637	70.214	75.548	5.334	8.2
Screw press: 2 press	50	9.6	54.878	5.871	4.914	1.316	2.622	69.601	76.502	6.901	11.1
Direct solvent: Plant 1	50	9.6	54.878	6.875	5.732	.964	3.187	71.636	79.576	7.940	11.1
Prepress solvent: Plant 2	80	6.0	54.878	7.668	5.450	1.060	2.548	71.604	79.992	8.388	10.4
ANNUAL CRUSH: 13,200 TONS											
Hydraulic: 8 press	80	7.5	54.980	5.223	5.105	0.914	2.552	68.774	75.359	6.585	11.9
Screw press: 2 press	50	12.0	54.980	4.887	4.254	1.387	2.670	68.178	76.451	8.273	15.9
Direct solvent: Plant 1	50	12.0	54.980	5.710	4.963	1.043	3.227	69.923	79.565	9.642	16.2
Prepress solvent: Plant 2	80	7.5	54.980	6.256	4.962	1.090	2.596	69.884	80.205	10.321	15.7
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 8 press	80	12.0	55.053	3.677	4.282	1.013	2.723	66.748	74.865	8.117	20.7
Screw press: 4 press	100	9.6	55.053	4.031	3.576	1.210	2.552	66.422	75.740	9.318	21.8
Direct solvent: Plant 2	100	9.6	55.053	4.582	3.968	.905	3.049	67.557	78.848	11.291	23.6
Prepress solvent: Plant 2	80	12.0	55.053	4.323	4.168	1.180	2.765	67.489	79.733	12.244	26.9
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12.0	55.212	3.303	3.936	0.986	2.699	66.136	74.652	8.516	24.2
Screw press: 4 press	100	12.0	55.212	3.386	3.096	1.245	2.611	65.550	75.586	10.036	27.9
Direct solvent: Plant 2	100	12.0	55.212	3.769	3.423	.953	3.109	66.466	78.711	12.245	30.6
Prepress solvent: Plant 3	160	7.5	55.212	4.562	3.474	.977	2.542	66.767	79.351	12.584	26.3
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 16 press	160	12.0	55.645	2.915	3.281	0.913	2.647	65.401	74.332	8.931	28.8
Screw press: 7 press	175	9.6	55.645	3.101	2.644	1.101	2.546	65.037	75.243	10.206	31.0
Direct solvent: Plant 3	200	11.0	55.645	3.379	2.906	.800	2.978	65.708	78.314	12.606	35.6
Prepress solvent: Plant 3	160	12.0	55.645	3.243	2.956	1.047	2.651	65.542	79.199	13.657	40.0

See footnote at end of table.

TABLE 90.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area IV, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 52,800 TONS											
Hydraulic: 20 press	200	12. 0	55. 812	2. 724	3. 243	0. 882	2. 648	65. 309	74. 225	8. 916	30. 8
Screw press: 8 press	200	12. 0	55. 812	2. 734	2. 365	1. 130	2. 555	64. 596	75. 171	10. 575	35. 8
Direct solvent: Plant 3	200	12. 0	55. 812	2. 903	2. 533	. 852	3. 018	65. 118	78. 285	13. 167	43. 1
Prepress solvent: Plant 4	240	10. 0	55. 812	3. 257	2. 904	. 968	2. 579	65. 520	79. 003	13. 483	39. 3
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12. 0	55. 966	2. 557	2. 948	0. 865	2. 617	64. 953	74. 154	9. 201	33. 7
Screw press: 10 press	250	11. 5	55. 966	2. 708	2. 358	1. 102	2. 543	64. 677	75. 078	10. 401	36. 1
Direct solvent: Plant 4	300	9. 6	55. 966	3. 046	2. 555	. 766	2. 950	65. 283	78. 136	12. 853	40. 2
Prepress solvent: Plant 4	240	12. 0	55. 966	2. 863	2. 586	1. 009	2. 589	65. 013	79. 021	14. 008	46. 3
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 30 press	300	12. 0	56. 092	2. 643	2. 940	0. 844	2. 618	65. 137	74. 082	8. 945	31. 8
Screw press: 12 press	300	12. 0	56. 092	2. 617	2. 150	1. 079	2. 532	64. 470	75. 028	10. 558	38. 0
Direct solvent: Plant 4	300	12. 0	56. 092	2. 627	2. 237	. 815	2. 984	64. 755	78. 142	13. 387	48. 4
Prepress solvent: Plant 5	400	9. 0	56. 092	3. 085	2. 608	. 882	2. 519	65. 186	78. 880	13. 694	42. 2
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12. 0	56. 370	2. 431	2. 681	0. 825	2. 592	64. 899	74. 012	9. 113	35. 2
Screw press: 16 press	400	12. 0	56. 370	2. 470	2. 019	1. 028	2. 522	64. 409	74. 957	10. 548	40. 1
Direct solvent: Plant 5	400	12. 0	56. 370	2. 385	2. 089	. 789	2. 971	64. 604	78. 071	13. 467	53. 4
Prepress solvent: Plant 5	400	12. 0	56. 370	2. 570	2. 209	. 943	2. 568	64. 660	78. 879	14. 219	52. 3

[1] Averaging 22 24-hour working days per month.

TABLE 91.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area V, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8.0	54.229	7.326	5.941	1.108	2.557	71.161	76.524	5.363	7.9
Screw press: 2 press	50	9.6	54.229	7.021	5.178	1.483	2.547	70.458	77.484	7.026	10.9
Direct solvent: Plant 1	50	9.6	54.229	7.925	6.024	1.087	3.119	72.384	79.652	7.268	10.1
Prepress solvent: Plant 2	80	6.0	54.229	8.845	5.728	1.119	2.490	72.411	80.069	7.658	9.5
ANNUAL CRUSH: 13,200 TONS											
Hydraulic: 8 press	80	7.5	54.151	6.230	5.397	1.005	2.469	69.252	76.380	7.128	12.4
Screw press: 2 press	50	12.0	54.151	5.840	4.487	1.530	2.585	68.593	77.480	8.887	16.5
Direct solvent: Plant 1	50	12.0	54.151	6.576	5.219	1.136	3.148	70.230	79.687	9.457	15.8
Prepress solvent: Plant 2	80	7.5	54.151	7.216	5.219	1.158	2.526	70.270	80.330	10.060	15.3
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 8 press	80	12.0	53.924	4.371	4.568	1.080	2.559	66.502	76.316	9.814	24.3
Screw press: 4 press	100	9.6	53.924	4.774	3.815	1.239	2.404	66.156	77.194	11.038	25.1
Direct solvent: Plant 2	100	9.6	53.924	5.281	4.220	.954	2.927	67.306	79.396	12.090	25.2
Prepress solvent: Plant 2	80	12.0	53.924	4.988	4.429	1.201	2.615	67.157	80.286	13.129	28.7
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12.0	53.803	3.914	4.216	1.021	2.515	65.469	76.245	10.776	29.8
Screw press: 4 press	100	12.0	53.803	4.009	3.324	1.276	2.438	64.850	77.195	12.345	33.4
Direct solvent: Plant 2	100	12.0	53.803	4.401	3.663	.980	2.960	65.807	79.403	13.596	33.9
Prepress solvent: Plant 3	160	7.5	53.803	5.265	3.715	.999	2.395	66.177	80.045	13.868	28.9
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 16 press	160	12.0	53.646	3.433	3.545	0.934	2.430	63.988	75.810	11.822	37.3
Screw press: 7 press	175	11.0	53.646	3.643	2.869	1.117	2.341	63.616	76.727	13.111	39.0
Direct solvent: Plant 3	200	9.6	53.646	3.898	3.100	.814	2.879	64.337	78.814	14.477	40.7
Prepress solvent: Plant 3	160	12.0	53.646	3.743	3.152	1.060	2.536	64.137	79.704	15.567	45.4

See footnote at end of table.

TABLE 91.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area V, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 52,800 TONS											
Hydraulic: 20 press	200	12.0	53.543	3.200	3.512	0.914	2.418	63.587	75.656	12.069	40.8
Screw press: 8 press	200	12.0	53.543	3.256	2.583	1.156	2.336	62.874	76.606	13.732	45.7
Direct solvent: Plant 3	200	12.0	53.543	3.348	2.700	.851	2.932	63.374	78.696	15.322	50.0
Prepress solvent: Plant 4	240	10.0	53.543	3.759	3.088	.980	2.488	63.858	79.417	15.559	45.2
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12.0	53.437	3.001	3.190	0.876	2.407	62.911	75.444	12.533	45.1
Screw press: 10 press	250	11.5	53.437	3.171	2.564	1.117	2.344	62.633	76.373	13.740	46.9
Direct solvent: Plant 4	300	9.6	53.437	3.512	2.717	.776	2.876	63.318	78.488	15.170	47.3
Prepress solvent: Plant 4	240	12.0	53.437	3.259	2.747	1.041	2.525	63.009	79.378	16.369	54.0
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 30 press	300	12.0	53.343	3.097	3.167	0.875	2.437	62.919	75.191	12.272	42.9
Screw press: 12 press	300	12.0	53.343	3.056	2.330	1.156	2.369	62.254	76.142	13.888	49.2
Direct solvent: Plant 4	300	12.0	53.343	3.032	2.376	.842	2.920	62.513	78.434	15.921	57.3
Prepress solvent: Plant 5	400	9.0	53.343	3.561	2.765	.911	2.453	63.033	79.176	16.143	49.5
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12.0	53.401	2.840	2.878	0.874	2.449	62.442	74.939	12.497	47.6
Screw press: 16 press	400	12.0	53.401	2.880	2.176	1.155	2.390	62.002	75.889	13.887	52.2
Direct solvent: Plant 5	400	12.0	53.401	2.754	2.214	.841	2.913	62.123	78.303	16.180	64.0
Prepress solvent: Plant 5	400	12.0	53.401	2.968	2.340	1.040	2.509	62.258	79.115	16.857	61.8

[1] Averaging 22 24-hour working days per month.

TABLE 92.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area VI, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 10,600 TONS											
Hydraulic: 6 press	60	8.0	56.422	6.906	9.282	0.855	4.568	78.033	78.894	0.861	1.3
Screw press: 3 press	75	6.4	56.422	7.158	7.317	1.088	4.241	76.226	79.510	3.284	4.7
Direct solvent: Plant 1	50	9.6	56.422	7.509	8.769	.892	4.460	78.052	81.627	3.575	4.9
Prepress solvent: Plant 2	80	6.0	56.422	8.349	8.319	.939	3.777	77.806	81.971	4.165	5.1
ANNUAL CRUSH: 13,200 TONS											
Hydraulic: 8 press	80	7.5	56.354	5.904	8.391	0.810	4.101	75.560	78.411	2.851	4.9
Screw press: 2 press	50	12.0	56.354	5.506	6.814	1.226	4.193	74.093	79.550	5.457	10.0
Direct solvent: Plant 1	50	12.0	56.354	6.226	7.633	.940	4.716	75.869	81.951	6.082	10.0
Prepress solvent: Plant 2	80	7.5	56.354	6.810	7.630	.961	4.046	75.801	82.490	6.689	10.1
ANNUAL CRUSH: 21,100 TONS											
Hydraulic: 8 press	80	12.0	56.147	4.136	7.183	0.881	4.476	72.823	78.671	5.848	14.3
Screw press: 5 press	125	7.7	56.147	5.069	5.257	1.000	4.083	71.556	79.387	7.831	15.8
Direct solvent: Plant 2	100	9.6	56.147	4.994	6.280	.794	4.673	72.888	82.107	9.219	19.0
Prepress solvent: Plant 2	80	12.0	56.147	4.701	6.598	1.031	4.448	72.925	83.026	10.101	22.0
ANNUAL CRUSH: 26,400 TONS											
Hydraulic: 10 press	100	12.0	56.036	3.715	6.662	0.861	4.501	71.775	78.691	6.916	18.8
Screw press: 4 press	100	12.0	56.036	3.792	5.151	1.103	4.329	70.411	79.611	9.200	24.6
Direct solvent: Plant 2	100	12.0	56.036	4.160	5.488	.831	4.812	71.327	82.335	11.008	27.2
Prepress solvent: Plant 3	160	7.5	56.036	4.972	5.565	.880	4.224	71.677	82.874	11.197	23.1
ANNUAL CRUSH: 42,200 TONS											
Hydraulic: 16 press	160	12.0	55.819	3.252	5.654	0.812	4.505	70.042	78.720	8.678	27.0
Screw press: 7 press	175	11.0	55.819	3.440	4.498	.993	4.325	69.075	79.561	10.486	30.9
Direct solvent: Plant 3	200	9.6	55.819	3.688	4.780	.715	4.740	69.742	82.347	12.605	35.1
Prepress solvent: Plant 3	160	12.0	55.819	3.531	4.857	.933	4.448	69.588	83.266	13.678	39.6

See footnote at end of table.

TABLE 92.—*Calculated effects of change in types of cottonseed oil mills on the costs and revenue per ton of seed processed for different volumes of seed crushed annually, in mill area VI, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Cost						Revenue		Net return on investment
			Constant	Variable				Total	Gross	Net	
				Plant	Labor	Power	Other				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
ANNUAL CRUSH: 52,800 TONS											
Hydraulic: 20 press	200	12.0	55.806	3.034	5.619	0.790	4.539	69.788	78.729	8.941	29.8
Screw press: 8 press	200	12.0	55.806	3.074	4.073	1.020	4.364	68.337	79.649	11.312	37.3
Direct solvent: Plant 3	200	12.0	55.806	3.167	4.224	.762	4.820	68.779	82.527	13.748	44.5
Prepress solvent: Plant 4	240	10.0	55.806	3.562	4.813	.876	4.494	69.551	83.172	13.621	39.1
ANNUAL CRUSH: 63,400 TONS											
Hydraulic: 24 press	240	12.0	55.740	2.847	5.145	0.778	4.506	69.016	78.736	9.720	34.5
Screw press: 10 press	250	11.5	55.740	2.997	4.080	.998	4.368	68.183	79.623	11.440	38.6
Direct solvent: Plant 4	300	9.6	55.740	3.327	4.280	.700	4.758	68.805	82.336	13.531	41.7
Prepress solvent: Plant 4	240	12.0	55.740	3.128	4.326	.911	4.449	68.554	83.255	14.701	47.9
ANNUAL CRUSH: 79,200 TONS											
Hydraulic: 30 press	300	12.0	55.686	2.936	5.098	0.762	4.531	69.013	78.639	9.626	33.2
Screw press: 12 press	300	12.0	55.686	2.891	3.707	.988	4.376	67.648	79.559	11.911	41.8
Direct solvent: Plant 4	300	12.0	55.686	2.868	3.707	.735	4.813	67.809	82.359	14.550	51.9
Prepress solvent: Plant 5	400	9.0	55.686	3.375	4.296	.815	4.356	68.528	83.018	14.490	43.9
ANNUAL CRUSH: 105,600 TONS											
Hydraulic: 40 press	400	12.0	55.754	2.699	4.630	0.747	4.509	68.339	78.539	10.200	38.2
Screw press: 16 press	400	12.0	55.754	2.723	3.455	.967	4.377	67.276	79.459	12.183	45.3
Direct solvent: Plant 5	400	12.0	55.754	2.603	3.438	.721	4.813	67.329	82.251	14.922	58.4
Prepress solvent: Plant 5	400	12.0	55.754	2.806	3.628	.878	4.429	67.495	83.038	15.543	56.3

[1] Averaging 22 24-hour working days per month.

MOST ECONOMICAL TYPE OF MILL FOR SPECIFIED CRUSHES IN ANY MILL AREA

The six widely separated mill areas included the extremes in the industry of all important cost items, seed qualities, and meal and hull market patterns. Because of this fact, the most economical mills for specified crushes, throughout the industry, can be determined. For the costs and revenue characteristics of the six widely separated mill areas may be combined into an extreme case in such a way as to place the severest limits possible on the profits from a change in type of mill for any specified crush. Construction of such an extreme case would show the minimum profit difference which would be expected almost anywhere between the various types of mills, although it would not show the absolute profit for any particular mill. (Table 93.)

TABLE 93.—*Calculated maximum differences in the costs and minimum differences in total and net revenue per ton of seed processed for different volumes of seed crushed annually resulting from change in types of cottonseed oil mills, in any mill area, 1949–50*

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Change from—					
			Hydraulic to higher oil yielding type mill			Screw press to higher oil yielding type mill		
			Cost [2]	Revenue		Cost [4]	Revenue	
				Total [3]	Net		Total [3]	Net
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
ANNUAL CRUSH: 10,600 TONS								
Hydraulic: 6 press	60	8. 0						
Screw press: 3 press	75	6. 4	−0. 02	0. 96	0. 98			
Direct solvent: Plant 1	50	9. 6	[5] 1. 51	3. 05	1. 54	2. 25	2. 09	−0. 16
Prepress solvent: Plant 2	80	8. 0	1. 81	3. 86	2. 05	2. 20	2. 91	. 71
ANNUAL CRUSH: 13,200 TONS								
Hydraulic: 8 press	80	7. 5						
Screw press: 3 press	75	8. 0	[5] 0. 06	0. 96	0. 90			
Direct solvent: Plant 1	50	12. 0	[5] 1. 21	3. 05	1. 84	1. 81	2. 09	0. 28
Prepress solvent: Plant 2	80	7. 5	1. 40	3. 86	2. 46	1. 90	2. 91	1. 01
ANNUAL CRUSH: 21,100 TONS								
Hydraulic: 8 press	80	12. 0						
Screw press: 4 press	100	9. 6	0. 26	0. 96	0. 70			
Direct solvent: Plant 2	100	9. 6	1. 09	3. 05	1. 96	1. 31	2. 09	0. 78
Prepress solvent: Plant 2	80	12. 0	1. 03	3. 86	2. 83	1. 27	2. 91	1. 64
ANNUAL CRUSH: 26,400 TONS								
Hydraulic: 10 press	100	12. 0						
Screw press: 4 press	100	12. 0	0	0. 96	0. 96			
Direct solvent: Plant 2	100	12. 0	. 53	3. 05	2. 52	0. 98	2. 09	1. 11
Prepress solvent: Plant 3	160	7. 5	1. 15	3. 86	2. 71	1. 45	2. 91	1. 46
ANNUAL CRUSH: 42,200 TONS								
Hydraulic: 16 press	160	12. 0						
Screw press: 7 press	175	11. 0	0. 17	0. 96	0. 79			
Direct solvent: Plant 3	200	9. 6	. 53	3. 05	2. 52	[5] 0. 92	2. 09	1. 17
Prepress solvent: Plant 3	160	12. 0	. 51	3. 86	3. 35	[5] . 65	2. 91	2. 26

See footnotes at end of table.

TABLE 93.—*Calculated maximum differences in the costs and minimum differences in total and net revenue per ton of seed processed for different volumes of seed crushed annually resulting from change in types of cottonseed oil mills, in any mill area, 1949–50*—Continued

Mill	24-hour crushing capacity at normal operating rate	Length of operating season [1]	Change from— Hydraulic to higher oil yielding type mill: Cost [2]	Hydraulic: Revenue Total [3]	Hydraulic: Revenue Net	Screw press to higher oil yielding type mill: Cost [4]	Screw press: Revenue Total [3]	Screw press: Revenue Net
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
ANNUAL CRUSH: 52,800 TONS								
Hydraulic: 20 press	200	12.0						
Screw press: 8 press	200	12.0	−0.08	0.96	1.04			
Direct solvent: Plant 3	200	12.0	0	3.05	3.05	[5] 0.50	2.09	1.59
Prepress solvent: Plant 4	240	10.0	.62	3.86	3.24	[5] 1.21	2.91	1.70
ANNUAL CRUSH: 63,400 TONS								
Hydraulic: 24 press	240	12.0						
Screw press: 10 press	250	11.5	0.27	0.96	0.69			
Direct solvent: Plant 4	300	9.6	.56	3.05	2.49	0.69	2.09	1.40
Prepress solvent: Plant 4	240	12.0	.43	3.86	3.43	[5] .38	2.91	2.53
ANNUAL CRUSH: 79,200 TONS								
Hydraulic: 30 press	300	12.0						
Screw press: 12 press	300	12.0	−0.09	0.96	1.05			
Direct solvent: Plant 4	300	12.0	[5] −.20	3.05	3.25	[5] 0.29	2.09	1.80
Prepress solvent: Plant 5	400	9.0	.45	3.86	3.41	.95	2.91	1.96
ANNUAL CRUSH: 105,600 TONS								
Hydraulic: 40 press	400	12.0						
Screw press: 16 press	400	12.0	0.11	0.96	0.85			
Direct solvent: Plant 5	400	12.0	[5] −.13	3.05	3.18	[5] 0.20	2.09	1.89
Prepress solvent: Plant 5	400	12.0	.19	3.86	3.67	[5] .26	2.91	2.65

[1] Averaging 22 24-hour working days per month.

[2] Calculated by totaling the differences in the following costs: Plant and water from Mill Area V (table 102); labor, social security, and workmen's compensation from Mill Area I (table 98); and power from Mill Area III (table 100), except in changing to direct solvent mills, power costs from Mill Area VI (table 103) were used.

[3] Revenue increase = oil gain per ton of seed processed × 1949–50 price of 100 grade oil, which is 11.67 cents per pound — decrease in meal revenue due to pellet sales. Oil gains in changing from hydraulic to higher oil yielding processes are 8.2, 35.2, and 42.2 pounds for screw press, direct solvent, and prepress solvent mills, respectively; from screw press to direct solvent and prepress solvent mills, 27 and 34 pounds, respectively. Decrease in meal revenue due to pellet sales = meal yield per ton of seed × sacked-pellet price differential or $0.47 \times 2.25 = 1.06$.

[4] Calculated by totaling the differences in the following costs: Plant and water from Mill Area V (table 102); and labor, social security, workmen's compensation, and power from Mill Area VI (table 103).

[5] When combinations of major cost differences did not equal maximum difference as calculated in any 1 of the 6 mill areas analyzed, adjustments were made by including other costs.

From the standpoint of total revenue per ton of seed, it was constructed through the following steps:

First, it was assumed that a shift from a lower to a higher oil-yielding process results in an increase in oil revenue equal to the difference in the pounds of oil per ton of seed times the 1949–50 average price of 100 grade oil.[15]

Second, it was assumed that a shift from the hydraulic or screw-press process to either of the solvent processes involves a reduction in meal revenue equivalent to the highest meal yield in any of the six mill areas[16] multiplied by the largest price differential between pellets and sacked meal, which gave approximately $1.06 per ton of seed. This is an extremely conservative procedure as either of these types of meal may be equally profitable, and seldom, if ever, would any hydraulic or screw-press mill produce only pellet meal.

Third, the slight decrease in hull revenue which results from shifting from lower to higher oil-yielding processes was ignored. The decrease is very minor, being equivalent to only the number of increased pounds of oil per ton of seed multiplied by the price per ton of hulls. Never was

[15] See p. 133 for explanation of the way in which the term "grade of oil" is here used. In line with this explanation the U. S. 1944–49 average FFA content of seed was used in calculating this grade of oil. See p. 13 for the differential oil yields of different type mills.

[16] This will be approximately as great as anywhere in the industry.

this amount more than 32 cents per ton in any of the 6 areas.

Finally, it was assumed that a shift from hydraulic mills, producing slab meal, to any other type mill would not result in any loss in total meal revenue. This assumption is favorable to the hydraulic process, which is very satisfactory for the problem at hand, because most mills are hydraulic and it is desired to construct a situation in which the advantage of changing the type of mill is the least possible.

By this procedure, the effect of change in types of mills on revenue is equivalent to the differences in their oil yields multiplied by the oil price (minus the price differential between pellets and sacked meal where the shift is from the hydraulic or screw-press processes to either of the solvent processes). For example, the prepress-solvent process yields 42.2 more pounds of oil per ton of seed than the hydraulic process. Using the 1949–50 price of 100 grade oil, 11.5 cents per pound, a shift from any given hydraulic mill to any prepress-solvent mill would result in $4.85 more oil revenue per ton of seed. Subtracting the loss in meal revenue of $1.06 gives a net gain of $3.79, which, as previously stated, is less than would be expected in any actual mill area.

From the standpoint of total cost per ton of seed, the extreme case was constructed as follows (table 93):

First, only those costs had to be considered which are affected by change in type of mills, handling the same size of crush. (These particular costs were described on p. 146.)

Second, five possible shifts from lower to higher oil-yielding types of mills were considered: (1) From the hydraulic to the screw press; (2) from the hydraulic to the direct solvent; (3) from the hydraulic to the prepress solvent; (4) from the screw press to the direct solvent; and (5) from the screw press to the prepress solvent.

Third, costs from the six widely separated mill areas were then combined into the extreme case in such a way as to provide the least possible incentive for making any of the above shifts.

For example, shifts (1) and (3) involved going from lower to higher power-using processes. The higher the power cost the less the incentive for such a change. Power cost was highest in mill area III, and therefore this area was used in the extreme case for shifts (1) and (3).

In contrast, shifts (2), (4), and (5) involved going from a higher to a lower power-using process. Power cost was lowest in mill area VI, and therefore this area was used in the extreme case for these shifts.

Shifts (1), (2), and (3) involved going from higher to lower labor-using types of mills. The lower the labor cost, the less the incentive for the change; hence, labor, workmen's compensation, and social security costs of area I were used in the extreme case for these shifts. In contrast, shifts (4) and (5) involved a shift from a lower to a higher labor cost process; hence, Area VI labor, workmen's compensation, and social security costs were used in the extreme case for shifts (4) and (5). Labor costs were usually higher for the direct-solvent than for the screw-press process because of higher wage rates per man-hour rather than higher man-hour requirements per ton of seed (table 64).

Differences in plant costs among areas were not enough to have any appreciable bearing on the relative profitability of different types of mills. However, plant costs in Area V were used in constructing the extreme case because property tax rates were somewhat higher there than elsewhere.

As shown in table 93, profit differentials between different types of mills were then found by subtracting cost per ton differentials from corresponding differential gains in total revenue per ton of seed, which arose in shifting from lower to higher oil-yielding types of mills for each of the nine different crushes used in this report. Only the most profitable mill of each type was shown in this table for each of the nine crushes, because it was found that these particular mills usually turned out to be the most economical, as the costs and revenue items of the six widely separated mill areas were recombined in the extreme case.

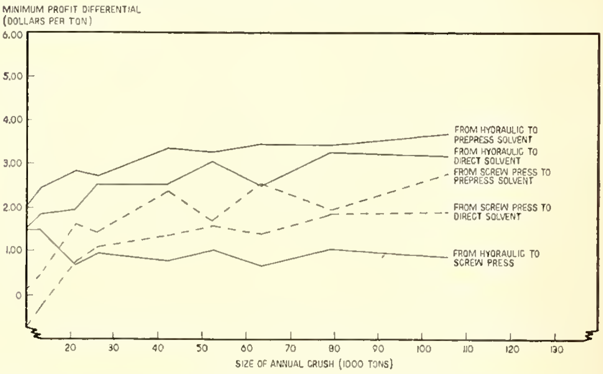

FIGURE 79.—Calculated minimum profit differences resulting from a shift from lower to higher oil-yielding types of cottonseed oil mills, for specified volumes of seed crushed annually, 1949–50.

EFFECT OF CHANGE IN SIZE OF SPECIFIED CRUSHES ON COSTS AND REVENUE

As previously stated, the relative economies of different types of optimum mills for the same size crush are independent of seed costs, since all mills would have the same seed costs if the crush were the same. The same principle applies to meal and hull returns except where change in type of mill might also require changing the types of some of the meal produced.

But the various types of mills were considered for a number of different crushes. The question therefore arises as to the significance of change in the size of the specified crushes on revenue and costs.

REVENUE

Although change in type of mill *always* modifies revenue through altering oil and hull yields, change in size of crush *may* or *may not* modify average returns from meal and hulls. It will not do so if these products are (1) all sold locally or all wholesale, or (2) if there is no local-wholesale price differential. But it will do so if these products are sold *both* locally and wholesale and if there is a local-wholesale price differential because, in most cases, the local market is limited whereas the wholesale market is not. Hence, the larger the crush the smaller the proportion of total meal (whether one or more types) or hulls sold locally, and therefore the lower the average value of all meal or hulls produced.

As previously stated, mill areas vary widely in respect to their meal market patterns. The patterns included in the six widely separated mill areas coincided approximately with the extremes of the industry. The nine volumes of seed (annual crushes) used in this report resulted in corresponding total meal outputs ranging approximately from 4,380 to 43,800 tons in area I. These limits varied somewhat from area to area owing to differences in ammonia content of seed, but the meal output of the largest mill or crush was always ten times that of the smallest, whatever the area.

Effect of Change in Size of Each Type of Mill on Average Meal Returns in Specified Mill Areas

Three assumptions were used in calculating the effect of these crushes upon average meal revenue per ton of seed in each mill area. First, it was assumed that any quantity of a particular type of meal, within the limits of the above-mentioned size range of crushes, could be sold at the same wholesale price. Second, it was assumed that the current volume of local sales of any particular type of meal in a given mill area represented the maximum amount which could be sold at the local price, whatever the size of crush or mill. This assumption was on the conservative side, as any local market might be expanded somewhat if sufficient effort were made to do so. Finally, it was assumed that the portions of different types of meal sold wholesale would not be altered by change in the size of crush or mill.

In line with these assumptions, figures 80 through 83 show how changes in specified crushes affected average returns per ton of meal in specified mill areas.

Figure 80 illustrates market patterns in which change in *type* of mill has no effect on average meal returns because the types of meal produced remain the same for all types of mills. In areas I and IV all mills produced only sacked meal and sold it both locally and wholesale. Differences in the heights of the lines in figure 80 reflect corresponding area differences in the yield and price of meal. Differences in the slopes of the lines reflect the influence of the size of the local market and local-wholesale price differentials.

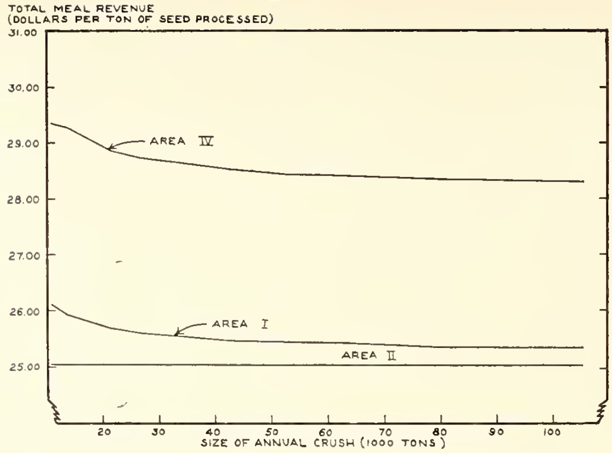

FIGURE 80.—Calculated effect of change in size of all types of cottonseed oil mills on total meal revenue per ton of seed crushed, in mill areas I, II, and IV (I—southeastern North Carolina; II—Delta, northeastern Arkansas; IV—eastern Oklahoma), 1949–50.

As area II had no local sales, increasing size of crush or mill had no effect on average meal returns.

Area III represented a current meal market of 3,100 tons of local sacked meal and a wholesale market of 85 percent slab and 15 percent sacked meal. As only hydraulic mills produce slab meal, shifting to any other type of mill was assumed, as previously stated, to involve a shift from slab to the highest value meal for which there was an established market. This was sacked meal. Accordingly, the calculated effect of this change in type of mill and size of crush on average meal returns is shown in figure 81.

Mill area V illustrates a still more complex market pattern in which pellets and sacked meal were produced and sold both locally and wholesale. The total local market was approximately 13,300 tons of sacked meal and 12,900 tons of pellet meal, or a total of 26,200 tons of meal. This represented

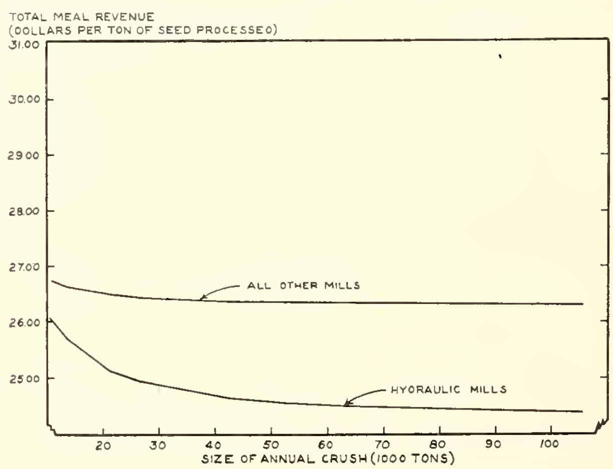

FIGURE 81.—Calculated effect of change in size of hydraulic cottonseed oil mills and all other types on total meal revenue per ton of seed processed, mill area III (Delta, southern Louisiana), 1949–50.

a crush of 55,300 tons of seed, somewhat greater than the sixth largest crush (52,800 tons) in this report. Even the local pellet market was somewhat greater than the total meal output from the fourth largest crush of 26,400 tons.

In such market patterns, hydraulic and screw-press mills were considered as one type, since they both produced sacked and pellet meal. Beginning with the smallest crush, it was assumed that these processes would produce only pellets until the local pellet market of 12,900 tons was filled up, and then would add only local sacked meal until its total local market of 26,200 tons was exhausted. For each larger crush, wholesale sacked meal and pellets would be added in the prevailing ratio of 62:38. It is recognized that actual operations might vary considerably from these rules, but, within wide limits, such variations would result in about the same effect on average meal returns.

From these assumptions and by varying the size of crush from 10,600 to 55,300 tons for both hydraulic and screw-press mills, a decline in average local meal sales was caused through changing the proportions of local sacked and pellet sales. These declines are shown in figure 82. Continued increase in size of crush resulted in further revenue declines by reducing all local sales as a proportion of total sales, as shown in figure 82.

Shifting from hydraulic or screw press to either type of solvent mill and varying the size of crush from the smallest (10,600 tons) to the largest (105,600 tons) resulted in an additional decline of 89 cents in the average value of meal per ton of seed. This was owing to the assumption that all solvent mills would produce only sacked meal in mill area V. (If pellets were produced, change in type of mill would cause no change in meal returns, as all types of mills would produce the same types of meal.)

Of all meal market patterns, that of area VI was the most complex. The local market consisted of approximately 23,500 tons of sacked meal, 3,600 tons of pellets, and 2,600 tons of bulk meal. The wholesale market was represented by 65 percent sacked sales, 25 percent pellets, and 10 percent bulk meal.

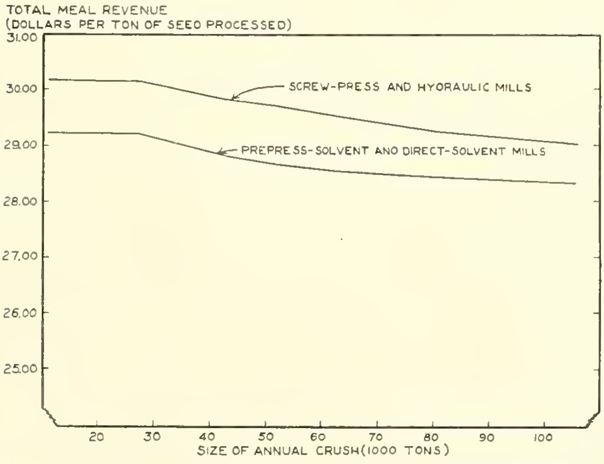

Figure 82.—Calculated effect on change in size of each type of cottonseed oil mill and total meal revenue per ton of seed processed, mill area V (north Tex. Blacklands), 1949–50.

In calculating the effect of change in type and size of crush in such a market pattern, it was assumed: (1) That hydraulic and screw-press mills would produce (*a*) only pellets until the local pellet market was filled up, (*b*) then add bulk until local bulk market was filled, then add sacked meal[17] until the local sacked market was gone; (2) whereupon they would sell wholesale all additional meal in the ratio of 65 percent sacked meal, 25 percent pellets, and 10 percent bulk. As solvent mills were not considered as producing pellets, it was further assumed (3) that such mills would first fill up the local bulk market and then the local sacked market, (4) and then sell wholesale all additional meal in the ratio of 10 percent bulk and 90 percent sacked.

In line with these calculations, the effects of varying the size of crush and type of mill on meal revenue in this market were computed and are shown in figure 83.

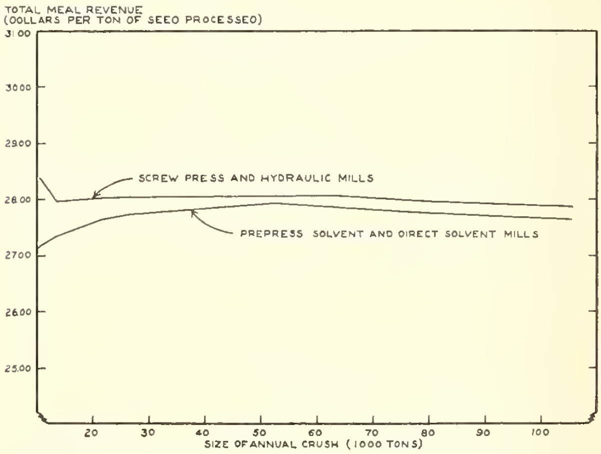

FIGURE 83.—Calculated effect of change in size of each type of cottonseed oil mill on total meal revenue per ton of seed processed, mill area VI (central California), 1949–50.

Effect of Change in Size of Crush on Average Hull Returns in Specified Mill Areas

As in the case of meal, it was assumed that any amount of hulls, within the limit of the above-mentioned range of crushes, could be sold in any given wholesale market at the same price. On the other hand, it was assumed that the amount of "normal" local sales represented the maximum amount which could be sold in any given local market at the same price. Variation in size of crush would not affect the average hull returns (1) where hulls were *all* sold locally or wholesale or (2)

[17] Bulk meal was assumed to be produced and sold before sacked meal as the bulk-sacked price differential of $3.90 was insufficient to cover the cost of meal bags ($4.50) needed for sacked meal. The sacked-pellet price differential was $2.25.

where they were sold both ways if there were no local-wholesale price differential.

In line with these assumptions, figure 84 shows the effect of change in size of crush of hydraulic mills in specified mill areas on average hull revenue.

Differences in the heights of the lines in figure 84 reflect corresponding area differences in the yield and price of hulls. Differences in the slopes of the lines reflect primarily the influence of an increasing proportion of total wholesale hulls on the average value of all hulls produced.

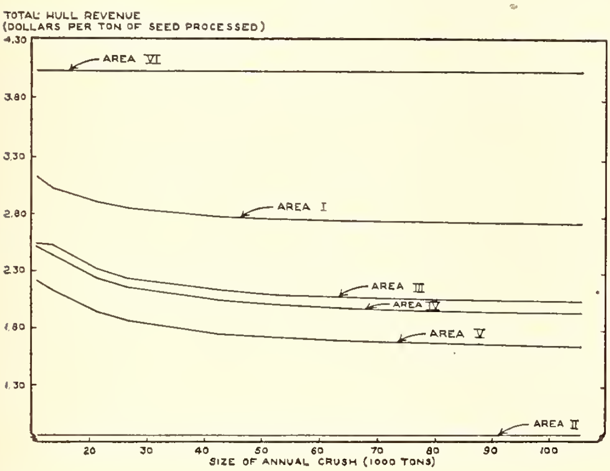

FIGURE 84.—Calculated effect of change in size of hydraulic cottonseed oil mill on total hull revenue per ton of seed processed, mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

COSTS

The calculated effect of change in size of specified crushes for each type of mill on costs and revenues are shown in tables 94 through 97.

For reasons previously stated, the calculated effect of change in size of crush on total (average) cost holds true in a particular locality only for whatever volumes of seed may be available at the same seed costs f. o. b. gins. In a few localities, the largest crush (105,000 tons) can be obtained by a given operator at the same cost at gins as smaller crushes. But the amount of seed available to an operator at the prevailing price varies so widely from area to area that in some places an operator could not obtain at that price even the smallest crush appearing in this study. In most areas, therefore, indefinite increases in the size of crush, at some point, will adversely affect net revenue by causing an increase in seed cost.

Moreover, such increases in the size of crush will result in greater decreases in total revenue than those shown in this report if a given operator's wholesale meal and hull market will not absorb widely different amounts of meal and hulls at the same price. In short, the extent to which the calculated effect of change in size of crush on total cost, and the revenue per ton of seed processed, is dependent on the unique conditions of individual mill areas, which only local judgment can evaluate.

However, the effect of change in size of crush on processing costs has wide applicability because it is not subject to limitations in calculating changes in seed costs or product selling prices for increasing volumes of seed.

Analysis showed four main characteristics of the relationship between volume and processing cost among the six widely separated and economically different mill areas.

First, in terms of this relationship, processing cost fell into three groups: Constant, rising, and declining. However, the particular items in each group were not the same for all mill areas. For example, meal bags were not included in constant cost in mill areas I and VI, but meal bags were included in other areas, as shown in tables 94 through 97.

Second, haul cost per ton of seed always increased directly with the size of crush, and was the most important of all rising costs. The most important declining costs were labor, electric power, and plant (depreciation, interest, taxes, and insurance).

Third, those costs that declined with the size of crush usually more than offset the costs that increased so that the larger the crush the smaller the total processing cost per ton of seed processed. This proposition evidently holds generally, as it was true for area IV, where seed density in the surrounding locality was less than anywhere else, and therefore showed greatest increase in haul costs (table 94). This means that, if increasing the size of mill did not lead at some point to prohibitive additional cost of diverting seed from competitors (or meal and hull discounts), the most economical size mill (whatever the type) would be at least somewhat larger than the biggest mill described in this report. As a practical fact, however, there are only a very limited number of mill areas in which this could be true. Accordingly, size of mill in any area is not limited because increasing size of mill and crush is associated with increasing processing costs. Instead, the limitation must be owing to the unavailability of seed (raw materials) except at the additional and prohibitive expense of diverting it from competing mills (even after making due allowance for the possibility that increasing the size of crush may, at some point, begin driving down the prevailing wholesale price of meal and hulls). Size of mill and crush can be increased, but only up to the point where the increased cost of obtaining seed outweighs those costs that decline with the increased scale of operation (plus any possible discounts on the wholesale price of meal and hulls).

The counterpressure of these "outside the mill" factors for smaller mills against the pressure of internal mill economies for larger mills must be substantial. In no area and for no type of mill was the saving in processing costs, resulting from increasing the size of crush from 10,600 tons to 105,-

600 tons, less than $5 per ton. By sufficiently increasing the scale of operations, this whole amount (and even more) might be used for underwriting higher seed prices or meal and hull discounts and still enable the operator to realize substantially greater total net revenue because of the increased volume of business.

Fourth, the smallest crush (10,600 tons), as a base, brought out significant variations in the rate of savings in processing costs by size of crush, for each type of mill in different areas, as shown in figure 85 and tables 94 through 97.

For all types of mills in any area the rate of savings in processing cost increased at an increasing rate by size of crush up to 21,000 tons. Thereafter, with minor exceptions, rate of savings in processing cost continued to increase but at a decreasing rate. Approximately 50 percent of the total possible savings were realized by increasing the size of crush only up to 21,000 tons. Generally speaking, at least 80 percent of the total possible savings in cost were realized at approximately a 53,000-ton crush (only half the largest tonnage used in this study).

The relationship between the rate of savings and size of crush for any type of mill varied appreciably among the mill areas. By increasing the size of crush to 105,600 tons the lowest rate of savings was shown in area IV and the highest rate was shown in area VI, whatever the type of mill. This fact was owing to the high seed density and wage rates in area VI. Since seed production was more plentiful in area VI, increasing the size of crush was associated with a much smaller increase in seed haul cost in area VI than in area IV. Also, because of much higher wage rates in area VI, the decrease in man-hour requirement per ton of seed, as size of crush increased, resulted in a greater relative decrease in labor cost per ton of seed in area VI.

Finally, in all areas except area III, the level of savings in processing cost was appreciably higher for solvent mills than for other mills with all increases in size of crush, the primary reason being that plant cost of solvent mills (depreciation, interest on investment, taxes, and insurance) decreases at a relatively faster rate with larger crushes. (The level of saving in processing costs was highest for the hydraulic process in area III because this process was assumed to produce a large amount of slab cake and therefore had a lower cost per ton of seed for sacked meal than the other processes.)

The incentive for increasing the size of crush and mill is thus clearly greatest for the solvent processes.

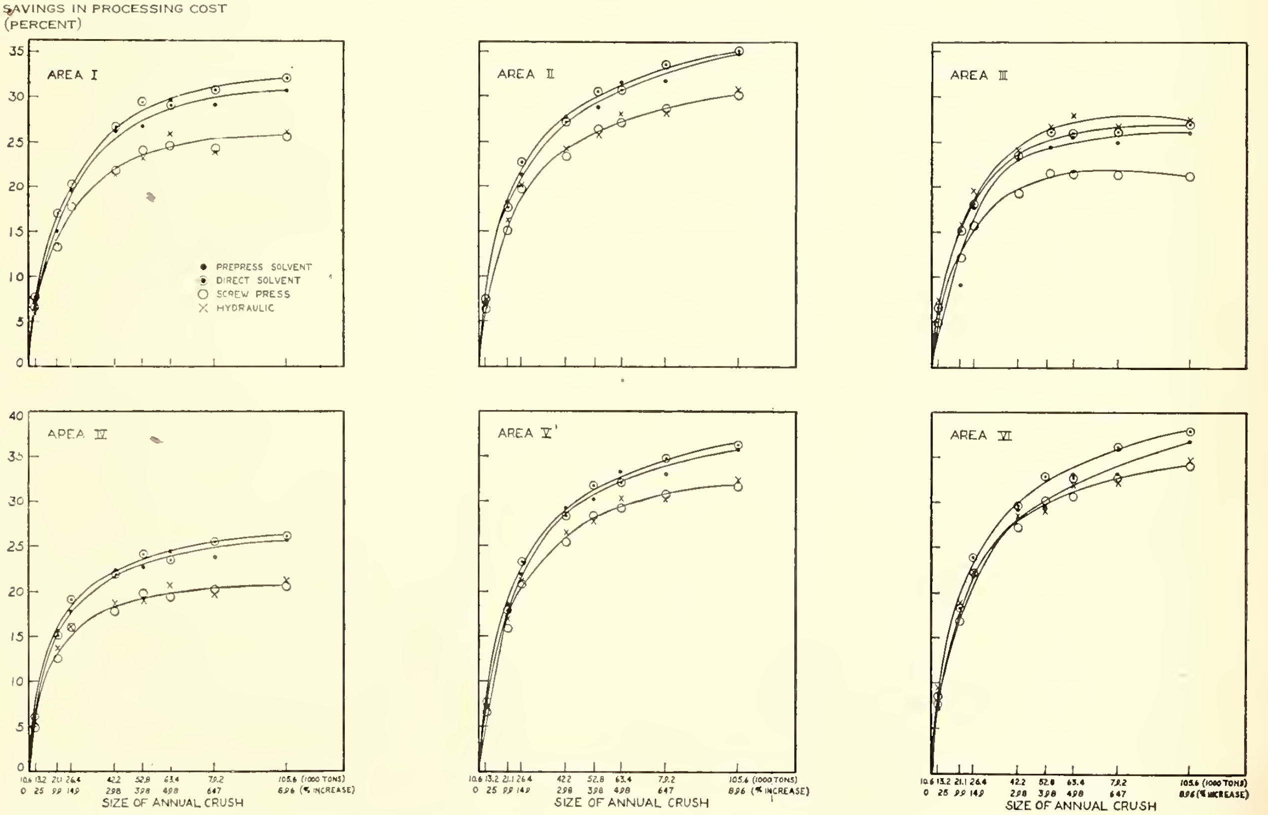

FIGURE 85.—Savings in processing costs associated with increase in size of crush, by type of plant, mill areas I through VI (I—southeastern North Carolina; II—Delta, northeastern Arkansas; III—Delta, southern Louisiana; IV—eastern Oklahoma; V—north Texas Blacklands; VI—central California), 1949–50.

TABLE 94.—*Calculated effects of change in sizes of crush (mill) on the costs and revenue per ton of seed processed for hydraulic cottonseed oil mills, in mill areas I through VI, 1949–50* [1]

Annual crush (tons)	Size of mill: Presses	Size of mill: 24-hour crushing capacity at normal operating rate	Length of season	Cost: Constant: Seed	Cost: Constant: Other [2]	Cost: Constant: Total	Cost: Rising: Seed haul	Cost: Rising: Other [3]	Cost: Rising: Total	Cost: Declining: Plant	Cost: Declining: Labor (including dormant season labor)	Cost: Declining: Other [4]	Cost: Declining: Total	Cost: Total	Processing: Total cost minus seed	Savings in cost: Percentage decrease in processing cost	Savings in cost: Proportion of total savings	Returns: Gross	Returns: Net	Increase in net returns [5]: Increase	Increase in net returns [5]: Proportion of total increase
	Number	*Tons*	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*	*Percent*	*Dollars*	*Dollars*	*Percent*	*Percent*
AREA I																					
10,600	6	60	8.0	45.248	5.594	50.842	2.410	0.531	2.941	6.031	4.661	4.503	15.195	68.978	23.730	0	0	72.829	3.851	0	0
13,200	8	80	7.5	45.248	5.594	50.842	2.450	.564	3.014	5.138	4.214	4.314	13.666	67.522	22.274	6.1	23.3	72.602	5.080	31.9	26.9
21,100	12	120	8.0	45.248	5.594	50.842	2.600	.600	3.200	4.316	3.370	3.972	11.658	65.700	20.452	13.8	52.7	72.159	6.459	67.7	57.0
26,400	10	100	12.0	45.248	5.594	50.842	2.670	.718	3.388	3.261	3.261	3.975	10.497	64.727	19.479	17.9	68.3	71.575	6.848	77.8	65.5
42,200	24	240	8.0	45.248	5.594	50.842	2.890	.689	3.579	3.304	2.812	3.313	9.429	63.850	18.602	21.6	82.4	71.824	7.974	107.1	90.2
52,800	24	240	10.0	45.248	5.594	50.842	3.080	.748	3.828	2.839	2.769	3.177	8.785	63.455	18.207	23.3	88.9	71.491	8.036	108.7	91.6
63,400	24	240	12.0	45.248	5.594	50.842	3.210	.775	3.985	2.513	2.446	3.058	8.017	62.844	17.596	25.8	98.5	71.262	8.418	118.6	99.9
79,200	40	400	9.0	45.248	5.594	50.842	3.420	.748	4.168	2.858	2.657	2.740	8.255	63.265	18.017	24.1	92.0	71.556	8.291	115.3	97.1
105,600	40	400	12.0	45.248	5.594	50.842	3.770	.793	4.563	2.388	2.226	2.731	7.345	62.750	17.502	26.2	100.0	71.173	8.423	118.7	100.0
AREA II																					
10,600	6	60	8.0	44.420	5.170	49.590	1.390	0.715	2.105	5.849	4.623	4.482	14.954	66.649	22.229	0	0	70.928	4.279	0	0
13,200	8	80	7.5	44.420	5.170	49.590	1.410	.711	2.121	4.995	4.188	4.283	13.466	65.177	20.757	6.6	21.9	70.881	5.704	33.3	21.0
21,100	8	80	12.0	44.420	5.170	49.590	1.520	.780	2.300	3.504	3.535	4.118	11.157	63.047	18.627	16.2	53.6	71.006	7.959	86.0	54.2
26,400	10	100	12.0	44.420	5.170	49.590	1.590	.785	2.375	3.143	3.255	3.907	10.305	62.270	17.850	19.7	65.2	71.006	8.736	104.2	65.6
42,200	16	160	12.0	44.420	5.170	49.590	2.000	.792	2.792	2.744	2.721	3.416	8.881	61.263	16.843	24.2	80.1	71.006	9.743	127.7	80.4
52,800	20	200	12.0	44.420	5.170	49.590	2.100	.795	2.895	2.555	2.696	3.179	8.430	60.915	16.495	25.8	85.4	71.006	10.091	135.8	85.5
63,400	24	240	12.0	44.420	5.170	49.590	2.220	.797	3.017	2.391	2.449	2.972	7.812	60.419	15.999	28.0	92.7	71.006	10.587	147.4	92.8
79,200	30	300	12.0	44.420	5.170	49.590	2.320	.798	3.118	2.468	2.449	2.768	7.685	60.393	15.973	28.1	93.0	71.006	10.613	148.0	93.2
105,600	40	400	12.0	44.420	5.170	49.590	2.400	.800	3.200	2.263	2.232	2.645	7.140	59.930	15.510	30.2	100.0	71.006	11.076	158.8	100.0
AREA III																					
10,600	6	60	8.0	42.026	3.733	45.759	2.250	0.479	2.729	5.746	4.883	6.629	17.258	65.746	23.720	0	0	73.469	7.723	0	0
13,200	8	80	7.5	42.026	3.733	45.759	2.350	.501	2.851	4.898	4.395	6.245	15.538	64.148	22.122	6.7	24.0	73.120	8.972	16.2	29.6
21,100	12	120	8.0	42.026	3.733	45.759	2.510	.602	3.112	4.139	3.455	5.574	13.168	62.039	20.013	15.6	55.9	72.291	10.252	32.7	59.7
26,400	10	100	12.0	42.026	3.733	45.759	2.690	.678	3.368	3.096	3.324	5.589	12.009	61.136	19.110	19.4	69.5	71.694	10.558	36.7	67.0
42,200	24	240	8.0	42.026	3.733	45.759	3.010	.663	3.673	3.151	2.826	4.658	10.635	60.067	18.041	23.9	85.7	71.640	11.573	49.9	91.1
52,800	22	220	10.9	42.026	3.733	45.759	3.120	.728	3.848	2.609	2.772	4.505	9.886	59.493	17.467	26.4	94.6	71.249	11.756	52.2	95.3
63,400	24	240	12.0	42.026	3.733	45.759	3.400	.752	4.152	2.396	2.426	4.395	9.217	59.128	17.102	27.9	100.0	71.086	11.958	54.8	100.0
79,200	40	400	9.0	42.026	3.733	45.759	3.870	.731	4.601	2.729	2.641	3.954	9.324	59.684	17.658	25.6	91.8	71.266	11.582	50.0	91.2
105,600	40	400	12.0	42.026	3.733	45.759	4.270	.777	5.047	2.279	2.184	3.991	8.454	59.260	17.234	27.3	97.8	70.912	11.652	50.9	92.9

AREA IV

10,600	6	60	8.0	44.654	5.861	50.515	2.750	0.405	3.155	6.130	5.623	4.791	16.544	70.214	25.560	0	0	75.548	5.334	0	0
13,200	8	80	7.5	44.654	5.861	50.515	2.930	.420	3.350	5.223	5.105	4.581	14.909	68.774	24.120	5.6	26.9	75.359	6.585	23.5	32.4
21,100	8	80	12.0	44.654	5.861	50.515	3.230	.608	3.838	3.677	4.282	4.436	12.395	66.748	22.094	13.6	65.4	74.865	8.117	52.2	72.0
26,400	10	100	12.0	44.654	5.861	50.515	3.530	.651	4.181	3.303	3.936	4.201	11.440	66.136	21.482	16.0	76.9	74.652	8.516	59.7	82.3
42,200	16	160	12.0	44.654	5.861	50.515	4.330	.718	5.048	2.915	3.281	3.642	9.838	65.401	20.747	18.8	90.4	74.332	8.931	67.4	93.0
52,800	20	200	12.0	44.654	5.861	50.515	4.700	.740	5.440	2.724	3.243	3.387	9.354	65.309	20.655	19.2	92.3	74.225	8.916	67.2	92.7
63,400	24	240	12.0	44.654	5.861	50.515	5.020	.756	5.776	2.557	2.948	3.157	8.662	64.953	20.299	20.6	99.0	74.154	9.201	100.0	100.0
79,200	30	300	12.0	44.654	5.861	50.515	5.330	.771	6.101	2.643	2.940	2.938	8.521	65.137	20.483	19.9	95.7	74.082	8.945	67.7	93.4
105,600	40	400	12.0	44.654	5.861	50.515	5.700	.787	6.487	2.431	2.681	2.785	7.897	64.899	20.245	20.8	100.0	74.012	9.113	70.8	97.7

AREA V

10,600	6	60	8.0	43.972	5.884	49.856	2.760	0.405	3.165	7.326	5.941	4.873	18.140	71.161	27.189	0	0	76.524	5.363	0	0
13,200	8	80	7.5	43.972	5.884	49.856	2.760	.410	3.170	6.230	5.397	4.599	16.226	69.252	25.280	7.0	21.8	76.380	7.128	32.9	24.6
21,100	8	80	12.0	43.972	5.884	49.856	2.760	.511	3.271	4.371	4.568	4.436	13.375	66.502	22.530	17.1	53.3	76.316	9.814	83.0	62.1
26,400	10	100	12.0	43.972	5.884	49.856	2.780	.525	3.305	3.914	4.216	4.178	12.308	65.469	21.497	20.9	65.1	76.245	10.776	100.9	75.5
42,200	16	160	12.0	43.972	5.884	49.856	2.990	.548	3.538	3.433	3.545	3.616	10.594	63.988	20.016	26.4	82.2	75.810	11.822	120.4	90.1
52,800	20	200	12.0	43.972	5.884	49.856	3.090	.556	3.646	3.200	3.512	3.373	10.085	63.587	19.615	27.9	86.9	75.656	12.069	125.0	93.5
63,400	24	240	12.0	43.972	5.884	49.856	3.150	.590	3.740	3.001	3.190	3.124	9.315	62.911	18.939	30.3	94.4	75.444	12.533	133.7	100.0
79,200	30	300	12.0	43.972	5.884	49.856	3.240	.636	3.876	3.007	3.167	2.923	9.187	62.919	18.947	30.3	94.4	75.191	12.272	128.8	96.3
105,600	40	400	12.0	43.972	5.884	49.856	3.390	.684	4.074	2.840	2.878	2.794	8.512	62.442	18.470	32.1	100.0	74.939	12.497	133.0	99.5

AREA VI

10,600	6	60	8.0	49.866	3.423	53.289	1.520	1.963	3.483	6.906	9.282	5.073	21.261	78.033	28.167	0	0	78.894	0.861	0	0
13,200	8	80	7.5	49.866	3.423	53.289	1.530	1.642	3.172	5.904	8.391	4.804	19.099	75.560	25.694	8.8	25.6	78.411	2.851	231.1	21.3
21,100	8	80	12.0	49.866	3.423	53.289	1.550	2.019	3.569	4.135	7.183	4.645	15.965	72.823	22.957	18.5	53.8	78.671	5.848	579.2	53.4
26,400	10	100	12.0	49.866	3.423	53.289	1.580	2.131	3.711	3.715	6.662	4.398	14.775	71.775	21.909	22.2	64.5	78.691	6.916	703.3	64.8
42,200	16	160	12.0	49.866	3.423	53.289	1.730	2.297	4.027	3.252	5.654	3.820	12.726	70.042	20.176	28.4	82.6	78.720	8.678	907.9	83.7
52,800	20	200	12.0	49.866	3.423	53.289	1.920	2.353	4.273	3.034	5.619	3.573	12.225	69.788	19.922	29.3	85.2	78.729	8.941	938.4	86.5
63,400	24	240	12.0	49.866	3.423	53.289	2.020	2.391	4.411	2.847	5.145	3.324	11.316	69.016	19.150	32.0	93.0	78.736	9.720	1,028.9	94.9
79,200	30	300	12.0	49.866	3.423	53.289	2.150	2.433	4.583	2.936	5.098	3.107	11.141	69.013	19.147	32.0	93.0	78.639	9.626	1,018.0	93.9
105,600	40	400	12.0	49.866	3.423	53.289	2.310	2.475	4.785	2.699	4.630	2.936	10.255	68.339	18.473	34.4	100.0	78.539	10.200	1,084.7	100.0

[1] Most profitable plant used for each specified crush, based on tables 98 through 103.
[2] Includes: Linter bags and ties; linter room expense; repairs; seed unloading labor; lubrication and cleaning; fuel oil; press cloth; and miscellaneous mill expense for all areas, and seed buyers for Areas I through V. Area VI did not require seed buyers. Also includes meal bags for Areas I, II, IV, and V.
[3] Includes: Brokerage fees, and insurance on stocks for all areas; and meal bags for Area VI.
[4] Includes: Salaries; office; travel and auto; electric power; water; laboratory service; social security; workmen's compensation; and general liability for all areas. Also includes meal bags for Area III.
[5] Smallest crush (mill) = base.

TABLE 95.—*Calculated effects of change in sizes of crush (mill) on the costs and revenue per ton of seed processed for screw-press cottonseed oil mills, in mill areas I through VI, 1949–50* [1]

Annual crush (tons)	Size of mill: Presses	Size of mill: 24-hour crushing capacity at normal operating rate	Length of season	Cost: Constant: Seed	Cost: Constant: Other [2]	Cost: Constant: Total	Cost: Rising: Seed haul	Cost: Rising: Other [3]	Cost: Rising: Total	Cost: Declining: Plant	Cost: Declining: Labor (including dormant season labor)	Cost: Declining: Other [4]	Cost: Declining: Total	Cost: Total	Processing: Total cost minus seed	Savings in cost: Percentage decrease in processing cost	Savings in cost: Proportion of total savings	Returns: Gross	Returns: Net	Increase in net returns [5]: Increase	Increase in net returns [5]: Proportion of total increase
	Number	*Tons*	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*	*Percent*	*Dollars*	*Dollars*	*Percent*	*Percent*
AREA I																					
10,600	3	75	6.4	45.248	5.594	50.842	2.410	0.488	2.898	6.268	3.784	4.668	14.720	68.460	23.212	0	0	73.728	5.268	0	0
13,200	3	75	8.0	45.248	5.594	50.842	2.450	.579	3.029	5.201	3.438	4.610	13.249	67.120	21.872	5.8	22.5	73.444	6.324	20.0	24.5
21,100	5	125	7.7	45.248	5.594	50.842	2.600	.641	3.241	4.483	2.649	4.203	11.335	65.418	20.170	13.1	51.0	73.058	7.640	45.0	55.1
26,400	4	100	12.0	45.248	5.594	50.842	2.670	.719	3.389	3.345	2.574	4.223	10.142	64.373	19.125	17.6	68.6	72.446	8.073	53.2	65.1
42,200	8	200	9.6	45.248	5.594	50.842	2.890	.729	3.619	3.157	2.258	3.653	9.068	63.529	18.281	21.2	82.7	72.496	8.967	70.2	85.9
52,800	8	200	12.0	45.248	5.594	50.842	3.080	.768	3.848	2.728	1.968	3.503	8.199	62.889	17.641	24.0	93.5	72.178	9.289	76.3	93.3
63,400	10	250	11.5	45.248	5.594	50.842	3.210	.771	3.981	2.663	1.965	3.303	7.931	62.754	17.506	24.6	95.7	72.181	9.427	78.9	96.5
79,200	12	300	12.0	45.248	5.594	50.842	3.420	.785	4.205	2.574	1.791	3.100	7.465	62.512	17.264	25.6	99.8	72.088	9.576	81.8	100.0
105,600	16	400	12.0	45.248	5.594	50.842	3.770	.795	4.565	2.425	1.682	2.985	7.092	62.499	17.251	25.7	100.0	72.044	9.545	81.2	99.3
AREA II																					
10,600	2	50	9.6	44.420	5.170	49.590	1.390	0.737	2.127	5.633	4.045	4.789	14.467	66.184	21.764	0	0	71.894	5.710	0	0
13,200	2	50	12.0	44.420	5.170	49.590	1.410	.770	2.180	4.683	3.482	4.757	12.922	64.692	20.272	6.9	22.8	71.965	7.273	27.4	23.6
21,100	4	100	9.6	44.420	5.170	49.590	1.520	.757	2.277	3.838	2.950	4.225	11.013	62.880	18.460	15.2	50.4	71.894	9.014	57.9	49.9
26,400	4	100	12.0	44.420	5.170	49.590	1.590	.787	2.377	3.222	2.554	4.132	9.908	61.875	17.455	19.8	65.8	71.965	10.090	76.7	66.1
42,200	7	175	11.0	44.420	5.170	49.590	2.000	.782	2.782	2.915	2.191	3.565	8.671	61.043	16.623	23.6	78.5	71.923	10.880	90.5	78.0
52,800	8	200	12.0	44.420	5.170	49.590	2.100	.796	2.896	2.604	1.959	3.382	7.945	60.431	16.011	26.4	87.8	71.965	11.534	102.0	87.9
63,400	10	250	11.5	44.420	5.170	49.590	2.220	.792	3.012	2.534	1.958	3.182	7.674	60.276	15.856	27.1	90.2	71.942	11.666	104.3	89.9
79,200	12	300	12.0	44.420	5.170	49.590	2.320	.800	3.120	2.446	1.785	2.977	7.208	59.918	15.498	28.8	95.6	71.965	12.047	111.0	95.7
105,600	16	400	12.0	44.420	5.170	49.590	2.400	.801	3.201	2.299	1.678	2.863	6.840	59.631	15.211	30.1	100.0	71.965	12.334	116.0	100.0
AREA III																					
10,600	3	75	6.4	42.026	5.737	47.763	2.250	0.442	2.692	5.984	4.013	5.741	15.738	66.193	24.167	0	0	75.040	8.847	0	0
13,200	3	75	8.0	42.026	5.737	47.763	2.350	.513	2.863	4.954	3.661	5.756	14.371	64.997	22.971	4.9	23.1	74.960	9.963	12.6	27.9
21,100	5	125	7.7	42.026	5.737	47.763	2.510	.598	3.108	4.272	2.820	5.276	12.368	63.239	21.213	12.2	57.2	74.592	11.353	28.3	62.7
26,400	4	100	12.0	42.026	5.737	47.763	2.690	.680	3.370	3.175	2.737	5.427	11.339	62.472	20.446	15.4	72.0	74.116	11.644	31.6	70.0
42,200	8	200	9.6	42.026	5.737	47.763	3.010	.703	3.713	3.010	2.397	4.790	10.197	61.673	19.647	18.7	87.5	74.130	12.457	40.8	90.4
52,800	8	200	12.0	42.026	5.737	47.763	3.120	.743	3.863	2.600	2.092	4.708	9.400	61.026	19.000	21.4	100.0	73.867	12.841	45.1	100.0
63,400	10	250	11.5	42.026	5.737	47.763	3.400	.749	4.149	2.539	2.086	4.496	9.121	61.033	19.007	21.4	99.9	73.852	12.819	44.9	99.4
79,200	12	300	12.0	42.026	5.737	47.763	3.870	.766	4.636	2.451	1.902	4.310	8.663	61.062	19.036	21.2	99.3	73.783	12.721	43.8	97.0
105,600	16	400	12.0	42.026	5.737	47.763	4.270	.778	5.048	2.315	1.786	4.197	8.298	61.109	19.083	21.0	98.4	73.742	12.633	42.8	94.8

AREA IV

10,600	2	50	9.6	44.654	5.861	50.515	2.750	0.431	3.181	5.871	4.914	5.120	15.905	69.601	24.947	0	0	76.502	6.901	0	0
13,200	2	50	12.0	44.654	5.861	50.515	2.930	.484	3.414	4.887	4.254	5.108	14.249	68.178	23.524	5.7	27.4	76.451	8.273	19.9	37.3
21,100	4	100	9.6	44.654	5.861	50.515	3.230	.585	3.815	4.031	3.576	4.485	12.082	66.422	21.768	12.7	61.2	75.740	9.318	35.0	65.8
26,400	4	100	12.0	44.654	5.861	50.515	3.530	.652	4.182	3.386	3.096	4.371	10.853	65.550	20.896	16.2	78.0	75.586	10.036	45.4	85.3
42,200	7	175	9.6	44.654	5.861	50.515	4.330	.708	5.038	3.101	2.644	3.739	9.484	65.037	20.383	18.3	87.9	75.243	10.206	47.9	90.0
52,800	8	200	12.0	44.654	5.861	50.515	4.700	.743	5.443	2.734	2.365	3.539	8.638	64.596	19.942	20.1	96.4	75.171	10.575	53.2	100.0
63,400	10	250	11.5	44.654	5.861	50.515	5.020	.754	5.774	2.708	2.358	3.322	8.388	64.677	20.023	19.7	94.8	75.078	10.401	50.7	95.3
79,200	12	300	12.0	44.654	5.861	50.515	5.330	.774	6.104	2.617	2.150	3.084	7.851	64.470	19.816	20.6	98.8	75.028	10.558	53.0	99.5
105,600	16	400	12.0	44.654	5.861	50.515	5.700	.789	6.489	2.470	2.019	2.916	7.405	64.409	19.755	20.8	100.0	74.957	10.548	52.8	99.3

AREA V

10,600	2	50	9.6	43.972	5.884	49.856	2.760	0.429	3.189	7.021	5.178	5.214	17.413	70.458	26.486	0	0	77.484	7.026	0	0
13,200	2	50	12.0	43.972	5.884	49.856	2.760	.471	3.231	5.840	4.487	5.179	15.506	68.593	24.621	7.0	22.1	77.480	8.887	26.5	27.1
21,100	4	100	9.6	43.972	5.884	49.856	2.760	.487	3.247	4.774	3.815	4.464	13.053	66.156	22.184	16.2	50.9	77.194	11.038	57.1	58.5
26,400	4	100	12.0	43.972	5.884	49.856	2.780	.528	3.308	4.009	3.324	4.353	11.686	64.850	20.878	21.2	66.3	77.195	12.345	75.7	77.5
42,200	7	175	11.0	43.972	5.884	49.856	2.990	.538	3.528	3.643	2.869	3.720	10.232	63.616	19.644	25.8	80.9	76.727	13.111	86.6	88.7
52,800	8	200	12.0	43.972	5.884	49.856	3.090	.557	3.647	3.256	2.583	3.532	9.371	62.874	18.902	28.6	89.7	76.606	13.732	95.4	97.7
63,400	10	250	11.5	43.972	5.884	49.856	3.150	.587	3.737	3.171	2.564	3.305	9.040	62.633	18.661	29.5	92.5	76.373	13.740	95.6	97.8
79,200	12	300	12.0	43.972	5.884	49.856	3.240	.639	3.879	3.056	2.330	3.133	8.519	62.254	18.282	31.0	97.0	76.142	13.888	97.7	100.0
105,600	16	400	12.0	43.972	5.884	49.856	3.390	.685	4.075	2.880	2.176	3.015	8.071	62.002	18.030	31.9	100.0	75.889	13.887	97.7	100.0

AREA VI

10,600	3	75	6.4	49.866	3.423	53.289	1.520	1.919	3.439	7.158	7.317	5.023	19.498	76.226	26.360	0	0	79.510	3.284	0	0
13,200	2	50	12.0	49.866	3.423	53.289	1.530	1.709	3.239	5.506	6.814	5.245	17.565	74.093	24.227	8.1	23.8	79.550	5.457	66.2	24.4
21,100	5	125	7.7	49.866	3.423	53.289	1.550	1.964	3.514	5.069	5.257	4.427	14.753	71.556	21.690	17.7	52.2	79.387	7.831	138.5	51.1
26,400	4	100	12.0	49.866	3.423	53.289	1.580	2.134	3.714	3.792	5.151	4.465	13.408	70.411	20.545	22.1	65.0	79.611	9.200	180.1	66.5
42,200	7	175	11.0	49.866	3.423	53.289	1.730	2.288	4.018	3.440	4.498	3.830	11.768	69.075	19.209	27.1	79.9	79.561	10.486	219.3	80.9
52,800	8	200	12.0	49.866	3.423	53.289	1.920	2.356	4.276	3.074	4.073	3.625	10.772	68.337	18.471	29.9	88.1	79.649	11.312	244.5	90.2
63,400	10	250	11.5	49.866	3.423	53.289	2.020	2.388	4.408	2.997	4.080	3.409	10.486	68.183	18.317	30.5	89.9	79.623	11.440	248.4	91.7
79,200	12	300	12.0	49.866	3.423	53.289	2.150	2.438	4.588	2.891	3.707	3.173	9.771	67.648	17.782	32.5	95.8	79.559	11.911	262.7	96.9
105,600	16	400	12.0	49.866	3.423	53.289	2.310	2.479	4.789	2.723	3.455	3.020	9.198	67.276	17.410	34.0	100.0	79.459	12.183	271.0	100.0

[1] Most profitable plant used for each specified crush based on tables 98 through 103.
[2] Includes: Linter bags and ties; linter room expense; repairs; seed unloading labor; lubrication and cleaning; fuel oil; and miscellaneous mill expense for all areas, and seed buyers for Areas I through V. Area VI did not require seed buyers. Also includes meal bags for all areas except Area VI.
[3] Includes: Brokerage fees and insurance on stocks for all areas, and meal bags for Area VI.
[4] Includes: Salaries, office; travel and auto; electric power; water; laboratory service; social security; workmen's compensation, and general liability for all areas.
[5] Smallest crush (mill)=base.

TABLE 96.—*Calculated effects of change in sizes of crush (mill) on the costs and revenue per ton of seed processed for direct-solvent cottonseed oil mills, in mill areas I through VI, 1949–50* [1]

Annual crush (tons)	Size of mill: 24-hour crushing capacity at normal operating rate	Length of season	Cost: Constant: Seed	Cost: Constant: Other [2]	Cost: Constant: Total	Cost: Rising: Seed haul	Cost: Rising: Other [3]	Cost: Rising: Total	Cost: Declining: Plant	Cost: Declining: Labor (including dormant season labor)	Cost: Declining: Other [4]	Cost: Declining: Total	Cost: Total	Processing: Total costs minus seed	Savings in cost: Percentage decrease in processing costs	Savings in cost: Proportion of total savings	Returns: Gross	Returns: Net	Increase in net returns [5]: Increase	Increase in net returns [5]: Proportion of total increase
	Tons	Mo.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Percent	Percent	Dol.	Dol.	Percent	Percent
AREA I																				
10,600	100	4.8	45.248	6.009	51.257	2.410	0.446	2.856	8.228	4.193	4.329	16.750	70.863	25.615	0	0	76.643	5.780	0	0
13,200	100	6.0	45.248	6.009	51,257	2.450	.537	2.987	6.646	3.748	4.202	14.596	68.840	23.592	7.9	24.5	76,373	7.535	30.4	26.7
21,100	100	9.6	45.248	6.009	51.257	2.600	.676	3.276	4.525	3.364	4.058	11.947	66.480	21.232	17.1	53.1	75.719	9.239	59.8	52.5
26,400	200	6.0	45.248	6.009	51.257	2.670	.630	3.300	4.718	2.737	3.662	11.117	65.674	20.426	20.3	63.0	75.839	10.165	75.9	66.6
42,200	200	9.6	45.248	6.009	51.257	2.890	.735	3.625	3.321	2.444	3.372	9.137	64.019	18.771	26.7	82.9	75.384	11.365	96.6	84.8
52,800	200	12.0	45.248	6.009	51.257	3.080	.773	3.853	2.853	2.129	3.224	8.206	63.316	18.068	29.5	91.6	75.046	11.730	102.9	90.3
63,400	400	7.2	45.248	6.009	51.257	3.210	.714	3.924	3.261	2.074	2.866	8.201	63.382	18.134	29.2	90.7	75.550	12.168	110.5	97.0
79,200	400	9.0	45.248	6.009	51.257	3.420	.722	4.142	2.798	2.070	2.705	7.573	62.972	17.724	30.8	95.7	75.334	12.362	113.9	100.0
105,600	400	12.0	45.248	6.009	51.257	3.770	.799	4.569	2.347	1.756	2.695	6.798	62.624	17.376	32.2	100.0	74.912	12.288	112.6	98.9
AREA II																				
10,600	50	9.6	44 420	5.585	50.005	1.390	0.742	2.132	6.573	4.735	4.607	15.915	68.052	23.632	0	0	75.042	6.990	0	0
13,200	50	12.0	44.420	5.585	50.005	1.410	.775	2.185	5.446	4.069	4.571	14.086	66.276	21.856	7.5	21.3	75.119	8.843	26.5	22.1
21,100	100	9.6	44.420	5.585	50.005	1.520	.762	2.282	4.344	3.261	3.995	11.600	63.887	19.467	17.6	50.0	75.042	11.155	59.6	49.7
26,400	100	12.0	44.420	5.585	50.005	1.590	.791	2.381	3.616	2.807	3.888	10.311	62.697	18.277	22.7	64.5	75.119	12.422	77.7	64.8
42,200	200	9.6	44.420	5.585	50.005	2.000	.774	2.774	3.175	2.385	3.295	8.855	61.634	17.214	27.2	77.3	75.042	13.408	91.8	76.6
52,800	200	12.0	44.420	5.585	50.005	2.100	.802	2.902	2.724	2.071	3.139	7.934	60.841	16.421	30.5	86.6	75.119	14.278	104.3	87.0
63,400	300	9.6	44.420	5.585	50.005	2.220	.778	2.998	2.844	2.096	2.865	7.805	60.808	16.388	30.7	87.2	75.042	14.234	103.6	86.4
79,200	300	12.0	44.420	5.585	50.005	2.320	.805	3.125	2.453	1.825	2.725	7.003	60.133	15.713	33.5	95.2	75.119	14.986	114.4	95.4
105,600	400	12.0	44.420	5.585	50.005	2.400	.806	3.206	2.224	1.702	2.608	6.534	59.745	15.325	35.2	100.0	75.119	15.374	119.9	100.0
AREA III																				
10,600	50	9.6	42.026	6.152	48.178	2.250	0.514	2.764	6.453	5.103	5.446	17.002	67.944	25.918	0	0	77.891	9.947	0	0
13,200	100	6.0	42.026	6.152	48.178	2.350	.481	2.831	6.318	3.974	4.928	15.220	66.229	24.203	6.6	24.4	77.885	11.656	17.2	28.3
21,100	100	9.6	42.026	6.152	48.178	2.510	.629	3.139	4.300	3.530	4.881	12.711	64.028	22.002	15.1	55.9	77.431	13.403	34.7	57.2
26,400	200	6.0	42.026	6.152	48.178	2.690	.598	3.288	4.502	2.902	4.401	11.805	63.271	21.245	18.0	66.7	77.410	14.139	42.1	69.4
42,200	200	9.6	42.026	6.152	48.178	3.010	.707	3.717	3.167	2.587	4.203	9.957	61.852	19.826	23.5	87.0	77.120	15.268	53.5	88.1
52,800	200	12.0	42.026	6.152	48.178	3.120	.747	3.867	2.721	2.255	4.127	9.103	61.148	19.122	26.2	97.0	76.841	15.693	57.8	95.2
63,400	400	7.2	42.026	6.152	48.178	3.400	.696	4.096	3.108	2.195	3.636	8.939	61.213	19.187	26.0	96.3	77.194	15.981	60.7	100.0
79,200	400	9.0	42.026	6.152	48.178	3.870	.737	4.607	2.668	2.190	3.527	8.385	61.170	19.144	26.1	96.7	77.052	15.882	59.7	98.4
105,600	400	12.0	42.026	6.152	48.178	4.270	.784	5.054	2.237	1.860	3.606	7.703	60.935	18,909	27.0	100.0	76.716	15.781	58.7	96.7

AREA IV

10,600	50	9.6	44.654	6.276	50.930	2.750	0.443	3.193	6.875	5.732	4.906	17.513	71.636	26.982	0	0	79.576	7.940	0	0
13,200	50	12.0	44.654	6.276	50.930	2.930	.486	3.416	5.710	4.963	4.904	15.577	69.923	25.269	6.3	24.1	79.565	9.642	21.4	30.7
21,100	100	9.6	44.654	6.276	50.930	3.230	.588	3.818	4.582	3.968	4.259	12.809	67.557	22.903	15.1	57.9	78.848	11.291	42.2	60.6
26,400	100	12.0	44.654	6.276	50.930	3.530	.658	4.188	3.769	3.423	4.156	11.348	66.466	21.812	19.2	73.6	78.711	12.245	54.2	77.9
42,200	200	11.0	44.654	6.276	50.930	4.330	.698	5.028	3.379	2.906	3.465	9.750	65.708	21.054	22.0	84.3	78.314	12.606	58.8	84.5
52,800	200	12.0	44.654	6.276	50.930	4.700	.747	5.447	2.903	2.533	3.305	8.741	65.118	20,464	24.2	92.7	78.285	13.167	65.8	94.5
63,400	300	9.6	44.654	6.276	50.930	5,020	.736	5.756	3.046	2.555	2.996	8.597	65.283	20.629	23.5	90.0	78.136	12.853	61.9	88.9
79,200	300	12.0	44.654	6.276	50.930	5.330	.778	6.108	2.627	2.237	2.853	7.717	64.755	20.101	25.5	97.7	78.142	13.387	68.6	98.6
105,600	400	12.0	44.654	6.276	50.930	5.700	.794	6.494	2.385	2.089	2.706	7.180	64.604	19.950	26.1	100.0	78.071	13.467	69.6	100.0

AREA V

10,600	50	9.6	43.972	6.299	50.271	2.760	0.442	3.202	7.925	6.024	4.962	18.911	72.384	28.412	0	0	79.652	7.268	0	0
13,200	50	12.0	43.972	6.299	50.271	2.760	.475	3.235	6.576	5.219	4.929	16.724	70.230	26.258	7.6	21.1	79.687	9.457	30.1	24.6
21,100	100	9.6	43.972	6.299	50.271	2.760	.493	3.253	5.281	4.220	4.281	13.782	67.306	23.334	17.9	49.6	79.396	12.090	66.3	54.1
26,400	100	12.0	43.972	6.299	50.271	2.780	.532	3.312	4.401	3.663	4.160	12.224	65.807	21.835	23.1	64.0	79.403	13.596	87.1	71.0
42,200	200	9.6	43.972	6.299	50.271	2.990	.609	3.599	3.898	3.100	3.469	10.467	64.337	20.365	28.3	78.4	78.814	14.477	99.2	80.9
52,800	200	12.0	43.972	6.299	50.271	3.090	.672	3.762	3.348	2.700	3.293	9.341	63.374	19.402	31.7	87.8	78.696	15.322	110.8	90.4
63,400	300	9.6	43.972	6.299	50.271	3.150	.673	3.823	3.512	2.717	2.995	9.224	63.318	19.346	31.9	88.4	78.488	15.170	108.7	88.7
79,200	300	12.0	43.972	6.299	50.271	3.240	.725	3.965	3.032	2.376	2.869	8.277	62.513	18.541	34.7	96.1	78.434	15.921	119.1	97.1
105,600	400	12.0	43.972	6.299	50.271	3.390	.751	4.141	2.754	2.214	2.743	7.711	62.123	18.151	36.1	100.0	78.303	16.180	122.6	100.0

AREA VI

10,600	50	9.6	49.866	3.838	53.704	1.520	1.453	2.973	7.509	8.769	5.097	21.375	78.052	28.186	0	0	81.627	3.575	0	0
13,200	50	12.0	49.866	3.838	53.704	1.530	1.703	3.233	6.226	7.633	5.073	18.932	75.869	26.003	7.7	20.3	81.951	6.082	70.1	22.1
21,100	100	9.6	49.866	3.838	53,704	1.550	2.007	3.557	4.994	6.280	4.353	15.627	72.888	23.022	18.3	48.2	82.107	9.219	157.9	49.7
26,400	100	12.0	49.866	3.838	53.704	1.580	2.146	3.726	4.160	5.488	4.249	13.897	71.327	21.461	23.9	62.9	82.335	11.008	207.9	65.5
42,200	200	9.6	49.866	3.838	53.704	1.730	2.285	4.015	3.688	4.780	3.555	12.023	69.742	19.876	29.5	77.6	82.347	12.605	252.6	79.6
52,800	200	12.0	49.866	3.838	53.704	1.920	2.369	4.289	3.167	4.224	3.395	10.786	68.779	18.913	32.9	86.6	82.527	13.748	284.6	89.7
63,400	300	9.6	49.866	3.838	53.704	2.020	2.380	4.400	3.327	4.280	3.094	10.701	68.805	18.939	32.8	86.3	82.336	13.531	278.5	87.7
79,200	300	12.0	49.866	3.838	53.704	2.150	2.451	4.601	2.868	3.707	2.929	9.504	67.809	17.943	36.3	95.5	82.359	14.550	307.0	96.7
105,600	400	12.0	49.866	3.838	53.704	2.310	2.493	4.803	2.603	3.438	2.781	8.822	67.329	17.463	38.0	100.0	82.251	14.922	317.4	100.0

[1] Most profitable plant used for each specified crush, based on tables 98 through 103.
[2] Includes: Linter bags and ties; linter room expense; repairs; seed unloading labor; lubrication and cleaning; hexane; fuel oil; and miscellaneous mill expense for all areas. Also includes seed buyers and meal bags for Areas I through V. In Area VI no seed buyers were required.
[3] Includes: Brokerage fees and insurance on stocks for all areas. Also includes meal bags for Area VI.
[4] Includes: Salaries; office; travel and auto; electric power; water; laboratory service; social security; workmen's compensation; and general liability for all areas.
[5] Smallest crush (mill) = base.

TABLE 97.—*Calculated effects of change in sizes of crush (mill) on the costs and revenue per ton of seed processed for prepress-solvent cottonseed oil mills, in mill areas I through VI, 1949–50* [1]

Annual crush (tons)	Size of mill: 24-hour crushing capacity at normal operating rate	Length of season	Cost: Constant: Seed	Cost: Constant: Other [2]	Cost: Constant: Total	Cost: Rising: Seed haul	Cost: Rising: Other [3]	Cost: Rising: Total	Cost: Declining: Plant	Cost: Declining: Labor (including dormant season labor)	Cost: Declining: Other [4]	Cost: Declining: Total	Cost: Total	Processing: Total costs minus seed	Savings in cost: Percentage decrease in processing cost	Savings in cost: Proportion of total savings	Returns: Gross	Returns: Net	Increase in net returns [5]: Increase	Increase in net returns [5]: Proportion of total increase
	Tons	*Mo.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Percent*	*Percent*	*Dol.*	*Dol.*	*Percent*	*Percent*
AREA I																				
10,600	80	6.0	45.248	5.599	50.847	2.410	0.492	2.902	7.551	4.597	4.581	16.729	70.478	25.230	0	0	77.397	6.919	0	0
13,200	80	7.5	45.248	5.599	50.847	2.450	.573	3.023	6.161	4.160	4.535	14.856	68.726	23.478	6.9	22.4	77.151	8.425	21.8	25.0
21,100	160	6.0	45.248	5.599	50.847	2.600	.608	3.208	5.389	3.205	4.038	12.632	66.687	21.439	15.0	48.7	76.727	10.040	45.1	51.7
26,400	160	7.5	45.248	5.599	50.847	2.670	.666	3.336	4.485	2.918	3.967	11.370	65.553	20.305	19.5	63.3	76.615	11.062	59.9	68.7
42,200	160	12.0	45.248	5.599	50.847	2.890	.762	3.652	3.188	2.487	3.674	9.349	63.848	18.600	26.3	85.4	75.858	12.010	73.6	84.4
52,800	240	10.0	45.248	5.599	50.847	3.080	.755	3.835	3.209	2.447	3.363	9.019	63.701	18.453	26.9	87.3	75.999	12.298	77.7	89.1
63,400	240	12.0	45.248	5.599	50.847	3.210	.783	3.993	2.822	2.176	3.240	8.238	63.078	17.830	29.3	95.1	75.745	12.667	83.1	95.3
79,200	400	9.0	45.248	5.599	50.847	3.420	.756	4.176	3.038	2.197	2.886	8.121	63.144	17.896	29.1	94.5	76.085	12.941	87.0	99.8
105,600	400	12.0	45.248	5.599	50.847	3.770	.801	4.571	2.529	1.858	2.903	7.290	62.708	17.460	30.8	100.0	75.657	12.949	87.2	100.0
AREA II																				
10,600	80	6.0	44.420	5.175	49.595	1.390	0.678	2.068	7 309	4.491	4.534	16.334	67.997	23.577	0	0	75.509	7.512	0	0
13,200	80	7.5	44.420	5.175	49.595	1.410	.719	2.129	5.959	4.068	4.473	14.500	66.224	21.804	7.5	21.6	75.794	9.570	27.4	23.9
21,100	80	12.0	44.420	5.175	49.595	1.520	.788	2.308	4.107	3.435	4.305	11.847	63.750	19.330	18.0	51.7	75.937	12.187	62.2	54.2
26,400	160	7.5	44.420	5.175	49.595	1.590	.735	2.325	4.301	2.850	3.884	11.035	62.955	18.535	21.4	61.5	75.794	12.839	79.9	69.6
42,200	160	12.0	44.420	5.175	49.595	2.000	.800	2.800	3.050	2.429	3.597	9.076	61.471	17.051	27.7	79.6	75.937	14.466	92.6	80.7
52,800	240	10.0	44.420	5.175	49.595	2.100	.785	2.885	3.052	2.392	3.263	8.707	61.187	16.767	28.9	83.0	75.844	14.657	95.1	82.8
63,400	240	12.0	44.420	5.175	49.595	2.220	.804	3.024	2.683	2.121	3.132	7.936	60.555	16.135	31.6	90.8	75.937	15.382	104.8	91.3
79,200	400	9.0	44.420	5.175	49.595	2.320	.772	3.092	2.878	2.147	2.813	7.838	60.525	16.105	31.7	91.1	75.880	15.355	104.4	90.9
105,600	400	12.0	44.420	5.175	49.595	2.400	.808	3.208	2.397	1.807	2.792	6.996	59.799	15.379	34.8	100.0	75.937	16.138	114.8	100.0
AREA III																				
10,600	80	6.0	42.026	5.742	47.768	2.250	0.454	2.704	7.197	4.850	5.504	17.551	68.023	25.997	0	0	78.764	10.741	0	0
13,200	80	7.5	42.026	5.742	47.768	2.350	.516	2.866	5.872	4.405	5.499	15.776	66.410	24.384	6.2	23.7	78.735	12.325	14.7	28.3
21,100	160	6.0	42.026	5.742	47.768	2.510	.568	3.078	5.144	3.395	4.970	13.509	64.355	22.329	14.1	53.8	78.312	13.957	29.9	57.6
26,400	160	7.5	42.026	5.742	47.768	2.690	.631	3.321	4.281	3.090	4.934	12.305	63.394	21.368	17.8	67.9	78.267	14.873	38.5	74.2
42,200	160	12.0	42.026	5.742	47.768	3.010	.733	3.743	3.042	2.632	4.770	10.444	61.955	19.929	23.3	88.9	77.674	15.719	46.3	89.2
52,800	240	10.0	42.026	5.742	47.768	3.120	.731	3.851	3.053	2.587	4.407	10.047	61.666	19.640	24.5	93.5	77.779	16.113	50.0	96.3
63,400	240	12.0	42.026	5.742	47.768	3.400	.760	4.160	2.684	2.303	4.341	9.328	61.256	19.230	26.0	99.2	77.569	16.313	51.9	100.0
79,200	400	9.0	42.026	5.742	47.768	3.870	.740	4.610	2.894	2.324	3.929	9.147	61.525	19.499	25.0	95.4	77.830	16.305	51.8	99.8
105,600	400	12.0	42.026	5.742	47.768	4.270	.785	5.055	2.410	1.958	4.008	8.386	61.209	19.183	26.2	100.0	77.486	16.277	51.5	99.2

AREA IV

10,600	80	6.0	44.654	5.866	50.520	2.750	0.378	3.128	7.668	5.450	4.838	17.956	71.604	26.950	0	0	79.992	8.388	0	0
13,200	80	7.5	44.654	5.866	50.520	2.930	.429	3.359	6.256	4.962	4.787	16.005	69.884	25.230	6.4	24.5	80.205	10.321	23.0	33.1
21,100	80	12.0	44.654	5.866	50.520	3.230	.616	3.846	4.323	4.168	4.632	13.123	67.489	22.835	15.3	58.6	79.733	12.244	46.0	66.2
26,400	160	7.5	44.654	5.866	50.520	3.530	.599	4.129	4.562	3.474	4.082	12.118	66.767	22.113	17.9	68.6	79.351	12.584	50.0	71.9
42,200	160	12.0	44.654	5.866	50.520	4.330	.726	5.056	3.243	2.956	3.767	9.966	65.542	20.888	22.5	86.2	79.199	13.657	62.8	90.4
52,800	240	10.0	44.654	5.866	50.520	4.700	.729	5.429	3.257	2.904	3.410	9.571	65.520	20.866	22.6	86.6	79.003	13.483	60.7	87.3
63,400	240	12.0	44.654	5.866	50.520	5.020	.745	5.765	2.863	2.586	3.279	8.728	65.013	20.359	24.5	93.9	79.021	14.008	67.0	96.4
79,200	400	9.0	44.654	5.866	50.520	5.330	.743	6.073	3.085	2.608	2.900	8.593	65.186	20.532	23.8	91.2	78.880	13.694	63.3	91.1
105,600	400	12.0	44.654	5.866	50.520	5.700	.796	6.496	2.570	2.209	2.865	7.644	64.660	19.906	26.1	100.0	78.879	14.219	69.5	100.0

AREA V

10,600	80	6.0	43.972	5.889	49.861	2.760	0.379	3.139	8.845	5.728	4.838	19.411	72.411	28.439	0	0	80.069	7.658	0	0
13,200	80	7.5	43.972	5.889	49.861	2.760	.418	3.178	7.216	5.219	4.796	17.231	70.270	26.298	7.5	21.0	80.330	10.060	31.4	26.1
21,100	80	12.0	43.972	5.889	49.861	2.760	.519	3.279	4.988	4.429	4.600	14.017	67.157	23.185	18.5	51.8	80.286	13.129	71.4	58.6
26,400	160	7.5	43.972	5.889	49.861	2.780	.475	3.255	5.265	3.715	4.081	13.061	66.177	22.205	21.9	61.3	80.045	13.868	81.1	67.5
42,200	160	12.0	43.972	5.889	49.861	2.990	.635	3.625	3.743	3.152	3.756	10.651	64.137	20.165	29.1	81.5	79.704	15.567	103.3	86.0
52,800	240	10.0	43.972	5.889	49.861	3.090	.655	3.745	3.759	3.088	3.405	10.252	63.858	19.886	30.1	84.3	79.417	15.559	103.2	85.9
63,400	240	12.0	43.972	5.889	49.861	3.150	.700	3.850	3.259	2.747	3.292	9.298	63.009	19.037	33.1	92.7	79.378	16.369	113.8	94.8
79,200	400	9.0	43.972	5.889	49.861	3.240	.692	3.932	3.561	2.765	2.914	9.240	63.033	19.061	33.0	92.4	79.176	16.143	110.8	92.3
105,600	400	12.0	43.972	5.889	49.861	3.390	.753	4.143	2.968	2.340	2.946	8.254	62.258	18.286	35.7	100.0	79.115	16.857	120.1	100.0

AREA VI

10,600	80	6.0	49.866	3.428	53.294	1.520	1.384	2.904	8.349	8.319	4.940	21.608	77.806	27.940	0	0	81.971	4.165	0	0
13,200	80	7.5	49.866	3.428	53.294	1.530	1.643	3.173	6.810	7.630	4.894	19.334	75.801	25.935	7.2	19.5	82.490	6.689	60.6	22.2
21,100	80	12.0	49.866	3.428	53.294	1.550	2.038	3.588	4.701	6.598	4.744	16.043	72.925	23.059	17.5	47.4	83.026	10.101	142.5	52.2
26,400	160	7.5	49.866	3.428	53.294	1.580	2.086	3.666	4.972	5.565	4.180	14.717	71.677	21.811	21.9	59.3	82.874	11.197	168.8	61.8
42,200	160	12.0	49.866	3.428	53.294	1.730	2.316	4.046	3.531	4.857	3.860	12.248	69.588	19.722	29.4	79.7	83 266	13.678	228.4	83.6
52,800	240	10.0	49.866	3.428	53.294	1.920	2.452	4.372	3.562	4.813	3.510	11.885	69.551	19.685	29.5	79.9	83.172	13.621	227.0	83.1
63,400	240	12.0	49.866	3.428	53.294	2.020	2.412	4.432	3.128	4.326	3.374	10.828	68.554	18.688	33.1	89.7	83.255	14.701	253.0	92.6
79,200	400	9.0	49.866	3.428	53.294	2.150	2.417	4.567	3.375	4.296	2.996	10.667	68.528	18.662	33.2	90.0	83.018	14.490	247.9	90.7
105,600	400	12.0	49.866	3.428	53.294	2.310	2.496	4.806	2.806	3.628	2.961	9.395	67.495	17.629	36.9	100.0	83.038	15.543	273.2	100.0

[1] Most profitable plant used for each specified crush based on tables 98 through 103.

[2] Includes: Linter bags and ties; linter room expeuse; seed unloading labor; lubrication and cleaning; hexane; fuel oil; and miscellaneous mill expense for all areas. Also includes seed buyers and meal bags for Areas I through V. In Arca VI no seed buyers were required.

[3] Includes: Brokerage fees and insurance on stocks for all areas. Area VI also includes meal bags.

[4] Includes: Salaries; office; travel and auto; electric power; water; laboratory service; social security; workmen's compensation; and general liability for all areas.

[5] Smallest crush (mill) = base.

TABLE 98.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area I, 1949–50*

Mill	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 10,600 TONS																				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																				
Plant 1	40	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	2.410	2.344	0.221	0.232	5.207	0.625	0.320		0.244	1.189
Plant 2**	80	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.625	.320		.244	1.189
Direct solvent:																				
Plant 1	50	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.875	.480		.244	1.599
Plant 2*	100	4.8	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.875	.480		.244	1.599
Screw press:																				
2 press	50	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.250			.934	1.184
3 press*	75	6.4	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.250			.934	1.184
Hydraulic:																				
4 press	40	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.250		0.690	.244	1.184
6 press*	60	8.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.250		.690	.244	1.184
8 press	80	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.410	2.344	.221	.232	5.207	.250		.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1	50	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	2.450	2.280	0.213	0.226	5.169	0.875	0.480		0.244	1.599
Plant 2*	100	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.875	.480		.244	1.599
Prepress solvent: Plant 2**	80	7.5	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.625	.320		.244	1.189
Screw press:																				
2 press	50	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.250			.934	1.184
3 press*	75	8.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.250			.934	1.184
4 press	100	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.250			.934	1.184
Hydraulic:																				
6 press	60	10.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.250		0.690	.244	1.184
8 press*	80	7.5	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.450	2.280	.213	.226	5.169	.250		.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																				
Prepress solvent:																				
Plant 2	80	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	2.600	2.095	0.192	0.205	5.092	0.625	0.320		0.244	1.189
Plant 3**	160	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.625	.320		.244	1.189
Direct solvent: Plant 2*	100	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.875	.480		.244	1.599
Screw press:																				
4 press	100	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.250			.934	1.184
5 press*	125	7.7	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.250			.934	1.184
Hydraulic:																				
8 press	80	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.250		0.690	.244	1.184
10 press	100	9.6	45.248	.400	.356	.291	1.350	.097	.055	47.792	2.600	2.095	.192	.205	5.092	.250		.690	.244	1.184
12 press*	120	8.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.600	2.095	.192	.205	5.092	.250		.690	.244	1.184

ANNUAL CRUSH: 26,400 TONS																				
Direct solvent:																				
Plant 2	100	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	2.670	1.979	0.180	0.192	5.021	0.875	0.480	------	0.244	1.599
Plant 3*	200	6.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.875	.480	------	.244	1.599
Prepress solvent: Plant 3**	160	7.5	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.625	.320	------	.244	1.189
Screw press:																				
4 press*	100	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.250	------	------	.934	1.184
5 press	125	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.250	------	------	.934	1.184
Hydraulic:																				
10 press*	100	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.250	------	0.690	.244	1.184
12 press	120	10.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.670	1.979	.180	.192	5.021	.250	------	.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3**	160	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	2.890	1.680	0.147	0.157	4.874	0.625	0.320	------	0.244	1.189
Direct solvent: Plant 3*	200	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.875	.480	------	.244	1.599
Screw press:																				
7 press	175	11.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.250	------	------	.934	1.184
8 press*	200	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.250	------	------	.934	1.184
Hydraulic:																				
16 press	160	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.250	------	0.690	.244	1.184
24 press	220	8.7	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.250	------	.690	.244	1.184
24 press*	240	8.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	2.890	1.680	.147	.157	4.874	.250	------	.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																				
Direct solvent: Plant 3*	200	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	3.080	1.515	0.129	0.137	4.861	0.875	0.480	------	0.244	1.599
Prepress solvent: Plant 4**	240	10.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.625	.320	------	.244	1.189
Screw press:																				
8 press*	200	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.250	------	------	.934	1.184
10 press	250	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.250	------	------	.934	1.184
Hydraulic:																				
20 press	200	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.250	------	0.690	.244	1.184
22 press	220	10.9	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.250	------	.690	.244	1.184
24 press*	240	10.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.080	1.515	.129	.137	4.861	.250	------	.690	.244	1.184
ANNUAL CRUSH: 63,400 TONS																				
Prepress solvent: Plant 4**	240	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	3.210	1.380	0.116	0.119	4.825	0.625	0.320	------	0.244	1.189
Direct solvent:																				
Plant 4	300	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.210	1.380	.116	.119	4.825	.875	.480	------	.244	1.599
Plant 5*	400	7.2	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.210	1.380	.116	.119	4.825	.875	.480	------	.244	1.599
Screw press:																				
10 press*	250	11.5	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.210	1.380	.116	.119	4.825	.250	------	------	.934	1.184
12 press	300	9.6	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.210	1.380	.116	.119	4.825	.250	------	------	.934	1.184
Hydraulic: 24 press*	240	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.210	1.380	.116	.119	4.825	.250	------	0.690	.244	1.184

See footnote at end of table.

TABLE 98.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area I, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																				
Plant 4	300	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	3.420	1.231	0.102	0.098	4.851	0.875	0.480	--------	0.244	1.599
Plant 5*	400	9.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.875	.480	--------	.244	1.599
Prepress solvent: Plant 5**	400	9.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.625	.320	--------	.244	1.189
Screw press:																				
12 press*	300	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.250	--------	--------	.934	1.184
14 press	350	10.3	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.250	--------	--------	.934	1.184
Hydraulic:																				
30 press	300	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.250	--------	0.690	.244	1.184
36 press	360	10.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.250	--------	.690	.244	1.184
40 press*	400	9.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.420	1.231	.102	.098	4.851	.250	--------	.690	.244	1.184

ANNUAL CRUSH: 105,600 TONS

Mill	Seed crushed per 24 hours	Length of season	Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
Prepress solvent: Plant 5**	400	12.0	45.248	0.400	0.356	0.291	1.350	0.097	0.050	47.792	3.770	1.170	0.095	0.074	5.109	0.625	0.320	--------	0.214	1.189
Direct solvent: Plant 5*	400	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.770	1.170	.095	.074	5.109	.875	.480	--------	.244	1.599
Screw press: 16 press*	400	12.0	45.248	.400	.356	.291	1.350	.097	.050	17.792	3.770	1.170	.095	.074	5.109	.250	--------	--------	.934	1.184
Hydraulic: 40 press*	400	12.0	45.248	.400	.356	.291	1.350	.097	.050	47.792	3.770	1.170	.095	.074	5.109	.250	--------	0.690	.244	1.184

Mill	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
ANNUAL CRUSH: 10,600 TONS																			
Prepress solvent:																			
Plant 1	2.645	2.889	0.901	0.321	6.756	5.160	0.469		1.274	0.058	1.866	0.388	0.346	0.240	0.363	0.198	0.004	17.122	17.122
Plant 2**	2.981	3.215	1.003	.352	7.551	3.096	.469	1.032	1.039	.047	1.866	.298	.346	.146	.270	.127	.003	16.290	15.258
Direct solvent:																			
Plant 1	2.649	2.872	.896	.348	6.765	3.715	.469	.654	.992	.069	1.866	.352	.345	.214	.298	.148	.003	15.890	15.236
Plant 2*	3.251	3.478	1.085	.414	8.228	2.477	.469	1.247	.846	.057	1.866	.279	.345	.101	.242	.106	.002	16.265	15.018
Screw press:																			
2 press	2.271	2.494	.778	.234	5.777	3.110	.437	.551	1.305	.020	1.866	.349	.340	.213	.269	.120	.003	14.360	13.809
3 press*	2.475	2.704	.844	.245	6.268	2.592	.439	.753	1.215	.018	1.866	.287	.340	.148	.246	.103	.002	14.277	13.524
Hydraulic:																			
4 press	2.203	2.434	.763	.235	5.635	4.560	.405		1.097	.008	1.866	.385	.339	.239	.333	.166	.004	15.037	15.037
6 press*	2.375	2.611	.815	.230	6.031	3.648	.405	.608	.943	.008	1.866	.324	.339	.192	.292	.136	.003	14.795	14.187
8 press	2.481	2.706	.844	.243	6.274	3.192	.405	1.064	.868	.008	1.866	.294	.339	.145	.272	.121	.003	14.851	13.787
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1	2.183	2.387	0.745	0.297	5.612	3.715	0.445		1.039	0.068	1.866	0.352	0.391	0.240	0.294	0.148	0.003	14.173	14.173
Plant 2*	2.619	2.812	.877	.338	6.646	2.477	.445	0.826	.805	.054	1.866	.279	.391	.146	.238	.105	.002	14.280	13.454
Prepress solvent: Plant 2**	2.421	2.627	.820	.293	6.161	3.096	.445	.619	1.076	.047	1.866	.298	.392	.181	.266	.126	.003	14.576	13.957
Screw press:																			
2 press	1.876	2.080	.649	.206	4.811	3.110	.415		1.371	.020	1.866	.349	.387	.239	.266	.119	.003	12.956	12.956
3 press*	2.045	2.243	.700	.213	5.201	2.592	.417	.429	1.240	.018	1.866	.287	.387	.192	.242	.102	.002	12.975	12.546
4 press	2.298	2.490	.777	.225	5.790	2.203	.415	.713	1.131	.016	1.866	.277	.387	.145	.225	.090	.002	13.260	12.547
Hydraulic:																			
6 press	1.935	2.141	.668	.206	4.950	3.648	.384	.547	.979	.008	1.866	.324	.385	.221	.288	.135	.003	13.738	13.191
8 press*	2.021	2.219	.692	.206	5.138	3.192	.384	.638	.901	.008	1.866	.294	.385	.179	.268	.121	.003	13.377	12.739
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2	1.644	1.822	0.569	0.221	4.256	3.096	0.410		1.158	0.047	1.866	0.298	0.462	0.241	0.256	0.125	0.003	12.218	12.218
Plant 3**	2.131	2.290	.715	.253	5.389	2.107	.410	0.688	.952	.037	1.866	.252	.462	.146	.212	.091	.002	12.614	11.926
Direct solvent: Plant 2*	1.757	1.922	.600	.246	4.525	2.477	.410	.477	.898	.054	1.866	.279	.461	.215	.229	.104	.002	11.997	11.520
Screw press:																			
4 press	1.552	1.717	.536	.175	3.980	2.203	.382	.389	1.228	.016	1.866	.277	.456	.214	.215	.088	.002	11.316	10.927
5 press*	1.773	1.922	.600	.188	4.483	1.920	.381	.348	1.148	.015	1.866	.265	.456	.185	.202	.079	.002	11.350	11.002
Hydraulic:																			
8 press	1.394	1.568	.489	.167	3.618	3.192	.353		1.002	.008	1.866	.294	.455	.240	.258	.119	.003	11.408	11.408
10 press	1.510	1.681	.524	.172	3.887	2.918	.353	.517	.933	.008	1.866	.276	.455	.214	.246	.111	.002	11.786	11.269
12 press*	1.703	1.851	.580	.182	4.316	2.584	.353	.433	.875	.008	1.866	.264	.455	.145	.231	.100	.002	11.632	11.199

See footnote at end of table.

TABLE 98.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area I, 1949–50*—Continued

ANNUAL CRUSH: 26,400 TONS

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																			
Plant 2	1.452	1.606	0.501	0.211	3.770	2.477	0.398	----------	0.954	0.054	1.866	0.279	0.484	0.241	0.220	0.103	0.002	10.848	10.848
Plant 3*	1.857	1.997	.623	.241	4.718	1.754	.398	0.585	.758	.043	1.866	.243	.484	.146	.187	.078	.002	11.262	10.677
Prepress solvent: Plant 3**	1.760	1.910	.596	.219	4.485	2.107	.398	.413	1.027	.038	1.866	.252	.485	.181	.206	.091	.002	11.551	11.138
Screw press:																			
4 press*	1.293	1.446	.451	.155	3.345	2.203	.371	----------	1.280	.016	1.866	.277	.479	.240	.209	.088	.002	10.376	10.376
5 press	1.480	1.625	.507	.169	3.781	1.920	.370	.340	1.197	.015	1.866	.265	.479	.214	.196	.079	.002	10.724	10.384
Hydraulic:																			
10 press*	1.255	1.413	.441	.152	3.261	2.918	.343	----------	.988	.008	1.866	.276	.478	.240	.240	.110	.002	10.730	10.730
12 press	1.423	1.574	.491	.165	3.653	2.584	.343	.388	.914	.008	1.866	.264	.478	.221	.225	.099	.002	11.045	10.657
ANNUAL CRUSH: 42,200 TONS																			
Prepress solvent: Plant 3**	1.225	1.366	0.426	0.171	3.188	2.107	0.380	----------	1.117	0.037	1.866	0.252	0.520	0.242	0.192	0.090	0.002	9.993	9.993
Direct solvent: Plant 3*	1.282	1.414	.441	.184	3.321	1.754	.380	0.310	.846	.043	1.866	.243	.519	.216	.176	.078	.002	9.754	9.444
Screw press:																			
7 press	1.179	1.314	.410	.145	3.048	1.701	.355	.146	1.188	.014	1.866	.246	.514	.230	.172	.071	.002	9.553	9.407
8 press*	1.227	1.360	.424	.146	3.157	1.620	.354	.284	1.176	.013	1.866	.241	.514	.215	.169	.068	.002	9.679	9.395
Hydraulic:																			
16 press	1.098	1.238	.386	.141	2.863	2.394	.327	----------	.963	.007	1.866	.249	.513	.241	.202	.092	.002	9.719	9.719
22 press	1.250	1.388	.433	.147	3.218	2.242	.327	.486	.850	.007	1.866	.237	.513	.202	.196	.088	.002	10.234	9.748
24 press*	1.290	1.424	.444	.146	3.304	2.128	.327	.357	.812	.007	1.866	.234	.513	.176	.190	.084	.002	10.000	9.643
ANNUAL CRUSH: 52,800 TONS																			
Direct solvent: Plant 3*	1.088	1.219	0.380	0.166	2.853	1.754	0.375	----------	0.910	0.043	1.866	0.243	0.530	0.243	0.168	0.077	0.002	9.064	9.064
Prepress solvent: Plant 4**	1.240	1.373	.428	.168	3.209	1.806	.374	0.267	1.061	.032	1.866	.237	.531	.224	.171	079	.002	9.859	9.592
Screw press:																			
8 press*	1.046	1.179	.368	.135	2.728	1.620	.348	----------	1.237	.013	1.866	.241	.526	.242	.161	.068	.002	9.052	9.052
10 press	1.165	1.296	.404	.140	3.005	1.555	.348	.284	1.170	.013	1.866	.235	.526	.216	.158	.066	.001	9.443	9.159
Hydraulic:																			
20 press	1.023	1.158	.361	.134	2.676	2.371	.322	----------	.945	.007	1.866	.240	.524	.242	.194	.091	.002	9.479	9.479
22 press	1.054	1.186	.370	.134	2.744	2.242	.322	.205	.889	.007	1.866	.237	.524	.230	.188	.087	.002	9.543	9.338
24 press*	1.094	1.227	.383	.135	2.839	2.128	.322	.319	.886	.007	1.866	.234	.524	.224	.183	.084	.002	9.618	9.299

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	1.079	1.211	0.378	0.154	2.822	1.806	0.370	----------	1.111	0.032	1.866	0.237	0.539	0.244	0.164	0.079	0.002	9.272	9.272
Direct solvent:																			
Plant 4	1.153	1.279	.399	.166	2.997	1.514	.371	0.267	.836	.038	1.866	.231	.538	.217	.151	.069	.001	9.096	9.363
Plant 5*	1.268	1.389	.433	.171	3.261	1.393	.371	.310	.778	.036	1.866	.225	.538	.176	.146	.065	.001	9.166	8.856
Screw press:																			
10 press*	1.020	1.152	.359	.132	2.663	1.555	.345	.065	1.221	.013	1.866	.235	.534	.237	.152	.066	.001	8.953	8.888
12 press	1.157	1.285	.401	.141	2.984	1.450	.345	.259	1.166	.012	1.866	.229	.534	.216	.147	.062	.001	9.271	9.012
Hydraulic: 24 press*	.957	1.090	.340	.126	2.513	2.128	.318	----------	.940	.007	1.866	.234	.532	.243	.177	.083	.002	9.043	9.043

ANNUAL CRUSH: 79,200 TONS

Direct solvent:																			
Plant 4	0.981	1.108	0.346	0.151	2.586	1.514	0.367	----------	0.899	0.038	1.866	0.231	0.546	0.244	0.144	0.069	0.001	8.505	8.505
Plant 5*	1.074	1.196	.373	.155	2.798	1.393	.367	0.310	.809	.035	1.866	.225	.546	.176	.139	.065	.001	8.730	8.420
Prepress solvent: Plant 5**	1.175	1.300	.406	.157	3.038	1.496	.366	.335	.989	.028	1.866	.225	.547	.209	.144	.068	.001	9.312	8.977
Screw press:																			
12 press*	.984	1.113	.347	.130	2.574	1.450	.341	----------	1.225	.012	1.866	.229	.541	.244	.140	.062	.001	8.685	8.685
14 press	1.063	1.190	.371	.134	2.758	1.409	.342	.186	1.225	.011	1.866	.227	.541	.226	.139	.061	.001	8.992	8.806
Hydraulic:																			
30 press	.992	1.125	.351	.132	2.600	2.128	.315	----------	.934	.006	1.866	.228	.540	.244	.170	.083	.002	9.116	9.116
36 press	1.068	1.200	.374	.135	2.777	2.029	.315	.304	.875	.006	1.866	.224	.540	.224	.165	.080	.002	9.407	9.103
40 press*	1.106	1.233	.385	.134	2.858	1.915	.315	.427	.843	.006	1.866	.222	.540	.208	.160	.076	.002	9.438	9.011

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5**	0.961	1.088	0.339	0.141	2.529	1.496	0.362	----------	1.101	0.028	1.866	0.225	0.555	0.246	0.141	0.068	0.001	8.618	8.618
Direct solvent: Plant 5*	.884	1.009	.315	.139	2.347	1.393	.363	----------	.895	.035	1.866	.225	.553	.246	.136	.064	.001	8.124	8.124
Screw press: 16 press*	.922	1.050	.328	.125	2.425	1.345	.337	----------	1.221	.011	1.866	.222	.549	.246	.133	.058	.001	8.414	8.414
Hydraulic: 40 press*	.906	1.035	.323	.124	2.388	1.915	.311	----------	.929	.006	1.866	.222	.548	.245	.157	.076	.002	8.665	8.665

See footnote at end of table.

TABLE 98.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area I, 1949–50*—Continued

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
ANNUAL CRUSH: 10,600 TONS											
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:											
Plant 1	40	12.0	71.310	71.310	39.810	26.140	8.000	2.913	76.863	5.553	5.553
Plant 2**	80	6.0	70.478	69.446	40.344	26.140	8.000	2.913	77.397	7.951	6.919
Direct solvent:											
Plant 1	50	9.6	70.488	69.834	39.033	26.140	8.000	2.945	76.118	6.284	5.630
Plant 2*	100	4.8	70.863	69.616	39.558	26.140	8.000	2.945	76.643	7.027	5.780
Screw press:											
2 press	50	9.6	68.543	67.992	36.290	26.140	8.000	3.071	73.501	5.509	4.958
3 press*	75	6.4	68.460	67.707	36.517	26.140	8.000	3.071	73.728	6.021	5.268
Hydraulic:											
4 press	40	12.0	69.220	69.220	35.130	26.140	8.000	3.109	72.379	3.159	3.159
6 press*	60	8.0	68.978	68.370	35.580	26.140	8.000	3.109	72.829	4.459	3.851
8 press	80	6.0	69.034	67.970	35.602	26.140	8.000	3.109	72.851	4.881	3.817
ANNUAL CRUSH: 13,200 TONS											
Direct solvent:											
Plant 1	50	12.0	68.733	68.733	39.033	25.964	8.000	2.853	75.850	7.117	7.117
Plant 2*	100	6.0	68.840	68.014	39.558	25.964	8.000	2.853	76.375	8.361	7.535
Prepress solvent: Plant 2**	80	7.5	68.726	68.107	40.366	25.964	8.000	2.821	77.151	9.044	8.425
Screw press:											
2 press	50	12.0	67.101	67.101	36.039	25.964	8.000	2.979	72.982	5.881	5.881
3 press*	75	8.0	67.120	66.691	36.501	25.964	8.000	2.979	73.444	6.753	6.324
4 press	100	6.0	67.405	66.692	36.524	25.964	8.000	2.979	73.467	6.775	6.062
Hydraulic:											
6 press	60	10.0	67.883	67.336	35.314	25.964	8.000	3.017	72.295	4.959	4.412
8 press*	80	7.5	67.522	66.884	35.621	25.964	8.000	3.017	72.602	5.718	5.080
ANNUAL CRUSH: 21,100 TONS											
Prepress solvent:											
Plant 2	80	12.0	66.291	66.291	39.810	25.700	8.000	2.683	76.193	9.902	9.902
Plant 3**	160	6.0	66.687	65.999	40.344	25.700	8.000	2.683	76.727	10.728	10.040
Direct solvent: Plant 2*	100	9.6	66.480	66.003	39.304	25.700	8.000	2.715	75.719	9.716	9.239
Screw press:											
4 press	100	9.6	65.384	64.995	36.290	25.700	8.000	2.841	72.831	7.836	7.447
5 press*	125	7.7	65.418	65.070	36.517	25.700	8.000	2.841	73.058	7.988	7.640
Hydraulic:											
8 press	80	12.0	65.476	65.476	35.130	25.700	8.000	2.879	71.709	6.233	6.233
10 press	100	9.6	65.854	65.337	35.374	25.700	8.000	2.879	71.953	6.616	6.099
12 press*	120	8.0	65.700	65.267	35.580	25.700	8.000	2.879	72.159	6.892	6.459

ANNUAL CRUSH: 26,400 TONS											
Direct solvent:											
Plant 2	100	12.0	65.260	65.260	39.033	25.612	8.000	2.669	75.314	10.054	10.054
Plant 3*	200	6.0	65.674	65.089	39.558	25.612	8.000	2.669	75.839	10.750	10.165
Prepress solvent: Plant 3**	160	7.5	65.553	65.140	40.366	25.612	8.000	2.637	76.615	11.475	11.062
Screw press:											
4 press*	100	12.0	64.373	64.373	36.039	25.612	8.000	2.795	72.446	8.073	8.073
5 press	125	9.6	64.721	64.381	36.290	25.612	8.000	2.795	72.697	8.316	7.976
Hydraulic:											
10 press*	100	12.0	64.727	64.727	35.130	25.612	8.000	2.833	71.575	6.848	6.848
12 press	120	10.0	65.042	64.654	35.314	25.612	8.000	2.833	71.759	7.105	6.717
ANNUAL CRUSH: 42,200 TONS											
Prepress solvent: Plant 3**	160	12.0	63.848	63.848	39.810	25.480	8.000	2.568	75.858	12.010	12.010
Direct solvent: Plant 3*	200	9.6	64.019	63.709	39.304	25.480	8.000	2.600	75.384	11.675	11.365
Screw press:											
7 press	175	11.0	63.403	63.257	36.111	25.480	8.000	2.726	72.317	9.060	8.914
8 press*	200	9.6	63.529	63.245	36.290	25.480	8.000	2.726	72.496	9.251	8.967
Hydraulic:											
16 press	160	12.0	63.569	63.569	35.130	25.480	8.000	2.764	71.374	7.805	7.805
22 press	220	8.7	64.084	63.598	35.491	25.480	8.000	2.764	71.735	8.137	7.651
24 press*	240	8.0	63.850	63.493	35.580	25.480	8.000	2.764	71.824	8.331	7.974
ANNUAL CRUSH: 52,800 TONS											
Direct solvent: Plant 3*	200	12.0	63.316	63.316	39.033	25.436	8.000	2.577	75.046	11.730	11.730
Prepress solvent: Plant 4**	240	10.0	63.701	63.434	40.018	25.436	8.000	2.545	75.999	12.565	12.298
Screw press:											
8 press*	200	12.0	62.889	62.889	36.039	25.436	8.000	2.703	72.178	9.289	9.289
10 press	250	9.6	63.280	62.996	36.290	25.436	8.000	2.703	72.429	9.433	9.149
Hydraulic:											
20 press	200	12.0	63.316	63.316	35.130	25.436	8.000	2.741	71.307	7.991	7.991
22 press	220	10.9	63.380	63.175	35.206	25.436	8.000	2.741	71.383	8.208	8.003
24 press*	240	10.0	63.455	63.136	35.314	24.436	8.000	2.741	71.491	8.355	8.036
ANNUAL CRUSH: 63,400 TONS											
Prepress solvent: Plant 4**	240	12.0	63.078	63.078	39.810	25.406	8.000	2.529	75.745	12.667	12.667
Direct solvent:											
Plant 4	300	9.6	63.312	63.045	39.304	25.406	8.000	2.562	75.272	12.227	11.960
Plant 5*	400	7.2	63.382	63.072	39.582	25.406	8.000	2.562	75.550	12.478	12.168
Screw press:											
10 press*	250	11.5	62.754	62.689	36.088	25.406	8.000	2.687	72.181	9.492	9.427
12 press	300	9.6	63.072	62.813	36.290	25.406	8.000	2.687	72.383	9.570	9.311
Hydraulic: 24 press*	240	12.0	62.844	62.844	35.130	25.406	8.000	2.726	71.262	8.418	8.418

See footnote at end of table.

TABLE 98.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area I, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Costs per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:											
Plant 4	300	12.0	62.747	62.747	39.033	25.377	8.000	2.547	74.957	12.210	12.210
Plant 5*	400	9.0	62.972	62.662	39.410	25.377	8.000	2.547	75.334	12.672	12.362
Prepress solvent: Plant 5**	400	9.0	63.144	62.809	40.194	25.377	8.000	2.514	76.085	13.276	12.941
Screw press:											
12 press*	300	12.0	62.512	62.512	36.039	25.377	8.000	2.672	72.088	9.576	9.576
14 press	350	10.3	62.819	62.633	36.173	25.377	8.000	2.672	72.222	9.589	9.403
Hydraulic:											
30 press	300	12.0	62.943	62.943	35.130	25.377	8.000	2.710	71.217	8.274	8.274
36 press	360	10.0	63.234	62.930	35.314	25.377	8.000	2.710	71.401	8.471	8.167
40 press*	400	9.0	63.265	62.838	35.469	25.377	8.000	2.710	71.556	8.718	8.291
ANNUAL CRUSH: 105,600 TONS											
Prepress solvent: Plant 5**	400	12.0	62.708	62.708	39.810	25.348	8.000	2.499	75.657	12.949	12.949
Direct solvent: Plant 5*	400	12.0	62.624	62.624	39.033	25.348	8.000	2.531	74.912	12.288	12.288
Screw press: 16 press*	400	12.0	62.499	62.499	36.039	25.348	8.000	2.657	72.044	9.545	9.545
Hydraulic: 40 press*	400	12.0	62.750	62.750	35.130	25.348	8.000	2.695	71.173	8.423	8.423

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush.

TABLE 99.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area II, 1949–50*

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 10,600 TONS																				
	Tons	*Mo.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Prepress solvent:																				
Plant 1	40	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	1.390	2.344	0.221	0.232	4.187	0.625	0.320		0.244	1.189
Plant 2**	80	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.625	.320		.244	1.189
Direct solvent:																				
Plant 1*	50	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.875	.480		.244	1.599
Plant 2	100	4.8	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.875	.480		.244	1.599
Screw press:																				
2 press*	50	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.250			.934	1.184
3 press	75	6.4	44.420	.400	.356	.291	1.350	.099	.050	47.966	1.390	2.344	.221	.232	4.187	.250			.934	1.184
Hydraulic:																				
4 press	40	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.250		0.690	.244	1.184
6 press*	60	8.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.221	.232	4.187	.250		.690	.244	1.184
8 press	80	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.390	2.344	.321	.232	4.187	.250		.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1*	50	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	1.410	2.280	0.213	0.226	4.129	0.875	0.480		0.244	1.599
Plant 2	100	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.875	.480		.244	1.599
Prepress solvent: Plant 2**	80	7.5	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.625	.320		.244	1.189
Screw press:																				
2 press*	50	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.250			.934	1.184
3 press	75	8.0	44.420	.400	.356	.291	1.350	.099	.050	47.966	1.410	2.280	.213	.226	4.129	.250			.934	1.184
4 press	100	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.250			.934	1.184
Hydraulic:																				
6 press	60	10.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.250		0.690	.244	1.184
8 press*	80	7.5	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.410	2.280	.213	.226	4.129	.250		.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																				
Prepress solvent:																				
Plant 2**	80	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	1.520	2.095	0.192	0.205	4.012	0.625	0.320		0.244	1.189
Plant 3	160	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.625	.320		.244	1.189
Direct solvent: Plant 2*	100	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.875	.480		.244	1.599
Screw press:																				
4 press*	100	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.250			.934	1.184
5 press	125	7.7	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.250			.934	1.184
Hydraulic:																				
8 press*	80	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.250		0.690	.244	1.184
10 press	100	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.250		.690	.244	1.184
12 press	120	8.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.520	2.095	.192	.205	4.012	.250		.690	.244	1.184

See footnote at end of table.

TABLE 99.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area II, 1949–50*—Continued

Mill	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 26,400 TONS																				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																				
Plant 2*	100	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	1.590	1.979	0.180	0.192	3.941	0.875	0.480	--------	0.244	1.599
Plant 3	200	6.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.875	.480	--------	.244	1.599
Prepress solvent: Plant 3**	160	7.5	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.625	.320	--------	.244	1.189
Screw press:																				
4 press*	100	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.250	--------	--------	.934	1.184
5 press	125	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.250	--------	--------	.934	1.184
Hydraulic:																				
10 press*	100	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.250	--------	0.690	.244	1.184
12 press	120	10.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	1.590	1.979	.180	.192	3.941	.250	--------	.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3**	160	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	2.000	1.680	0.147	0.157	3.984	0.625	0.320	--------	0.244	1.189
Direct solvent: Plant 3*	200	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.875	.480	--------	.244	1.599
Screw press:																				
7 press*	175	11.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.250	--------	--------	.934	1.184
8 press	200	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.250	--------	--------	.934	1.184
Hydraulic:																				
16 press*	160	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.250	--------	0.690	.244	1.184
22 press	220	8.7	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.250	--------	.690	.244	1.184
24 press	240	8.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.000	1.680	.147	.157	3.984	.250	--------	.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																				
Direct solvent: Plant 3*	200	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	2.100	1.515	0.129	0.137	3.881	0.875	0.480	--------	0.244	1.599
Prepress solvent: Plant 4**	240	10.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.625	.320	--------	.244	1.189
Screw press:																				
8 press*	200	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.250	--------	--------	.934	1.184
10 press	250	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.250	--------	--------	.934	1.184
Hydraulic:																				
20 press*	200	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.250	--------	0.690	.244	1.184
22 press	220	10.9	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.250	--------	.690	.244	1.184
24 press	240	10.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.100	1.515	.129	.137	3.881	.250	--------	.690	.244	1.184

ANNUAL CRUSH: 63,400 TONS																				
Prepress solvent: Plant 4**	240	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	2.220	1.380	0.116	0.119	3.835	0.625	0.320	--------	0.244	1.189
Direct solvent:																				
Plant 4*	300	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.220	1.380	.116	.119	3.835	.875	.480	--------	.244	1.599
Plant 5	400	7.2	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.220	1.380	.116	.119	3.835	.875	.480	--------	.244	1.599
Screw press:																				
10 press*	250	11.5	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.220	1.380	.116	.119	3.835	.250	--------	--------	.934	1.184
12 press	300	9.6	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.220	1.380	.116	.119	3.835	.250	--------	--------	.934	1.184
Hydraulic: 24 press*	240	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.220	1.380	.116	.119	3.835	.250	--------	0.690	.244	1.184
ANNUAL CRUSH: 79,200 TONS																				
Direct solvent:																				
Plant 4*	300	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	2.320	1.231	0.102	0.098	3.751	0.875	0.480	--------	0.244	1.599
Plant 5	400	9.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.875	.480	--------	.244	1.599
Prepress solvent: Plant 5**	400	9.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.625	.320	--------	.244	1.189
Screw press:																				
12 press*	300	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.250	--------	--------	.934	1.184
14 press	350	10.3	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.250	--------	--------	.934	1.184
Hydraulic:																				
30 press*	300	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.250	--------	0.690	.244	1.184
36 press	360	10.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.250	--------	.690	.244	1.184
40 press	400	9.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.320	1.231	.102	.098	3.751	.250	--------	.690	.244	1.184
ANNUAL CRUSH: 105,600 TONS																				
Prepress solvent: Plant 5**	400	12.0	44.420	0.400	0.356	0.291	1.350	0.099	0.050	46.966	2.400	1.170	0.095	0.074	3.739	0.625	0.320	--------	0.244	1.189
Direct solvent: Plant 5*	400	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.400	1.170	.095	.074	3.739	.875	.480	--------	.244	1.599
Screw press: 16 press*	400	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.400	1.170	.095	.074	3.739	.250	--------	--------	.934	1.184
Hydraulic: 40 press*	400	12.0	44.420	.400	.356	.291	1.350	.099	.050	46.966	2.400	1.170	.095	.074	3.739	.250	--------	0.690	.244	1.184

See footnote at end of table.

TABLE 99.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area II, 1949–50*—Continued

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	2.722	2.974	0.535	0.328	5.559	5.220	0.315	----	1.170	0.077	1.440	0.389	0.538	0.230	0.359	0.240	0.004	16.541	16.541
Plant 2**	3.057	3.299	.594	.359	7.309	3.132	.315	1.044	950	.070	1.440	.298	.538	.140	.265	.152	.002	15.655	14.611
Direct solvent:																			
Plant 1*	2.727	2.957	.532	.357	6.573	3.758	.316	.661	.898	.086	1.440	.352	.537	.205	.293	.178	.003	15.300	14.639
Plant 2	3.314	3.542	.638	.422	7.916	2.506	.316	1.262	.790	.085	1.440	.279	.537	.097	.237	.125	.002	15.592	14.330
Screw press:																			
2 press*	2.348	2.579	.464	.242	5.633	3.149	.338	.558	1.182	.048	1.440	.350	.533	.204	.267	.143	.002	13.847	13.289
3 press	2.559	2.777	.500	.251	6.087	2.624	.339	.763	1.110	.047	1.440	.301	.533	.141	.243	123	.002	13.753	12.990
Hydraulic:																			
4 press	2.281	2.531	.456	.242	5.510	4.620	.311	----	1.010	.041	1.440	.385	.531	.230	.333	.200	.003	14.614	14.614
6 press*	2.445	2.685	.483	.236	5.849	3.696	.311	.616	.862	.041	1.440	.325	.531	.184	.290	164	.003	14.312	13.696
8 press	2.559	2.792	.502	.251	6.104	3.234	.311	1.078	.798	.040	1.440	.294	.531	.138	.269	.145	.002	14.384	13.306
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1*	2.245	2.456	0.442	0.303	5.446	3.758	0.311	----	0.950	0.079	1.440	0.352	0.545	0.230	0.290	0.178	0.003	13.582	13.582
Plant 2	2.669	2.863	.515	.344	6.391	2.506	.311	0.835	.733	.075	1.440	.279	.545	.140	.234	.125	.002	13.616	12.781
Prepress solvent: Plant 2**	2.481	2.694	.485	.299	5.959	3.132	.310	.626	.974	.067	1.440	.298	.546	.173	.262	.151	.002	13.940	13.314
Screw press:																			
2 press*	1.937	2.148	.387	.211	4.683	3.149	.333	----	1.238	.041	1.440	.350	.540	.230	.264	.143	.002	12.413	12.413
3 press	2.100	2.302	.414	.218	5.034	2.624	.335	.435	1.116	.043	1.440	.301	.540	.184	.240	.122	.002	12.416	11.981
4 press	2.355	2.552	.459	.230	5.596	2.230	.333	.722	1.024	.043	1.440	.277	.540	.138	.222	.107	.002	12.674	11.952
Hydraulic:																			
6 press	1.991	2.200	.396	.211	4.798	3.696	.307	.554	.879	.034	1.440	.325	.539	.207	.287	.163	.003	13.232	12.678
8 press*	2.083	2.288	.412	.212	4.995	3.234	.307	.647	.820	.037	1.440	.294	.539	.172	.266	.145	.002	12.898	12.251
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2**	1.682	1.864	0.336	0.225	4.107	3.132	0.303	----	1.050	0.059	1.440	0.298	0.557	0.231	0.253	0.151	0.002	11.583	11.583
Plant 3	2.166	2.328	.419	.256	5.169	2.132	.303	0.696	.844	.050	1.440	.253	.557	.140	.208	.109	.002	11.903	11.207
Direct solvent: Plant 2*	1.788	1.954	.352	.250	4.344	2.506	.303	.452	.807	.066	1.440	.279	.556	.206	.225	.124	.002	11.310	10.858
Screw press:																			
4 press*	1.588	1.756	.316	.178	3.838	2.230	.326	.394	1.101	.033	1.440	.277	.552	.205	.214	.106	.002	10.718	10.324
5 press	1.804	1.952	.351	.186	4.293	1.943	.325	.353	1.036	.030	1.440	.265	.552	.177	.201	.095	.002	10.712	10.359
Hydraulic:																			
8 press*	1.433	1.611	.290	.170	3.504	3.234	.301	.000	.898	.029	1.440	.294	.550	.230	.258	.145	.002	10.885	10.885
10 press	1.547	1.720	.310	.175	3.752	2.957	.301	.524	.837	.027	1.440	.276	.550	.205	.245	.134	.002	11.250	10.726
12 press	1.740	1.898	.342	.190	4.170	2.618	.301	.439	.786	.025	1.440	.264	.550	.185	.230	.121	.002	11.131	10.692

ANNUAL CRUSH: 26,400 TONS																			
Direct solvent:																			
Plant 2*	1.477	1.631	0.294	0.214	3.616	2.506	0.301	----------	0.850	0.062	1.440	0.279	0.560	0.231	0.220	0.124	0.002	10.191	10.191
Plant 3	1.885	2.026	.365	.244	4.520	1.775	.301	0.592	.679	.056	1.440	.243	.560	.140	.187	.093	.002	10.588	9.996
Prepress solvent: Plant 3**	1.789	1.941	.349	.222	4.301	2.132	.300	.418	.918	.049	1.440	.253	.561	.174	.203	.108	.002	10.859	10.441
Screw press:																			
4 press*	1.322	1.477	.266	.157	3.222	2.230	.324	----------	1.158	.030	1.440	.277	.556	.231	.208	.106	.002	9.784	9.784
5 press	1.504	1.650	.297	.168	3.619	1.943	.323	.344	1.069	.029	1.440	.265	.556	.205	.195	.095	.002	10.085	9.741
Hydraulic:																			
10 press*	1.284	1.444	.260	.155	3.143	2.957	.298	.000	.880	.024	1.440	.276	.554	.231	.240	.134	.002	10.179	10.179
12 press	1.453	1.606	.289	.171	3.519	2.618	.298	.393	.811	.024	1.440	.264	.554	.212	.225	.120	.002	10.480	10.087
ANNUAL CRUSH: 42,200 TONS																			
Prepress solvent: Plant 3**	1.243	1.385	0.249	0.173	3.050	2.132	0.297	----------	1.017	0.044	1.440	0.253	0.567	0.233	0.189	0.108	0.002	9.332	9.332
Direct solvent: Plant 3*	1.299	1.432	.258	.186	3.751	1.775	.297	0.313	.748	.053	1.440	.243	.566	.208	.173	.093	.001	9.085	8.772
Screw press:																			
7 press*	1.196	1.332	.240	.147	2.915	1.722	.321	.148	1.053	.023	1.440	.246	.561	.221	.172	.086	.001	8.909	8.761
8 press	1.244	1.378	.248	.147	3.017	1.640	.320	.287	1.020	.023	1.440	.241	.561	.207	.168	.083	.001	9.008	8.721
Hydraulic:																			
16 press*	1.117	1.258	.227	.142	2.744	2.426	.295	.000	.848	.018	1.440	.249	.560	.232	.203	.112	.002	9.129	9.129
22 press	1.267	1.406	.253	.149	3.075	2.272	.295	.493	.754	.018	1.440	.237	.560	.193	.196	.106	.002	9.641	9.148
24 press	1.304	1.438	.259	.147	3.148	2.156	.295	.362	.743	.016	1.440	.234	.560	.168	.190	.102	.002	9.416	9.054
ANNUAL CRUSH: 52,800 TONS																			
Direct solvent: Plant 3*	1.101	1.234	0.222	0.167	2.724	1.775	0.296	----------	0.803	0.052	1.440	0.243	0.568	0.234	0.166	0.093	0.001	8.395	8.395
Prepress solvent: Plant 4**	1.251	1.383	.249	.169	3.052	1.827	.295	0.270	.940	.040	1.440	.238	.569	.216	.168	.095	.001	9.151	8.881
Screw press:																			
8 press*	1.060	1.193	.215	.136	2.604	1.640	.319	----------	1.094	.022	1.440	.241	.563	.233	.161	.082	.001	8.400	8.400
10 press	1.177	1.308	.235	.141	2.861	1.574	.319	.287	1.939	.020	1.440	.235	.563	.207	.158	.080	.001	8.784	8.497
Hydraulic:																			
20 press*	1.037	1.172	.211	.135	2.555	2.402	.294	.000	.834	.017	1.440	.240	.562	.233	.194	.111	.002	8.884	8.884
22 press	1.049	1.200	.216	.135	2.600	2.272	.294	.208	.786	.015	1.440	.237	.562	.221	.188	.106	.002	8.931	8.723
24 press	1.106	1.238	.223	.136	2.703	2.156	.294	.323	.787	.015	1.440	.234	.562	.214	.183	.102	.002	9.015	8.692
ANNUAL CRUSH: 63,400 TONS																			
Prepress solvent: Plant 4**	1.088	1.220	0.220	0.155	2.683	1.827	0.294	----------	0.982	0.039	1.440	0.238	0.570	0.234	0.162	0.095	0.001	8.565	8.565
Direct solvent:																			
Plant 4*	1.161	1.285	.231	.167	2.844	1.531	.295	0.270	.740	.047	1.440	.231	.569	.209	.149	.082	.001	8.408	8.138
Plant 5	1.277	1.396	.251	.172	3.096	1.409	.295	.313	.691	.045	1.440	.225	.569	.170	.143	.077	.001	8.474	8.161
Screw press:																			
10 press*	1.030	1.162	.209	.133	2.534	1.574	.318	.066	1.079	.020	1.440	.235	.564	.228	.152	.080	.001	8.291	8.225
12 press	1.167	1.294	.233	.142	2.836	1.468	.318	.262	1.048	.019	1.440	.229	.564	.208	.147	.075	.001	8.615	8.353
Hydraulic: 24 press*	.967	1.099	.198	.127	2.391	2.156	.293	----------	.829	.014	1.440	.234	.563	.234	.177	.101	.002	8.434	8.434

See footnote at end of table.

TABLE 99.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area II, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill[1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor			Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor										Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																			
Plant 4*	0.988	1.113	0.200	0.152	2.453	1.531	0.294		0.792	0.046	1.440	0.231	0.570	0.235	0.142	0.082	0.001	7.817	7.817
Plant 5	1.081	1.202	.216	.155	2.654	1.409	.294	0.313	.715	.043	1.440	.225	.570	.201	.136	.077	.001	8.078	7.765
Prepress solvent: Plant 5**	1.181	1.305	.235	.157	2.878	1.514	.294	.339	.898	.035	1.440	.226	.571	.201	.141	.081	.001	8.619	8.280
Screw press:																			
12 press*	.993	1.120	.202	.131	2.446	1.468	.317		1.083	.018	1.440	.229	.566	.234	.140	.075	.001	8.017	8.017
14 press	1.072	1.198	.216	.135	2.621	1.427	.318	.189	1.083	.018	1.440	.227	.566	.217	.138	.074	.001	8.319	8.130
Hydraulic:																			
30 press*	1.000	1.132	.204	.132	2.468	2.156	.293		.823	.013	1.440	.228	.564	.234	.170	.101	.002	8.492	8.492
36 press	1.075	1.206	.217	.136	2.634	2.056	.293	.308	.773	.013	1.440	.224	.564	.215	.166	.097	.002	8.785	8.477
40 press	1.113	1.239	.223	.135	2.710	1.940	.293	.431	.745	.012	1.440	.222	.564	.200	.160	.093	.002	8.812	8.381

ANNUAL CRUSH: 105,600 TONS

Mill[1]	Depreciation	Interest	Taxes	Insurance on building and machinery	Plant total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total including dormant season labor	Total excluding dormant season labor
Prepress solvent: Plant 5**	0.966	1.092	0.197	0.142	2.397	1.514	0.293		0.972	0.035	1.440	0.226	0.573	0.235	0.138	0.081	0.001	7.905	7.905
Direct solvent: Plant 5*	.889	1.013	.182	.140	2.224	1.409	.293		.789	.043	1.440	.225	.571	.235	.134	.077	.001	7.441	7.441
Screw press: 16 press*	.929	1.054	.190	.126	2.299	1.361	.317		1.080	.016	1.440	.223	.567	.234	.133	.071	.001	7.742	7.742
Hydraulic: 40 press*	.912	1.040	.187	.124	2.263	1.940	.292		.819	.012	1.440	.222	.566	.234	.158	.093	.002	8.041	8.041

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:											
Plant 1	40	12.0	68.883	68.883	42.133	25.037	8.000	0.767	75.937	7.054	7.054
Plant 2**	80	6.0	67.997	66.953	41.705	25.037	8.000	.767	75.509	8.556	7.512
Direct solvent:											
Plant 1*	50	9.6	68.052	67.391	41.227	25.037	8.000	.778	75.042	7.651	6.990
Plant 2	100	4.8	68.344	67.082	40.728	25.037	8.000	.778	74.543	7.461	6.199
Screw press:											
2 press*	50	9.6	66.184	65.626	38.038	25.037	8.000	.819	71.894	6.268	5.710
3 press	75	6.4	66.090	65.327	37.774	25.037	8.000	.819	71.630	6.303	5.540
Hydraulic:											
4 press	40	12.0	66.951	66.951	37.138	25.037	8.000	.831	71.006	4.055	4.055
6 press*	60	8.0	66.649	66.033	37.060	25.037	8.600	.831	70.928	4.895	4.279
8 press	80	6.0	66.721	65.643	36.762	25.037	8.000	.831	70.630	4.987	3.909

ANNUAL CRUSH: 13,200 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
Direct solvent:											
Plant 1*	50	12.0	66.276	66.276	41.364	25.037	8.000	0.778	75.119	8.843	8.843
Plant 2	100	6.0	66.310	65.475	40.885	25.037	8.000	.778	74.700	9.225	8.390
Prepress solvent: Plant 2**	80	7.5	66.224	65.598	41.990	25.037	8.000	.767	75.794	10.196	9.570
Screw press:											
2 press*	50	12.0	64.692	64.692	38.109	25.037	8.000	.819	71.965	7.273	7.273
3 press	75	8.0	64.695	64.260	38.028	25.037	8.000	.819	71.884	7.624	7.189
4 press	100	6.0	64.953	64.231	37.722	25.037	8.000	.819	71.578	7.347	6.625
Hydraulic:											
6 press	60	10.0	65.511	64.957	37.057	25.037	8.666	.831	70.925	5.968	5.414
8 press*	80	7.5	65.177	64.530	37.013	25.037	8.000	.831	70.881	6.351	5.704

ANNUAL CRUSH: 21,100 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
Prepress solvent:											
Plant 2**	80	12.0	63.750	63.750	42.133	25.037	8.000	0.767	75.937	12.187	12.187
Plant 3	160	6.0	64.070	63.374	41.705	25.037	8.000	.767	75.509	12.135	11.439
Direct solvent: Plant 2*	100	9.6	63.887	63.435	41.227	25.037	8.000	.778	75.042	11.607	11.155
Screw press:											
4 press*	100	9.6	62.880	62.486	38.038	25.037	8.000	.819	71.894	9.408	9.014
5 press	125	7.7	62.874	62.521	37.996	25.037	8.000	.819	71.852	9.331	8.978
Hydraulic:											
8 press*	80	12.0	63.047	63.047	37.138	25.037	8.000	.831	71.006	7.959	7.959
10 press	100	9.6	63.412	62.888	37.069	26.037	8.000	.831	70.937	8.049	7.525
12 press	120	8.0	63.293	62.854	37.060	25.037	8.000	.831	70.928	8.074	7.635

See footnote at end of table.

TABLE 99.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area II, 1949–50*—Continued

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
ANNUAL CRUSH: 26,400 TONS											
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:											
Plant 2*	100	12.0	62.697	62.697	41.304	25.037	8.000	0.778	75.119	12.422	12.422
Plant 3	200	6.0	63.094	62.502	40.885	25.037	8.000	.778	74.700	12.198	11.606
Prepress solvent: Plant 3**	160	7.5	62.955	62.537	41.990	25.037	8.000	.767	75.794	13.257	12.839
Screw press:											
4 press*	100	12.0	61.875	61.875	38.109	25.037	8.000	.819	71.965	10.090	10.090
5 press	125	9.6	62.176	61.832	38.038	25.037	8.000	.819	71.894	10.062	9.718
Hydraulic:											
10 press*	100	12.0	62.270	62.270	37.138	25.037	8.000	.831	71.006	8.736	8.736
12 press	120	10.0	62.571	62.178	37.057	25.037	8.000	.831	70 925	8.747	8.354
ANNUAL CRUSH: 42,200 TONS											
Prepress solvent: Plant 3**	160	12.0	61.471	61.471	42.133	25.037	8.000	0.767	75.937	14.466	14.466
Direct solvent: Plant 3*	200	9.6	61.634	61.321	41.227	25.037	8.000	.778	75.042	13.721	13.408
Screw press:											
7 press*	175	11.0	61.043	60.895	38.067	25.037	8.000	.819	71.923	11.028	10.880
8 press	200	9.6	61.142	60.855	38.038	25.037	8.000	.819	71.894	11.039	10.752
Hydraulic:											
16 press*	160	12.0	61.263	61.263	37.138	25.037	8.000	.831	71.006	9.743	9.743
22 press	220	8.7	61.282	61.282	37.079	25.037	8.000	.831	70.947	9.665	9.172
24 press	240	8.0	61.550	61.188	37.060	25.037	8.000	.831	70.928	9.740	9.378
ANNUAL CRUSH: 52,800 TONS											
Direct solvent: Plant 3*	260	12.0	60.841	60.841	41.304	25.037	8.000	0.778	75.119	14.278	14.278
Prepress solvent: Plant 4**	240	10.0	61.187	60.917	42.040	25.037	8.000	.767	75.844	14.927	14.657
Screw press:											
8 press*	200	12.0	60.431	60.431	38.109	25.037	8.000	.819	71.965	11.534	11.534
10 press	250	9.6	60.815	60.528	38.038	25.037	8.000	.819	71.894	11.366	11.079
Hydraulic:											
20 press*	200	12.0	60.915	60.915	37.138	25.037	8.000	.831	71.006	10.091	10.091
22 press	220	10.9	60.962	60.754	37.094	25.037	8.000	.831	70.962	10.208	10.000
24 press	240	10.0	61.046	60.723	37.057	25.037	8.000	.831	70.925	10.202	9.879

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	240	12.0	60.555	60.555	42.133	25.037	8.000	0.767	75.937	15.382	15.382
Direct solvent:											
Plant 4*	300	9.6	60.808	60.538	41.227	25.037	8.000	.778	75.042	14.504	14.234
Plant 5	400	7.2	60.874	60.561	41.123	25.037	8.000	.778	74.938	14.377	14.064
Screw press:											
10 press*	250	11.5	60.276	60.210	38.086	25.037	8.000	.819	71.942	11.732	11.666
12 press	300	9.6	60.600	60.338	38.038	25.037	8.000	.819	71.894	11.556	11.294
Hydraulic: 24 press*	240	12.0	60.419	60.419	37.138	25.037	8.000	.831	71.006	10.587	10.587

ANNUAL CRUSH: 79,200 TONS

Direct solvent:											
Plant 4*	300	12.0	60.133	60.133	41.304	25.037	8.000	0.778	75.119	14.986	14.986
Plant 5	400	9.0	60.394	60.081	41.248	25.037	8.000	.778	75.063	14.982	14.669
Prepress solvent: Plant 5**	400	9.0	60.525	60.186	42.076	25.037	8.000	.767	75.880	15.694	15.355
Screw press:											
12 press*	300	12.0	59.918	59.918	38.169	25.037	8.000	.819	71.965	12.047	12.047
14 press	350	10.3	60.220	60.031	38.035	25.037	8.000	.819	71.891	11.860	11.671
Hydraulic:											
30 press*	300	12.0	60.393	60.393	37.138	25.037	8.000	.831	71.006	10.613	10.613
36 press	360	10.0	60.686	60.378	37.057	25.037	8.660	.831	70.925	10.547	10.239
40 press	400	9.0	60.713	60.282	37.088	25.037	8.000	.831	70.956	10.674	10.243

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5**	400	12.0	59.799	59.799	42.133	25.037	8.000	0.767	75.937	16.138	16.138
Direct solvent: Plant 5*	400	12.0	59.745	59.745	41.304	25.037	8.000	.778	75.119	15.374	15.374
Screw press: 16 press*	400	12.0	59.631	59.631	38.109	25.037	8.000	.819	71.965	12.334	12.334
Hydraulic: 40 press*	400	12.0	59.930	59.930	37.138	25.037	8.000	.831	71.006	11.076	11.076

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush.

TABLE 100.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area III, 1949–50*

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed: Unaffected by type of mill or size of crush: Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Affected by size of crush: Seed haul	Salaries	Office	Travel and auto	Total	Affected by type of mill: Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 10,600 TONS																				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																				
Plant 1	40	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	2.256	2.344	0.221	0.232	5.047	0.625	0.320		0.244	1.189
Plant 2**	80	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.625	.320		.244	1.189
Direct solvent:																				
Plant 1*	50	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.875	.480		.244	1.599
Plant 2	100	4.8	42.026	.460	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.875	.480		.244	1.599
Screw press:																				
2 press	50	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.250			.934	1.184
3 press*	75	6.4	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.250			.934	1.184
Hydraulic:																				
4 press	40	12.0	42.026	.400	.356	.291	1.356	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.256		0.690	.244	1.184
6 press*	60	8.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.250		.690	.244	1.184
8 press	80	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.250	2.344	.221	.232	5.047	.250		.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1	50	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	2.350	2.280	0.213	0.226	5.069	0.875	0.480		0.244	1.599
Plant 2*	100	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.875	.480		.244	1.599
Prepress solvent: Plant 2**	80	7.5	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.625	.320		.244	1.189
Screw press:																				
2 press	50	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.250			.934	1.184
3 press*	75	8.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.250			.934	1.184
4 press	100	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.250			.244	1.184
Hydraulic:																				
6 press	60	10.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.250		0.690	.244	1.184
8 press*	80	7.5	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.350	2.280	.213	.226	5.069	.250		.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																				
Prepress solvent:																				
Plant 2	80	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	2.510	2.095	0.192	0.205	5.002	0.625	0.320		0.244	1.189
Plant 3**	160	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.625	.320		.244	1.189
Direct solvent: Plant 2*	100	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.875	.480		.244	1.599
Screw press:																				
4 press	100	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.250			.934	1.184
5 press*	125	7.7	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.250			.934	1.184
Hydraulic:																				
8 press	80	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.250		0.690	.244	1.184
10 press	100	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.250		.690	.244	1.184
12 press*	120	8.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.510	2.095	.192	.205	5.002	.250		.690	.244	1.184

ANNUAL CRUSH: 26,400 TONS																				
Direct solvent:																				
Plant 2	100	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	2.690	1.979	0.180	0.192	5.041	0.875	0.480		0.244	1.599
Plant 3*	200	6.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.875	.480		.244	1.599
Prepress solvent: Plant 3**	160	7.5	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.625	.320		.244	1.189
Screw press:																				
4 press*	100	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.250			.934	1.184
5 press	125	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.250			.934	1.184
Hydraulic:																				
10 press*	100	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.250		0.690	.244	1.184
12 press	120	10.0	42.020	.400	.356	.291	1.350	.102	.050	44.575	2.690	1.979	.180	.192	5.041	.250		.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3**	160	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	3.010	1.680	0.147	0.157	4.994	0.625	0.320		0.244	1.189
Direct solvent: Plant 3*	200	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.875	.480		.244	1.599
Screw press:																				
7 press	175	11.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.250			.934	1.184
8 press*	200	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.250			.934	1.184
Hydraulic:																				
16 press	160	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.250		0.690	.244	1.184
22 press	220	8.7	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.250		.690	.244	1.184
24 press*	240	8.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.010	1.680	.147	.157	4.994	.250		.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																				
Direct solvent: Plant 3*	200	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	3.120	1.515	0.129	0.137	4.901	0.875	0.480		0.244	1.599
Prepress solvent: Plant 4**	240	10.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.625	.320		.244	1.189
Screw press:																				
8 press*	200	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.250			.934	1.184
10 press	250	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.250			.934	1.184
Hydraulic:																				
20 press	200	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.250		0.690	.244	1.184
22 press*	220	10.9	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.250		.690	.244	1.184
24 press	240	10.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.120	1.515	.129	.137	4.901	.250		.690	.244	1.184
ANNUAL CRUSH: 63,400 TONS																				
Prepress solvent: Plant 4**	240	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.500	44.575	3.400	1.380	0.116	0.119	5.015	0.625	0.320		0.244	1.189
Direct solvent:																				
Plant 4	300	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.400	1.380	.116	.119	5.015	.875	.480		.244	1.599
Plant 5*	400	7.2	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.400	1.380	.116	.119	5.015	.875	.480		.244	1.599
Screw press:																				
10 press*	250	11.5	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.400	1.380	.116	.119	5.015	.250			.934	1.184
12 press	300	9.6	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.400	1.380	.116	.119	5.015	.250			.934	1.184
Hydraulic: 24 press*	240	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.400	1.380	.116	.119	5.015	.250		0.690	.244	1.184

See footnote at end of table.

TABLE 100.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area III, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																		
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill					
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total	
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	
Direct solvent:																					
Plant 4	300	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	3.870	1.231	0.102	0.098	5.301	0.875	0.480	--------	0.244	1.599	
Plant 5*	400	9.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.875	.480	--------	.244	1.599	
Prepress solvent: Plant 5**	400	9.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.625	.320	--------	.244	1.189	
Screw press:																					
12 press*	300	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.250	--------	--------	.934	1.184	
14 press	350	10.3	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.250	--------	--------	.934	1.184	
Hydraulic:																					
30 press	300	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.250	--------	0.690	.244	1.184	
36 press	360	10.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.250	--------	.690	.244	1.184	
40 press*	400	9.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	3.870	1.231	.102	.098	5.301	.250	--------	.690	.244	1.184	

ANNUAL CRUSH: 105,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
Prepress solvent: Plant 5**	400	12.0	42.026	0.400	0.356	0.291	1.350	0.102	0.050	44.575	4.270	1.170	0.095	0.074	5.609	0.625	0.320	--------	0.244	1.189
Direct solvent: Plant 5*	400	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	4.270	1.170	.095	.074	5.609	.875	.480	--------	.244	1.599
Screw press: 16 press*	400	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	4.270	1.170	.095	.074	5.609	.250	--------	--------	.934	1.184
Hydraulic: 40 press*	400	12.0	42.026	.400	.356	.291	1.350	.102	.050	44.575	4.270	1.170	.095	.074	5.609	.250	--------	0.690	.244	1.184

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	2.644	2.887	0.588	0.320	6.439	5.400	0.530	---	2.280	0.046	2.004	0.390	0.316	0.225	0.377	0.267	0.004	18.278	18.278
Plant 2**	2.978	3.213	.654	.352	7.197	3.240	.530	1.080	1.911	.042	2.004	.299	.316	.138	.280	.172	.003	17.212	16.132
Direct solvent:																			
Plant 1*	2.649	2.871	.584	.349	6.453	3.888	.531	.684	1.724	.059	2.004	.353	.313	.201	.309	.201	.003	16.723	16.039
Plant 2	3.240	3.463	.705	.414	7.822	2,592	.531	1.305	1.489	.056	2.004	.281	.313	.097	.251	.144	.002	16.887	15.582
Screw press:																			
2 press	2.270	2.493	.507	.235	5.505	3.264	.502	.578	2.369	.013	2.004	.351	.302	.200	.280	.172	.003	15.543	14.965
3 press*	2.488	2.703	.550	.243	5.984	2.720	.502	.791	2.223	.013	2.004	.303	.302	.140	.255	.148	.002	15.387	14.596
Hydraulic:																			
4 press	2.202	2.445	.498	.235	5.380	4.800	.403	---	1.917	.006	1.423	.386	.299	.224	.346	.235	.004	15.423	15.423
6 press*	2.374	2.611	.531	.230	5.746	3.840	.403	.640	1.580	.006	1.423	.326	.299	.180	.301	.193	.003	14.940	14.300
8 press	2.481	2.705	.551	.243	5.980	3.360	.403	1.120	1.500	.006	1.423	.296	.299	.137	.279	.172	.003	14.978	13.858
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1	2.190	2.387	0.486	0.297	5.360	3.888	0.518	---	1.862	0.059	2.004	0.353	0.343	0.225	0.305	0.200	0.003	15.120	15.120
Plant 2*	2.610	2.800	.570	.338	6.318	2.592	.518	0.864	1.481	.055	2.004	.281	.343	.138	.247	.143	.002	14.986	14.122
Prepress solvent: Plant 2**	2.419	2.625	.535	.293	5.872	3.240	.517	.648	1.983	.042	2.004	.305	.346	.170	.276	.171	.003	15.577	14.929
Screw press:																			
2 press	1.874	2.079	.423	.206	4.582	3.264	.489	---	2.504	.013	2.004	.351	.333	.224	.276	.171	.003	14.214	14.214
3 press*	2.044	2.243	.456	.211	4.954	2.720	.490	.451	2.320	.013	2.004	.303	.333	.180	.252	.147	.002	14.169	13.718
4 press	2.288	2.478	.504	.224	5.494	2.312	.489	.748	2.123	.012	2.004	.278	.333	.137	.233	.129	.002	14.294	13.546
Hydraulic:																			
6 press	1.934	2.141	.436	.206	4.717	3.840	.363	.570	1.748	.006	1.199	.326	.332	.207	.296	.191	.003	13.798	13.228
8 press*	2.021	2.219	.452	.206	4.898	3.360	.363	.672	1.577	.006	1.199	.296	.332	.169	.275	.170	.003	13.320	12.648
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2	1.643	1.821	0.371	0.221	4.056	3.240	0.470	---	2.215	0.042	2.004	0.299	0.429	0.226	0.266	0.170	0.003	13.420	13.420
Plant 3**	2.131	2.293	.467	.253	5.144	2.205	.470	0.720	1.840	.039	2.004	.254	.429	.139	.219	.124	.002	13.589	12.869
Direct solvent: Plant 2*	1.751	1.914	.390	.245	4.300	2.592	.470	.468	1.673	.055	2.004	.281	.428	.201	.237	.141	.002	12.852	12.384
Screw press:																			
4 press	1.547	1.710	.349	.175	3.781	2.312	.440	.408	2.317	.012	2.004	.278	.424	.201	223	.127	.002	12.529	12.121
5 press*	1.773	1.922	.391	.186	4.272	2.015	.439	.366	2.181	.012	2.004	.266	.424	.174	.209	.114	.002	12.478	12.112
Hydraulic:																			
8 press	1.394	1.567	.319	.167	3.447	3.360	.279	---	1.821	.006	.862	.296	.422	.224	.263	.166	.003	11.149	11.149
10 press	1.505	1.673	.341	.172	3.691	3.072	.279	.544	1.690	.005	.862	.278	.422	.200	.250	.153	.003	11.449	10.905
12 press*	1.708	1.867	.380	.184	4.139	2.720	.279	.456	1.575	.005	.862	.266	.422	.180	.234	.138	.002	11.278	10.822

See footnote at end of table.

TABLE 100.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area III, 1949–50*—Continued

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
ANNUAL CRUSH: 26,400 TONS																			
Direct solvent:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 2	1.448	1.600	0.325	0.211	3.584	2.592	0.454	---------	1.798	0.055	2.004	0.281	0.459	0.226	0.231	0.140	0.002	11.826	11.826
Plant 3*	1.857	1.997	.406	.242	4.502	1.836	.454	0.612	1.447	.053	2.004	.244	.459	.139	.197	.107	.002	12.056	11.444
Prepress solvent: Plant 3**	1.761	1.912	.389	.219	4.281	2.205	.453	.432	1.949	.039	2.004	.257	.460	.171	.213	.123	.002	12.589	12.157
Screw press:																			
4 press*	1.288	1.440	.293	.154	3.175	2.312	.425	---------	2.441	.012	2.004	.278	.454	.226	.217	.126	.002	11.672	11.672
5 press	1.480	1.625	.331	.168	3.604	2.015	.423	.357	2.279	.012	2.004	.266	.454	.201	.203	.113	.002	11.933	11.576
Hydraulic:																			
10 press*	1.251	1.407	.286	.152	3.096	3.072	.252	---------	1.808	.005	.750	.278	.453	.225	.243	.152	.002	10.336	10.336
12 press	1.428	1.581	.322	.166	3.497	2.720	.252	.408	1.677	.005	.750	.266	.453	.207	.227	.137	.002	10.601	10.193
ANNUAL CRUSH: 42,200 TONS																			
Prepress solvent: Plant 3**	1.226	1.367	0.278	0.171	3.042	2.205	0.427	---------	2.171	0.039	2.004	0.254	0.505	0.228	0.199	0.121	0.002	11.197	11.197
Direct solvent: Plant 3*	1.282	1.414	.288	.183	3.167	1.836	.427	0.324	1.633	.053	2.004	.244	.504	.203	.182	.105	.002	10.684	10.360
Screw press:																			
7 press	1.179	1.314	.267	.144	2.904	1.785	.400	.153	2.296	.011	2.004	.247	.500	.216	.179	.102	.002	10.799	10.646
8 press*	1.227	1.360	.277	.146	3.010	1.700	.399	.298	2.278	.011	2.004	.242	.500	.203	.175	.098	.002	10.920	10.622
Hydraulic:																			
16 press	1.100	1.240	.252	.141	2.733	2.520	.210	---------	1.775	.005	.581	.251	.498	.227	.203	.126	.002	9.131	9.131
22 press	1.247	1.384	.282	.146	3.059	2.360	.210	.512	1.587	.005	.581	.238	.498	.189	.196	.119	.002	9.556	9.044
24 press*	1.290	1.425	.290	.146	3.151	2.240	.210	.376	1.548	.005	.581	.235	.498	.165	.190	.113	.002	9.314	8.938
ANNUAL CRUSH: 52,800 TONS																			
Direct solvent: Plant 3*	1.088	1.219	0.248	0.166	2.721	1.836	0.419	---------	1.768	0.053	2.004	0.244	0.519	0.228	0.174	0.105	0.002	10.073	10.073
Prepress solvent: Plant 4**	1.237	1.369	.279	.168	3.053	1.890	.418	0.279	2.063	.038	2.004	.239	.520	.211	.177	.107	.002	11.001	10.722
Screw press:																			
8 press*	1.046	1.179	.240	.135	2.600	1.700	.392	---------	2.407	.011	2.004	.242	.515	.228	.167	.098	.002	10.366	10.366
10 press	1.166	1.297	.264	.139	2.866	1.632	.392	.298	2.274	.011	2.004	.236	.515	.203	.164	.095	.002	10.692	10.394
Hydraulic:																			
20 press	1.023	1.158	.236	.134	2.551	2.496	.196	---------	1.768	.005	.525	.242	.513	.227	.194	.124	.002	8.843	8.843
22 press*	1.052	1.183	.241	.133	2.609	2.360	.196	.216	1.648	.005	.525	.238	.513	.215	.188	.118	.002	8.833	8.617
24 press	1.094	1.227	.250	.135	2.706	2.240	.196	.336	1.655	.005	.525	.235	.513	.209	.182	.113	.002	8.917	8.581

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	1.076	1.208	0.246	0.154	2.684	1.890	0.413	----------	2.170	0.038	2.004	0.239	0.530	0.230	0.170	0.107	0.002	10.477	10.477
Direct solvent:																			
Plant 4	1.151	1.278	.260	.167	2.856	1.584	.413	0.279	1.628	.053	2.004	.232	.529	.205	.157	.093	.002	10.035	9.756
Plant 5*	1.267	1.388	.282	.171	3.108	1.458	.413	.324	1.503	.052	2.004	.226	.529	.167	.151	.088	.001	10.024	9.700
Screw press:																			
10 press*	1.020	1.153	.235	.131	2.539	1.632	.386	.068	2.380	.011	2.004	.236	.525	.224	.158	.094	.002	10.259	10.191
12 press	1.156	1.283	.261	.141	2.841	1.522	.386	.272	2.271	.010	2.004	.230	.525	.204	.153	.089	.001	10.508	10.236
Hydraulic: 24 press*	.958	1.090	.222	.126	2.396	2.240	.186	----------	1.762	.005	.488	.235	.524	.228	.176	.112	.002	8.354	8.354

ANNUAL CRUSH: 79,200 TONS

Direct solvent:																			
Plant 4	0.980	1.107	0.225	0.151	2.463	1.584	0.408	----------	1.761	0.052	2.004	0.232	0.539	0.232	0.150	0.093	0.002	9.520	9.520
Plant 5*	1.074	1.196	.243	.155	2.668	1.458	.408	0.324	1.586	.052	2.004	.226	.539	.198	.144	.087	.001	9.695	9.371
Prepress solvent: Plant 5**	1.174	1.299	.264	.157	2.894	1.566	.407	.351	1.991	.038	2.004	.227	.541	.199	.149	.092	.001	10.460	10.109
Screw press:																			
12 press*	.984	1.111	.226	.130	2.451	1.522	.380	----------	2.403	.010	2.004	.230	.535	.231	.146	.089	.001	10.002	10.002
14 press	1.066	1.194	.243	.134	2.637	1.479	.381	.196	2.401	.010	2.004	.228	.535	.214	.144	.087	.001	10.317	10.121
Hydraulic:																			
30 press	.991	1.124	.229	.132	2.476	2.240	.177	----------	1.755	.005	.450	.229	.534	.231	.169	.112	.002	8.380	8.380
36 press	1.069	1.202	.245	.135	2.651	2.136	.177	.320	1.645	.005	.450	.225	.534	.212	.164	.107	.002	8.628	8.308
40 press*	1.107	1.236	.251	.135	2.729	2.016	.177	.448	1.583	.004	.450	.223	.534	.197	.159	.102	.002	8.624	8.176

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5**	0.960	1.088	0.221	0.141	2.410	1.566	0.402	----------	2.165	0.038	2.004	0.227	0.551	0.234	0.146	0.092	0.001	9.836	9.836
Direct solvent: Plant 5*	.884	1.009	.205	.139	2.237	1.458	.402	----------	1.760	.052	2.004	.226	.550	.234	.141	.087	.001	9.152	9.152
Screw press: 16 press*	.925	1.051	.214	.125	2.315	1.411	.375	----------	2 401	.010	2.004	.224	.545	.233	.138	.084	.001	9.741	9.741
Hydraulic: 40 press*	.907	1.037	.211	.124	2.279	2.016	.168	----------	1.752	.004	.413	.223	.544	.233	.156	.102	.002	7.892	7.892

See footnote at end of table.

TABLE 100.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area III, 1949–50*—Continued

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:											
Plant 1	40	12.0	69.089	69.089	41.349	26.773	8.000	2.315	78.437	9.348	9.348
Plant 2**	80	6.0	68.023	66.943	41.676	26.773	8.000	2.315	78.764	11.821	10.741
Direct solvent:											
Plant 1*	50	9.6	67.944	67.260	40.769	26.773	8.000	2.349	77.891	10.631	9.947
Plant 2	100	4.8	68.108	66.803	40.734	26.773	8.000	2.349	77.856	11.053	9.748
Screw press:											
2 press	50	9.6	66.349	65.771	37.677	26.773	8.000	2.481	74.931	9.160	8.58
3 press*	75	6.4	66.193	65.402	37.786	26.773	8.000	2.481	75.040	9.638	8.84
Hydraulic:											
4 press	40	12.0	66.229	66.229	36.542	26.069	8.000	2.521	73.132	6.903	6.903
6 press*	60	8.0	65.746	65.106	36.879	26.069	8.000	2.521	73.469	8.363	7.723
8 press	80	6.0	65.784	64.664	36.831	26.069	8.000	2.521	73.421	8.757	7.637

ANNUAL CRUSH: 13,200 TONS

Direct solvent:											
Plant 1	50	12.0	66.363	66.363	40.552	26.664	8.000	2.349	77.565	11.202	11.202
Plant 2*	100	6.0	66.229	65.365	40.872	26.664	8.000	2.349	77.885	12.520	11.656
Prepress solvent: Plant 2**	80	7.5	66.410	65.762	41.756	26.664	8.000	2.315	78.735	12.993	12.325
Screw press:											
2 press	50	12.0	65.042	65.042	37.476	26.664	8.000	2.474	74.614	9.572	9.572
3 press*	75	8.0	64.997	64.546	37.822	26.664	8.000	2.474	74.960	10.414	9.967
4 press	100	6.0	65.122	64.374	37.772	26.664	8.000	2.474	74.910	10.536	9.788
Hydraulic:											
6 press	60	10.0	64.626	64.056	36.690	25.713	8.000	2.505	72.908	8.852	8.282
8 press*	80	7.5	64.148	63.476	36.902	25.713	8.000	2.505	73.120	9.644	8.972

ANNUAL CRUSH: 21,100 TONS

Prepress solvent:											
Plant 2	80	12.0	64.186	64.186	41.349	26.501	8.000	2.135	77.985	13.799	13.799
Plant 3**	160	6.0	64.355	63.635	41.676	26.501	8.000	2.135	78.312	14.677	13.957
Direct solvent: Plant 2*	100	9.6	64.028	63.560	40.769	26.501	8.000	2.161	77.431	13.871	13.403
Screw press:											
4 press	100	9.6	63.290	62.882	37.677	26.501	8.000	2.263	74.441	11.559	11.151
5 press*	125	7.7	63.239	62.873	37.828	26.501	8.000	2.263	74.592	11.719	11.353
Hydraulic:											
8 press	80	12.0	61.910	61.910	36.542	25.118	8.000	2.294	71.954	10.044	10.044
10 press	100	9.6	62.210	61.666	36.738	25.118	8.000	2.294	72.150	10.484	9.940
12 press*	120	8.0	62.039	61.583	36.879	25.118	8.000	2.294	72.291	10.708	10.252

ANNUAL CRUSH: 26,400 TONS											
Direct solvent:											
Plant 2	100	12.0	63.041	63.041	40.552	26.447	8.000	2.091	77.090	14.049	14.049
Plant 3*	200	6.0	63.271	62.659	40.872	26.447	8.000	2.091	77.410	14.751	14.139
Prepress solvent: Plant 3**	160	7.5	63.394	62.962	41.756	26.447	8.000	2.064	78.267	15.305	14.873
Screw press:											
4 press*	100	12.0	62.472	62.472	37.476	26.447	8.000	2.193	74.116	11.644	11.644
5 press	125	9.6	62.733	62.376	37.677	26.447	8.000	2.193	74.317	11.941	11.584
Hydraulic:											
10 press*	100	12.0	61.136	61.136	36.542	24.928	8.000	2.224	71.694	10.558	10.558
12 press	120	10.0	61.401	60.993	36.690	24.928	8.000	2.224	71.842	10.849	10.441
ANNUAL CRUSH: 42,200 TONS											
Prepress solvent: Plant 3**	160	12.0	61.955	61.955	41.349	26.366	8.000	1.959	77.674	15.719	15.719
Direct solvent: Plant 3*	200	9.6	61.852	61.528	40.769	26.366	8.000	1.985	77.120	15.592	15.268
Screw press:											
7 press	175	11.0	61.552	61.399	37.552	26.366	8.000	2.087	74.005	12.606	12.453
8 press*	200	9.6	61.673	61.375	37.677	26.366	8.000	2.087	74.130	12.755	12.457
Hydraulic:											
16 press	160	12.0	59.884	59.884	36.542	24.643	8.000	2.118	71.303	11.419	11.419
22 press	220	8.7	60.309	59.797	36.825	24.643	8.000	2.118	71.586	11.789	11.277
24 press*	240	8.0	60.067	59.691	36.879	24.643	8.000	2.118	71.640	11.949	11.573
ANNUAL CRUSH: 52,800 TONS											
Direct solvent: Plant 3*	200	12.0	61.148	61.148	40.552	26.339	8.000	1.950	76.841	15.693	15.693
Prepress solvent: Plant 4**	240	10.0	61.666	61.387	41.516	26.339	8.000	1.924	77.779	16.392	16.113
Screw press:											
8 press*	200	12.0	61.026	61.026	37.476	26.339	8.000	2.052	73.867	12.841	12.841
10 press	250	9.6	61.352	61.054	37.677	26.339	8.000	2.052	74.068	13.014	12.716
Hydraulic:											
20 press	200	12.0	59.503	59.503	36.542	24.547	8.000	2.083	71.172	11.669	11.669
22 press*	220	10.9	59.493	59.277	36.619	24.547	8.000	2.083	71.249	11.972	11.756
24 press	240	10.0	59.577	59.241	36.690	24.547	8.000	2.083	71.320	12.079	11.743
ANNUAL CRUSH: 63,400 TONS											
Prepress solvent: Plant 4**	240	12.0	61.256	61.256	41.349	26.320	8.000	1.900	77.569	16.313	16.313
Direct solvent:											
Plant 4	300	9.6	61.224	60.945	40.769	26.320	8.000	1.927	77.016	16.071	15.792
Plant 5*	400	7.2	61.213	60.889	40.947	26.320	8.000	1.927	77.194	16.305	15.981
Screw press:											
10 press*	250	11.5	61.033	60.965	37.503	26.320	8.000	2.029	73.852	12.887	12.819
12 press	300	9.6	61.282	61.010	37.677	26.320	8.000	2.029	74.026	13.016	12.744
Hydraulic: 24 press*	240	12.0	59.128	59.128	36.542	24.484	8.000	2.060	71.086	11.958	11.958

See footnote at end of table.

TABLE 100.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area III, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:											
Plant 4	300	12.0	60.995	60.995	40.552	26.302	8.000	1.903	76.757	15.762	15.762
Plant 5*	400	9.0	61.170	60.846	40.847	26.302	8.000	1.903	77.052	16.206	15.882
Prepress solvent: Plant 5**	400	9.0	61.525	61.174	41.651	26.302	8.000	1.877	77.830	16.656	16.305
Screw press:											
12 press*	300	12.0	61.062	61.062	37.476	26.302	8.000	2.005	73.783	12.721	12.721
14 press	350	10.3	61.377	61.181	37.592	26.302	8.000	2.005	73.899	12.718	12.522
Hydraulic:											
30 press	300	12.0	59.440	59.440	36.542	24.421	8.000	2.036	70.999	11.559	11.559
36 press	360	10.0	59.618	59.368	36.690	24.421	8.000	2.036	71.147	11.779	11.459
40 press*	400	9.0	59.684	59.236	36.809	24.421	8.000	2.036	71.266	12.030	11.582

ANNUAL CRUSH: 105,600 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Prepress solvent: Plant 5**	400	12.0	61.209	61.209	41.349	26.284	8.000	1.853	77.486	16.277	16.277
Direct solvent: Plant 5*	400	12.0	60.935	60.935	40.552	26.284	8.000	1.880	76.716	15.781	15.781
Screw press: 16 press*	400	12.0	61.109	61.109	37.476	26.284	8.000	1.982	73.742	12.633	12.633
Hydraulic: 40 press*	400	12.0	59.260	59.260	36.542	24.357	8.000	2.013	70.912	11.652	11.652

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush.

Table 101.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area IV, 1949–50*

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed: Unaffected by type of mill or size of crush: Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Affected by size of crush: Seed haul	Salaries	Office	Travel and auto	Total	Affected by type of mill: Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 10,600 TONS																				
Prepress solvent:	*Tons*	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 1	40	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	2.750	2.344	0.221	0.232	5.547	0.625	0.320	--------	0.244	1.189
Plant 2**	80	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.625	.320	--------	.244	1.189
Direct solvent:																				
Plant 1*	50	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.875	.480	--------	.244	1.599
Plant 2	100	4.8	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.875	.480	--------	.244	1.599
Screw press:																				
2 press*	50	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.250	--------	--------	.934	1.184
3 press	75	6.4	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.250	--------	--------	.934	1.184
Hydraulic:																				
4 press	40	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.250	--------	0.690	.244	1.184
6 press*	60	8.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.250	--------	.690	.244	1.184
8 press	80	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.750	2.344	.221	.232	5.547	.250	--------	.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1*	50	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	2.930	2.280	0.213	0.226	5.649	0.875	0.480	--------	0.244	1.599
Plant 2	100	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.875	.480	--------	.244	1.599
Prepress solvent: Plant 2**	80	7.5	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.625	.320	--------	.244	1.189
Screw press:																				
2 press*	50	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.250	--------	--------	.934	1.184
3 press	75	8.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.250	--------	--------	.934	1.184
4 press	100	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.250	--------	--------	.934	1.184
Hydraulic:																				
6 press	60	10.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.250	--------	0.690	.244	1.184
8 press*	80	7.5	44.654	.400	.356	.291	1.350	.115	.050	47.216	2.930	2.280	.213	.226	5.649	.250	--------	.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																				
Prepress solvent:																				
Plant 2**	80	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	3.230	2.095	0.192	0.205	5.722	0.625	0.320	--------	0.244	1.189
Plant 3	160	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.625	.320	--------	.244	1.189
Direct solvent: Plant 2*	100	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.875	.480	--------	.244	1.599
Screw press:																				
4 press*	100	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.250	--------	--------	.934	1.184
5 press	125	7.7	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.250	--------	--------	.934	1.184
Hydraulic:																				
8 press*	80	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.250	--------	0.690	.244	1.184
10 press	100	9.6	44.654	.400	.356	.291	1.250	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.250	--------	.690	.244	1.184
12 press	120	8.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.230	2.095	.192	.205	5.722	.250	--------	.690	.244	1.184

See footnote at end of table.

TABLE 101.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area IV, 1949–50*—Continued

ANNUAL CRUSH: 26,400 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																				
Plant 2*	100	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	3.530	1.979	0.180	0.192	5.881	0.875	0.480		0.244	1.599
Plant 3	200	6.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.875	.480		.244	1.599
Prepress solvent: Plant 3**	160	7.5	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.625	.320		.244	1.189
Screw press:																				
4 press*	100	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.250			.934	1.184
5 press	125	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.250			.934	1.184
Hydraulic:																				
10 press*	100	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.250		0.690	.244	1.184
12 press	120	10.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	3.530	1.979	.180	.192	5.881	.250		.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3**	160	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	4.330	1.680	0.147	0.157	6.314	0.625	0.320		0.244	1.189
Direct solvent: Plant 3*	200	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.680	.147	.157	6.314	.875	.480		.244	1.599
Screw press:																				
7 press*	175	11.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.680	.147	.157	6.314	.250			.934	1.184
8 press	200	9.6	44.654	.400	.356	.291	1,350	.115	.050	47,216	4.330	1.680	.147	.157	6.314	.250			.934	1.184
Hydraulic:																				
16 press*	160	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.680	.147	.157	6.314	.250		0.690	.244	1.184
22 press	220	8.7	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.680	.147	.157	6.314	.250		.690	.244	1.184
24 press	240	8.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.680	.147	.157	6.314	.250		.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																				
Direct solvent: Plant 3*	200	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	4.700	1.515	0.129	0.137	6.481	.875	0.480		0.244	1.599
Prepress solvent: Plant 4**	240	10.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.625	.320		.244	1.189
Screw press:																				
8 press*	200	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.250			.934	1.184
10 press	250	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.250			.934	1.184
Hydraulic:																				
20 press*	200	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.250		0.690	.244	1.184
22 press	220	10.9	44.654	.400	.356	.291	1,350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.250		.690	.244	1.184
24 press	240	10.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.700	1.515	.129	.137	6.481	.250		.690	.244	1.184

ANNUAL CRUSH: 63,400 TONS																				
Prepress solvent: Plant 4**	240	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	5.020	1.380	0.116	0.119	6.635	0.625	0.320		0.244	1.189
Direct solvent:																				
Plant 4*	300	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.020	1.380	.116	.119	6.635	.875	.480		.244	1.599
Plant 5	400	7.2	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.020	1.380	.116	.119	6.635	.875	.480		.244	1.599
Screw press:																				
10 press*	250	11.5	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.020	1.380	.116	.119	6.635	.250			.934	1.184
12 press	300	9.6	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.020	1.380	.116	.119	6.635	.250			.934	1.184
Hydraulic: 24 press*	240	12.0	44.654	.400	.356	291	1.350	.115	.050	47.216	5.020	1.380	.116	.119	6.635	.250		0.690	.244	1.184
ANNUAL CRUSH: 79,200 TONS																				
Direct solvent:																				
Plant 4*	300	12.0	44.654	0.400	0.356	0.291	1.350	0.115	.050	47.216	5.330	1.231	0.102	0.098	6.761	0.875	0.480		0.244	1.599
Plant 5	400	9.0	4 .654	.400	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.875	.480		.244	1.599
Prepress solvent: Plant 5**	400	9.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.625	.320		.244	1.189
Screw press:																				
12 press*	300	12.0	44.654	.440	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.250			.934	1.184
14 press	350	10.3	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.250			.934	1.184
Hydraulic:																				
30 press*	300	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.250		0.690	.244	1.184
36 press	360	10.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	4.330	1.231	.102	.098	6.761	.250		.690	.244	1.184
40 press	400	9.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.330	1.231	.102	.098	6.761	.250		.690	.244	1.184
ANNUAL CRUSH: 105,600 TONS																				
Prepress solvent: Plant 5**	400	12.0	44.654	0.400	0.356	0.291	1.350	0.115	0.050	47.216	5.700	1.170	0.095	0.074	7.039	0.625	0.320		0.244	1.189
Direct solvent: Plant 5*	400	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.700	1.170	.095	.074	7.039	.875	.480		.244	1.599
Screw press: 16 press*	400	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.700	1.170	.095	.074	7.039	.250			.933	1.184
Hydraulic: 40 press*	400	12.0	44.654	.400	.356	.291	1.350	.115	.050	47.216	5.700	1.170	.095	.074	7.039	.250		0.690	.244	1.184

See footnote at end of table.

TABLE 101.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area IV, 1949–50*—Continued

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor			Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor										Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	2.644	2.887	1.011	0.320	6.862	6.000	0.650	----------	1.265	0.069	2.115	0.389	0.232	0.240	0.410	0.488	0.006	18.726	18.726
Plant 2**	2.978	3.213	1.125	.352	7.668	3.600	.650	1.200	1.060	.061	2.115	.299	.232	.146	.302	.315	.004	17.652	16.452
Direct solvent:																			
Plant 1*	2.649	2.871	1.006	.349	6.875	4.320	.652	.760	.964	.088	2.115	.352	.229	.214	.334	.367	.004	17.274	16.514
Plant 2	3.240	3.463	1.213	.414	8.330	2.880	.652	1.450	.868	.070	2.115	.280	.229	.102	.270	.264	.003	17.513	16.063
Screw press:																			
2 press*	2.270	2.493	.873	.235	5.871	3.648	.620	.646	1.316	.018	2.115	.350	.218	.213	.303	.332	.004	15.654	15.008
3 press	2.488	2.703	.947	.243	6.381	3.040	.620	.884	1.233	.018	2.115	.302	.218	.148	.275	.286	.003	15.523	14.639
Hydraulic:																			
4 press	2.202	2.445	.856	.235	5.738	5.400	.583	----------	1.081	.009	2.115	.386	.214	.239	.380	.461	.005	16.611	16.611
6 press*	2.374	2.611	.915	.230	6.130	4.320	.583	.720	.946	.008	2.115	.325	.214	.191	.331	.380	.004	16.267	15.547
8 press	2.481	2.705	.948	.243	6.377	3.780	.583	1.260	.882	.007	2.115	.295	.214	.144	.307	.339	.004	16.307	15.047

ANNUAL CRUSH: 13,200 TONS

Mill [1]	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total including dormant season labor	Total excluding dormant season labor
Direct solvent:																			
Plant 1*	2.190	2.387	0.836	0.297	5.710	4.320	0.643	----------	1.043	0.088	2.115	0.352	0.246	0.240	0.331	0.367	0.004	15.459	15.459
Plant 2	2.610	2.800	.981	.338	6.729	2.880	.643	0.960	.819	.065	2.115	.280	.246	.146	.266	.263	.003	15.415	14.455
Prepress solvent: Plant 2**	2.419	2.625	.919	.293	6.256	3.600	.642	.720	1.090	.061	2.115	.299	.248	.181	.299	.315	.004	15.830	15.110
Screw press:																			
2 press*	1.874	2.079	.728	.206	4.887	3.648	.606	----------	1.387	.018	2.115	.350	.244	.240	.299	.331	.004	14.129	14.129
3 press	2.044	2.243	.785	.211	5.283	3.040	.608	.504	1.254	.017	2.115	.302	.244	.192	.272	.285	.003	14.119	13.615
4 press	2.288	2.478	.868	.224	5.858	2.584	.606	.836	1.123	.017	2.115	.278	.244	.145	.251	.250	.003	14.310	13.474
Hydraulic:																			
6 press	1.934	2.141	.750	.206	5.031	4.320	.569	.648	.980	.008	2.115	.325	.241	.220	.328	.378	.004	15.167	14.519
8 press*	2.021	2.219	.777	.206	5.223	3.780	.569	.756	.914	.008	2.115	.295	.241	.179	.303	.338	.004	14.725	13.969

ANNUAL CRUSH: 21,100 TONS

Mill [1]	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total including dormant season labor	Total excluding dormant season labor
Prepress solvent:																			
Plant 2**	1.643	1.821	0.638	0.221	4.323	3.600	0.568	----------	1.180	0.061	2.115	0.299	0.374	0.242	0.287	0.309	0.004	13.362	13.362
Plant 3	2.131	2.293	.803	.253	5.480	2.450	.568	0.800	.908	.044	2.115	.253	.374	.147	.235	.227	.003	13.604	12.804
Direct solvent: Plant 2*	1.751	1.914	.671	.246	4.582	2.880	.568	.520	.905	.066	2.115	.280	.373	.215	255	.258	.003	13.020	12.500
Screw press:																			
4 press*	1.547	1.710	.599	.175	4.031	2.584	.536	.456	1.210	.017	2.115	.278	.370	.215	.240	.245	.003	12.300	11.844
5 press	1.773	1.922	.673	.186	4.554	2.252	.534	.409	1.114	.017	2.115	.266	.370	.185	.225	.220	.003	12.264	11.855
Hydraulic:																			
8 press*	1.394	1.567	.549	.167	3.677	3.780	.502	----------	1.013	.007	2.115	.295	.367	.241	.292	.333	.004	12.626	12.626
10 press	1.505	1.673	.586	.172	3.936	3.456	.502	.612	.938	.007	2.115	.277	.367	.214	.278	.308	.003	13.013	12.401
12 press	1.708	1.867	.654	.184	4.413	3.060	.502	.513	.873	.007	2.115	.265	.367	.193	.260	.278	.003	12.849	12.336

ANNUAL CRUSH: 26,400 TONS

Direct solvent:																			
Plant 2*	1.448	1.600	0.510	0.211	3.769	2.880	0.543	----------	0.953	0.065	2.115	0.280	0.415	0.243	0.248	0.256	0.003	11.770	11.770
Plant 3	1.858	2.000	.700	.242	4.800	2.040	.543	0.680	.725	.048	2.115	.244	.415	.148	.211	.195	.002	12.166	11.486
Prepress solvent: Plant 3**	1.761	1.912	.670	.219	4.562	2.450	.544	.480	.977	.044	2.115	.253	.416	.183	.229	.225	.003	12.481	12.001
Screw press:																			
4 press*	1.288	1.440	.504	.154	3.386	2.584	.512	----------	1.245	.017	2.115	.278	.410	.242	.234	.243	.003	11.269	11.269
5 press	1.480	1.625	.569	.168	3.842	2.252	.511	.399	1.149	.017	2.115	.266	.410	.216	.219	.218	.002	11.616	11.217
Hydraulic:																			
10 press*	1.251	1.407	.493	.152	3.303	3.456	.480	----------	.986	.007	2.115	.277	.409	.242	.271	.306	.003	11.855	11.855
12 press	1.428	1.581	.554	.166	3.729	3.060	.480	.459	.903	.007	2.115	.265	.409	.223	.254	.277	.003	12.184	11.725

ANNUAL CRUSH: 42,200 TONS

Prepress solvent: Plant 3**	1.226	1.367	0.479	0.171	3.243	2.450	0.506	----------	1.047	0.044	2.115	0.253	0.479	0.247	0.214	0.222	0.003	10.823	10.823
Direct solvent: Plant 3*	1.283	1.416	.496	.184	3.379	2.040	.506	0.360	.800	.048	2.115	.244	.478	.220	.195	.192	.002	10.579	10.219
Screw press:																			
7 press*	1.180	1.316	.461	.141	3.101	1.995	.478	.171	1.101	.017	2.115	.247	.474	.234	.192	.196	.002	10.323	10.152
8 press	1.228	1.362	.477	.146	3.213	1.900	.477	.333	1.084	.017	2.115	.242	.474	.219	.188	.189	.002	10.453	10.120
Hydraulic:																			
16 press*	1.100	1.240	.434	.141	2.915	2.835	.446	----------	.913	.007	2.115	.250	.472	.246	.228	.257	.003	10.687	10.687
22 press	1.250	1.389	.486	.147	3.272	2.655	.446	.576	.799	.007	2.115	.238	.472	.204	.220	.243	.003	11.250	10.674
24 press	1.291	1.426	.500	.146	3.363	2.520	.446	.423	.778	.007	2.115	.235	.472	.178	.214	.233	.003	10.987	10.564

ANNUAL CRUSH: 52,800 TONS

Direct solvent: Plant 3*	1.088	1.221	0.428	0.166	2.903	2.040	0.493	----------	0.852	0.048	2.115	0.244	0.499	0.248	0.187	0.191	0.002	9.822	9.822
Prepress solvent: Plant 4**	1.238	1.371	.480	.168	3.257	2.100	.494	0.310	.968	.036	2.115	.238	.500	.229	.189	.196	.002	10.634	10.324
Screw press:																			
8 press*	1.047	1.180	.413	.135	2.734	1.900	.465	----------	1.130	.016	2.115	.242	.495	.248	.180	.188	.002	9.715	9.715
10 press	1.166	1.297	.454	.139	3.056	1.824	.465	.333	1.060	.016	2.115	.236	.495	.220	.176	.182	.002	10.180	9.847
Hydraulic:																			
20 press*	1.024	1.160	.406	.134	2.724	2.808	.435	----------	.882	.007	2.115	.241	.493	.247	.219	.254	.003	10.428	10.428
22 press	1.054	1.186	.415	.134	2.789	2.655	.435	.243	.826	.007	2.115	.238	.493	.234	.212	.242	.003	10.492	10.249
24 press	1.095	1.229	.430	.135	2.889	2.520	.435	.378	.822	.007	2.115	.235	.493	.228	.206	.232	.003	10.563	10.185

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	1.077	1.209	0.423	0.154	2.863	2.100	0.486	----------	1.009	0.036	2.115	0.238	0.514	0.231	0.184	0.195	0.002	9.973	9.973
Direct solvent:																			
Plant 4*	1.152	1.279	.448	.167	3.046	1.760	.485	0.310	.766	.042	2.115	.232	.513	.223	.168	.171	.002	9.833	9.523
Plant 5	1.267	1.388	.486	.171	3.312	1.620	.485	.360	.703	.039	2.115	.226	.513	.181	.162	.161	.002	9.879	9.519
Screw press:																			
10 press*	1.020	1.153	.404	.131	2.708	1.824	.458	.076	1.102	.016	2.115	.236	.511	.243	.170	.181	.002	9.642	9.566
12 press	1.157	1.285	.450	.141	3.033	1.701	.458	.304	1.041	.015	2.115	.229	.511	.222	.164	.172	.002	9.967	9.663
Hydraulic: 24 press*	.958	1.091	.382	.126	2.557	2.520	.428	----------	.865	.007	2.115	.235	.507	.249	.200	.232	.003	9.918	9.918

See footnote at end of table.

TABLE 101.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area IV, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill[1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																			
Plant 4*	0.981	1.107	0.388	0.151	2.627	1.760	0.477	----------	0.815	0.042	2.115	0.232	0.527	0.251	0.161	0.170	0.002	9.179	9.179
Plant 5	1.074	1.196	.419	.155	2.844	1.620	.477	0.360	.724	.039	2.115	.226	.527	.215	.155	.160	.002	9.464	9.104
Prepress solvent: Plant 5**	1.174	1.299	.455	.157	3.085	1.740	.478	.390	.882	.030	2.115	.226	.528	.215	.160	.169	.002	10.020	9.630
Screw press:																			
12 press*	.985	1.112	.390	.130	2.617	1.701	.449	----------	1.079	.015	2.115	.229	.523	.251	.157	.171	.002	9.309	9.309
14 press	1.066	1.194	.418	.134	2.812	1.653	.451	.219	1.063	.014	2.115	.227	.523	.232	.155	.168	.002	9.634	9.415
Hydraulic:																			
30 press*	.992	1.125	.394	.132	2.643	2.520	.420	----------	.844	.007	2.115	.229	.521	.250	.193	.231	.003	9.976	9.976
36 press	1.070	1.204	.422	.135	2.831	2.403	.420	.360	.785	.007	2.115	.225	.521	.230	.188	.222	.002	10.309	9.949
40 press	1.107	1.236	.433	.135	2.911	2.268	.420	.504	.752	.007	2.115	.223	.521	.214	.182	.212	.002	10.331	9.827

ANNUAL CRUSH: 105,600 TONS

Mill[1]	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
Prepress solvent: Plant 5**	0.960	1.088	0.381	0.141	2.570	1.740	0.469	----------	0.943	0.030	2.115	0.226	0.543	0.253	0.157	0.168	0.002	9.216	9.216
Direct solvent: Plant 5*	.884	1.009	.353	.139	2.385	1.620	.469	----------	.789	.039	2.115	.226	.541	.253	.152	.159	.002	8.750	8.750
Screw press: 16 press*	.925	1.051	.368	.126	2.470	1.577	.442	----------	1.028	.014	2.115	.223	.537	.252	.149	.161	.002	8.970	8.970
Hydraulic: 40 press*	.907	1.037	.363	.124	2.431	2.268	.413	----------	.825	.007	2.115	.223	.535	.252	.178	.211	.002	9.460	9.460

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:											
Plant 1	40	12.0	72.678	72.678	40.793	29.375	8.000	2.284	80.452	7.774	7.774
Plant 2**	80	6.0	71.604	70.404	40.333	29.375	8.000	2.284	79.992	9.588	8.388
Direct solvent:											
Plant 1*	50	9.6	71.636	70.876	39.883	29.375	8.000	2.318	79.576	8.700	7.940
Plant 2	100	4.8	71.875	70.425	39.346	29.375	8.000	2.318	79.039	8.614	7.164
Screw press:											
2 press*	50	9.6	69.601	68.955	36.678	29.375	8.000	2.449	76.502	7.547	6.901
3 press	75	6.4	69.470	68.586	36.388	29.375	8.000	2.449	76.212	7.626	6.742
Hydraulic:											
4 press	40	12.0	70.558	70.558	35.774	29.375	8.000	2.489	75.638	5.080	5.080
6 press*	60	8.0	70.214	69.494	35.684	29.375	8.000	2.489	75.548	6.054	5.334
8 press	80	6.0	70.254	68.994	35.371	29.375	8.000	2.489	75.235	6.241	4.981
ANNUAL CRUSH: 13,200 TONS											
Direct solvent:											
Plant 1*	50	12.0	69.923	69.923	39.960	29.297	8.000	2.308	79.565	9.642	9.642
Plant 2	100	6.0	69.879	68.919	39.510	29.297	8.000	2.308	79.115	10.196	9.236
Prepress solvent: Plant 2**	80	7.5	69.884	69.164	40.625	29.297	8.000	2.283	80.205	11.041	10.321
Screw press:											
2 press*	50	12.0	68.178	68.178	36.749	29.297	8.000	2.405	76.451	8.273	8.273
3 press	75	8.0	68.168	67.664	36.657	29.297	8.000	2.405	76.359	8.695	8.191
4 press	100	6.0	68.359	67.523	36.335	29.297	8.000	2.405	76.037	8.514	7.678
Hydraulic:											
6 press	60	10.0	69.216	68.568	35.696	29.297	8.000	2.435	75.428	6.860	6.212
8 press*	80	7.5	68.774	68.018	35.627	29.297	8.000	2.435	75.359	7.341	6.585
ANNUAL CRUSH: 21,100 TONS											
Prepress solvent:											
Plant 2**	80	12.0	67.489	67.489	40.793	28.877	8.000	2.063	79.733	12.244	12.244
Plant 3	160	6.0	67.731	66.931	40.333	28.877	8.000	2.063	79.273	12.342	11.542
Direct solvent: Plant 2*	100	9.6	67.557	67.037	39.883	28.877	8.000	2.088	78.848	11.811	11.291
Screw press:											
4 press*	100	9.6	66.422	65.966	36.678	28.877	8.000	2.185	75.740	9.774	9.318
5 press	125	7.7	66.386	65.977	36.617	28.877	8.000	2.185	75.679	9.702	9.293
Hydraulic.											
8 press*	80	12.0	66.748	66.748	35.774	28.877	8.000	2.214	74.865	8.117	8.117
10 press	100	9.6	67.135	66.523	35.705	28.877	8.000	2.214	74.796	8.273	7.661
12 press	120	8.0	66.971	66.458	35.684	28.877	8.000	2.214	74.775	8.317	7.804

See footnote at end of table.

TABLE 101.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area IV, 1949–50*—Continued

ANNUAL CRUSH: 26,400 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:											
Plant 2*	100	12.0	66.466	66.466	39.960	28.737	8.000	2.014	78.711	12.245	12.245
Plant 3	200	6.0	66.862	66.182	39.510	28.737	8.000	2.014	78.261	12.079	11.399
Prepress solvent: Plant 3**	160	7.5	66.767	66.287	40.625	28.737	8.000	1.989	79.351	13.064	12.584
Screw press:											
4 press*	100	12.0	65.550	65.550	36.737	28.737	8.000	2.112	75.586	10.036	10.036
5 press	125	9.6	65.897	65.498	36.678	28.737	8.000	2.112	75.527	10.029	9.630
Hydraulic:											
10 press*	100	12.0	66.136	66.136	35.774	28.737	8.000	2.141	74.652	8.516	8.516
12 press	120	10.0	66.465	66.006	35.696	28.737	8.000	2.141	74.574	8.568	8.109

ANNUAL CRUSH: 42.200 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Prepress solvent: Plant 3**	160	12.0	65.542	65.542	40.793	28.527	8.000	1.879	79.199	13.657	13.657
Direct solvent: Plant 3*	200	9.6	65.708	65.348	39.883	28.527	8.000	1.904	78.314	12.966	12.606
Screw press:											
7 press*	175	11.0	65.037	64.866	36.715	28.527	8.000	2.001	75.243	10.377	10.206
8 press	200	9.6	65.167	64.834	36.678	28.527	8.000	2.001	75.206	10.372	10.039
Hydraulic:											
16 press*	160	12.0	65.401	65.401	35.774	28.527	8.000	2.031	74.332	8.931	8.931
22 press	220	8.7	65.964	65.388	35.702	28.527	8.000	2.031	74.260	8.872	8.296
24 press	240	8.0	65.701	65.278	35.684	28.527	8.000	2.031	74.242	8.964	8.541

ANNUAL CRUSH: 52,800 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Direct solvent: Plant 3*	200	12.0	65.118	65.118	39.960	28.457	8.000	1.868	78,285	13.167	13.167
Prepress solvent: Plant 4**	240	10.0	65.520	65.210	40.704	28.457	8.000	1.842	79.003	13.793	13.483
Screw press:											
8 press*	200	12.0	64.596	64.596	36.749	28.457	8.000	1.965	75.171	10.575	10.575
10 press	250	9.6	65.061	64.728	36.678	28.457	8.000	1.965	75.100	10.372	10.039
Hydraulic:											
20 press*	200	12.0	65.309	65.309	35.774	28.457	8.000	1.994	74.225	8.916	8.916
22 press	220	10.9	65.373	65.130	35.735	28.457	8.000	1.994	74.186	9.056	8.813
24 press	240	10.0	65.444	65.066	35.696	28.457	8.000	1.994	74.147	9.081	8.703

ANNUAL CRUSH: 63,400 TONS											
Prepress solvent: Plant 4**	240	12.0	65.013	65.013	40.793	28.410	8.000	1.818	79.021	14.008	14.008
Direct solvent:											
Plant 4*	300	9.6	65.283	64.973	39.883	28.410	8.000	1.843	78.136	13.163	12.853
Plant 5	400	7.2	65.329	64.969	39.752	28.410	8.000	1.843	78.005	13.036	12.676
Screw press:											
10 press*	250	11.5	64.677	64.601	36.728	28.410	8.000	1.940	75.078	10.477	10.401
12 press	300	9.6	65.002	64.698	36.678	28.410	8.000	1.940	75.028	10.330	10.026
Hydraulic: 24 press*	240	12.0	64.953	64.953	35.774	28.410	8.000	1.970	74.154	9.201	9.201
ANNUAL CRUSH: 79,200 TONS											
Direct solvent:											
Plant 4*	300	12.0	64.755	64.755	39.960	28.363	8.000	1.819	78.142	13.387	13.387
Plant 5	400	9.0	65.040	64.680	39.893	28.363	8.000	1.819	78.075	13.395	13.035
Prepress solvent: Plant 5**	400	9.0	65.186	64.796	40.724	28.363	8.000	1.793	78.880	14.084	13.694
Screw press:											
12 press*	300	12.0	64.470	64.470	36.749	28.363	8.000	1.916	75.028	10.558	10.558
14 press	350	10.3	64.795	64.576	36.678	28.363	8.000	1.916	74.957	10.381	10.162
Hydraulic:											
30 press*	300	12.0	65.137	65.137	35.774	28.363	8.000	1.945	74.082	8.945	8.945
36 press	360	10.0	65.470	65.110	35.696	28.363	8.000	1.945	74.004	8.894	8.534
40 press	400	9.0	65.492	64.988	35.714	28.363	8.000	1.945	74.022	9.034	8.530
ANNUAL CRUSH: 105,600 TONS											
Prepress solvent: Plant 5**	400	12.0	64.660	64.660	40.793	28.317	8.000	1.769	78.879	14.219	14.219
Direct solvent: Plant 5*	400	12.0	64.604	64.604	39.960	28.317	8.000	1.794	78.071	13.467	13.467
Screw press: 16 press*	400	12.0	64.409	64.409	36.749	28.317	8.000	1.891	74.957	10.548	10.548
Hydraulic: 40 press*	400	12.0	64.899	64.899	35.774	28.317	8.000	1.921	74.012	9.113	9.113

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush.

TABLE 102.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area V, 1949–50*

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																	
			Unaffected by type of mill or size of crush								Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 10,600 TONS																				
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																				
Plant 1	40	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	2.760	2.344	0.221	0.232	5.557	0.625	0.320		0.244	1.189
Plant 2**	80	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.625	.320		.244	1.189
Direct solvent:																				
Plant 1*	50	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.875	.480		.244	1.599
Plant 2	100	4.8	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.875	.480		.244	1.599
Screw press:																				
2 press*	50	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.250			.934	1.184
3 press	75	6.4	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.250			.934	1.184
Hydraulic:																				
4 press	40	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.321	.232	5.557	.250		0.690	.244	1.184
6 press*	60	8.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.250		.690	.244	1.184
8 press	80	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.344	.221	.232	5.557	.250		.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																				
Direct solvent:																				
Plant 1*	50	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	2.760	2.280	0.213	0.226	5.479	0.875	0.480		0.244	1.599
Plant 2	100	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.213	.226	5.479	.875	.480		.244	1.599
Prepress solvent: Plant 2**	80	7.5	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.213	.226	5.479	.625	.320		.244	1.189
Screw press:																				
2 press*	50	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.213	.226	5.479	.250			.934	1.184
3 press	75	8.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.213	.226	5.479	.250			.934	1.184
4 press	100	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.213	.226	5.479	.250			.934	1.184
Hydraulic:																				
6 press	60	10.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.313	.226	5.479	.250		0.690	.244	1.184
8 press*	80	7.5	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.280	.313	.226	5.479	.250		.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																				
Prepress solvent:																				
Plant 2**	80	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	2.760	2.095	0.192	0.205	5.252	0.625	0.320		0.244	1.189
Plant 3	160	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.625	.320		.244	1.189
Direct solvent: Plant 2*	100	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5 252	.875	.480		.244	1.599
Screw press:																				
4 press*	100	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.250			.934	1.184
5 press	125	7.7	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.250			.934	1.184
Hydraulic:																				
8 press*	80	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.250		0.690	.244	1.184
10 press	100	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.250		.690	.244	1.184
12 press	120	8.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.760	2.095	.192	.205	5.252	.250		.690	.244	1.184

ANNUAL CRUSH: 26,400 TONS																				
Direct solvent:																				
Plant 2*	100	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	2.780	1.979	0.180	0.192	5.131	0.875	0.480		0.244	1.599
Plant 3	200	6.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.949	.180	.192	5.131	.875	.480		.244	1.599
Prepress solvent: Plant 3**	160	7.5	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.979	.180	.192	5.131	.625	.320		.244	1.189
Screw press:																				
4 press*	100	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.979	.180	.192	5.131	.250			.934	1.184
5 press	125	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.979	.180	.192	5.131	.250			.934	1.184
Hydraulic:																				
10 press*	100	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.979	.180	.192	5.131	.250		0.690	.244	1.184
12 press	120	10.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.780	1.979	.180	.192	5.131	.250		.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																				
Prepress solvent: Plant 3**	160	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	2.990	1.680	0.147	0.157	4.974	0.625	0.320		0.244	1.189
Direct solvent: Plant 3*	200	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.875	.480		.244	1.599
Screw press:																				
7 press*	175	11.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.250			.934	1.184
8 press	200	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.250			.934	1.184
Hydraulic:																				
16 press*	160	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.250		0.690	.244	1.184
22 press	220	8.7	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.250		.690	.244	1.184
24 press	240	8.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	2.990	1.680	.147	.157	4.974	.250		.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																				
Direct solvent: Plant 3*	200	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	3.090	1.515	0.129	0.137	4.871	0.875	0.480		0.244	1.599
Prepress solvent: Plant 4**	240	10.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.625	.320		.244	1.189
Screw press:																				
8 press*	200	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.250			.934	1.184
10 press	250	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.250			.934	1.184
Hydraulic:																				
20 press*	200	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.250		0.690	.244	1.184
22 press	220	10.9	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.250		.690	.244	1.184
24 press	240	10.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.090	1.515	.129	.137	4.871	.250		.690	.244	1.184
ANNUAL CRUSH: 63,400 TONS																				
Prepress solvent: Plant 4**	240	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	3.150	1.380	0.116	0.119	4.765	0.625	0.320		0.244	1.189
Direct solvent:																				
Plant 4*	300	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.150	1.380	.116	.119	4.765	.875	.480		.244	1.599
Plant 5	400	7.2	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.150	1.380	.116	.119	4.765	.875	.480		.244	1.599
Screw press:																				
10 press*	250	11.5	43.972	.400	.356	.291	1.350	.122	.050	46.541	3,150	1.380	.116	.119	4.765	.250			.934	1.184
12 press	300	9.6	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.150	1.380	.116	.119	4.765	.250			.934	1.184
Hyrdaulic: 24 press*	240	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.150	1.380	.116	.119	4.765	.250		0.690	.244	1.184

See footnote at end of table.

TABLE 102.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area V, 1949–50*—Continued

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed: Unaffected by type of mill or size of crush: Seed f. o. b. gins	Seed buyers	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Affected by size of crush: Seed haul	Salaries	Office	Travel and auto	Total	Affected by type of mill: Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 79,200 TONS																				
	Tons	Months	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Direct solvent:																				
Plant 4*	300	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	3.240	1.231	0.102	0.098	4.671	0.875	0.480		0.244	1.599
Plant 5	400	9.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.875	.480		.244	1.599
Prepress solvent: Plant 5**	400	9.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.625	.320		.244	1.189
Screw press:																				
12 press*	300	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.250			.934	1.184
14 press	350	10.3	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.250			.934	1.184
Hydraulic:																				
30 press*	300	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.250		0.690	.244	1.184
36 press	360	10.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.250		.690	.244	1.184
40 press	400	9.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.240	1.231	.102	.098	4.671	.250		.690	.244	1.184
ANNUAL CRUSH: 105,600 TONS																				
Prepress solvent: Plant 5**	400	12.0	43.972	0.400	0.356	0.291	1.350	0.122	0.050	46.541	3.390	1.170	0.095	0.074	4.729	0.625	0.320		0.244	1.189
Direct solvent: Plant 5*	400	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.390	1.170	.095	.074	4.729	.875	.480		.244	1.599
Screw press: 16 press*	400	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.390	1.170	.095	.074	4.729	.250			.934	1.184
Hydraulic: 40 press*	400	12.0	43.972	.400	.356	.291	1.350	.122	.050	46.541	3.390	1.170	.095	.074	4.729	.250		0.699	.244	1.184

Mill [1]	Plant: Depreciation	Plant: Interest	Plant: Taxes	Plant: Insurance on building and machinery	Plant: Total	Labor: Production	Labor: Meal grinding and product loading	Labor: Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total: Including dormant season labor	Total: Excluding dormant season labor
ANNUAL CRUSH: 10,600 TONS																			
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	2.653	2.897	2.047	0.322	7.919	6.300	0.688	----------	1.530	0.068	2.131	0.390	0.234	0.236	0.425	0.374	0.005	20.300	20.300
Plant 2**	2.989	3.224	2.278	.354	8.845	3.780	.688	1.260	1.119	.066	2.131	.299	.234	.145	.312	.242	.003	19.124	17.864
Direct solvent:																			
Plant 1*	2.658	2.881	2.035	.351	7.925	4.536	.690	.798	1.087	.093	2.131	.353	.231	.211	.346	.282	.004	18.687	17.889
Plant 2	3.251	3.475	2.455	.416	9.597	3.024	.690	1.523	.946	.087	2.131	.281	.231	.101	.278	.202	.003	19.094	17.571
Screw press:																			
2 press*	2.357	2.590	1.830	.244	7.021	3.840	.658	.680	1.483	.019	2.131	.351	.219	.210	.313	.248	.003	17.176	16.496
3 press	2.577	2.801	1.979	.251	7.608	3.200	.658	.930	1.299	.018	2.131	.302	.219	.147	.285	.214	.003	17.014	16.084
Hydraulic:																			
4 press	2.290	2.542	1.796	.243	6.871	5.700	.621	----------	1.360	.010	2.131	.386	.216	.236	.395	.345	.004	18.275	18.275
6 press*	2.464	2.710	1.915	.237	7.326	4.560	.621	.760	1.108	.009	2.131	.326	.216	.189	.344	.285	.004	17.879	17.119
8 press	2.572	2.806	1.982	.252	7.612	3.990	.621	1.330	.972	.008	2.131	.296	.216	.138	.318	.254	.003	17.889	16.559
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1*	2.190	2.395	1.692	0.299	6.576	4.536	0.683	----------	1.136	0.093	2.131	0.353	0.239	0.236	0.343	0.281	0.004	16.611	16.611
Plant 2	2.619	2.809	1.985	.339	7.752	3.024	.683	1.008	.871	.086	2.131	.281	.239	.144	.275	.202	.003	16.699	15.691
Prepress solvent: Plant 2**	2.427	2.634	1.861	.294	7.216	3.780	.683	.756	1.158	.066	2.131	.299	.240	.178	.309	.242	.003	17.061	16.305
Screw press:																			
2 press*	1.945	2.158	1.524	.213	5.840	3.840	.647	----------	1.530	.019	2.131	.351	.235	.236	.310	.247	.003	15.389	15.389
3 press	2.115	2.322	1.640	.218	6.295	3.200	.649	.530	1.300	.018	2.131	.302	.235	.190	.281	.213	.003	15.347	14.817
4 press	2.361	2.558	1.807	.231	6.957	2.720	.647	.880	1.151	.017	2.131	.278	.235	.143	.260	.188	.003	15.610	14.730
Hydraulic:																			
6 press	2.006	2.220	1.569	.213	6.008	4.560	.609	.684	1.131	.009	2.131	.326	.233	.217	.341	.284	.004	16.537	15.853
8 press*	2.093	2.299	1.625	.213	6.230	3.990	.609	.798	1.005	.008	2.131	.296	.233	177	.315	.253	.003	16.048	15.25
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2**	1.648	1.827	1.291	0.222	4.988	3.780	0.649	----------	1.201	0.066	2.131	0.299	0.283	0.236	0.299	0.240	0.003	14.175	14.175
Plant 3	2.141	2.302	1.626	.255	6.324	2.573	.649	0.840	.922	.050	2.131	.254	.283	.145	.245	.177	.002	14.605	13.765
Direct solvent: Plant 2*	1.757	1.920	1.357	.247	5.281	3.024	.650	.546	.954	.086	2.131	.281	.282	.211	.265	.200	.003	13.914	13.368
Screw press:																			
4 press*	1.592	1.760	1.243	.179	4.774	2.720	.615	.480	1.239	.017	2.131	.278	.277	.210	.250	.186	.002	13.179	12.699
5 press	1.821	1.968	1.390	.191	5.370	2.370	.613	.430	1.139	.017	2.131	.266	.277	.182	.234	.167	.002	13.198	12.768
Hydraulic:																			
8 press*	1.439	1.618	1.143	.171	4.371	3.990	.578	----------	1.080	.008	2.131	.296	.276	.235	.305	.252	.003	13.525	13.525
10 press	1.552	1.725	1.218	.176	4.671	3.648	.578	.646	.984	.008	2.131	.278	.276	.210	.290	.233	.003	13.956	13.310
12 press	1.757	1.921	1.357	.188	5.223	3.230	.578	.542	.898	.007	2.131	.266	.276	.189	.271	.211	.003	13.825	13.283

See footnote at end of table.

TABLE 102.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area V, 1949–50*—Continued

ANNUAL CRUSH: 26,400 TONS

Mill [1]	(Cost per ton of seed crushed (affected by size of crush and type of mill))																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
Direct solvent:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 2*	1.452	1.604	1.133	0.212	4.401	3.024	0.639	---------	0.980	0.086	2.131	0.281	0.296	0.236	0.259	0.200	0.003	12.536	12.536
Plant 3	1.866	2.008	1.419	.243	5.536	2.142	.639	0.714	.720	.070	2.131	.244	.296	.144	.220	.153	.002	13.011	12.297
Prepress solvent: Plant 3**	1.768	1.920	1.356	.221	5.265	2.573	.638	.504	.999	.060	2.131	.254	.297	.178	.239	.176	.002	13.316	12.812
Screw press:																			
4 press*	1.325	1.480	1.046	.158	4.009	2.720	.604	---------	1.276	.017	2.131	.278	.292	.236	.244	.185	.002	11.994	11.994
5 press	1.518	1.667	1.178	.172	4.535	2.370	.603	.420	1.174	.017	2.131	.266	.292	.210	.228	.167	.002	12.415	11.995
Hydraulic:																			
10 press*	1.288	1.448	1.023	.155	3.914	3.648	.568	---------	1.021	.008	2.131	.278	.290	.235	.284	.233	.003	12.613	12.613
12 press	1.467	1.625	1.148	.169	4.409	3.230	.568	.485	.927	.007	2.131	.266	.290	.217	.265	.211	.003	13.009	12.524
ANNUAL CRUSH: 42,200 TONS																			
Prepress solvent: Plant 3**	1.230	1.372	0.969	0.172	3.743	2.573	0.579	---------	1.060	0.060	2.131	0.254	0.398	0.237	0.223	0.173	0.002	11.433	11.433
Direct solvent: Plant 3*	1.288	1.421	1.004	.185	3.898	2.142	.580	0.378	.814	.071	2.131	.244	.397	.212	.204	.150	.002	11.223	10.845
Screw press:																			
7 press*	1.204	1.343	.949	.147	3.643	2.100	.589	.180	1.117	.017	2.131	.247	.313	.225	.202	.151	.002	10.917	10.737
8 press	1.253	1.390	.982	.148	3.773	2.000	.588	.350	1.098	.016	2.131	.242	.313	.211	.198	.146	.002	11.068	10.718
Hydraulic:																			
16 press*	1.125	1.269	.896	.143	3.433	2.993	.552	---------	.934	.007	2.131	.250	.312	.236	.241	.197	.003	11.289	11.289
22 press	1.277	1.419	1.002	.150	3.848	2.803	.552	.608	.810	.007	2.131	.238	.312	.197	.232	.187	.002	11.927	11.319
24 press	1.319	1.457	1.029	.149	3.954	2.660	.552	.447	.789	.007	2.131	.235	.312	.172	.226	.179	.002	11.666	11.219
ANNUAL CRUSH: 52,800 TONS																			
Direct solvent: Plant 3*	1.092	1.225	0.865	0.166	3.348	2.142	0.558	---------	0.851	0.071	2.131	0.244	0.435	0.237	0.195	0.149	0.002	10.363	10.363
Prepress solvent: Plant 4**	1.243	1.376	.972	.168	3.759	2.205	.557	0.326	.980	.053	2.131	.239	.436	.219	.198	.152	.002	11.257	10.931
Screw press:																			
8 press*	1.067	1.202	.850	.137	3.256	2.000	.583	---------	1.156	.016	2.131	.242	.320	.237	.190	.145	.002	10.278	10.278
10 press	1.187	1.320	.933	.142	3.582	1.920	.583	.350	1.076	.016	2.131	.236	.320	.211	.186	.141	.022	10.754	10.404
Hydraulic:																			
20 press*	1.045	1.183	.836	.136	3.200	2.964	.548	---------	.914	.007	2.131	.241	.319	.237	.232	.195	.003	10.991	10.991
22 press	1.076	1.210	.855	.136	3.277	2.803	.548	.257	.840	.007	2.131	.238	.319	.224	.224	.186	.002	11.056	10.799
24 press	1.118	1.253	.885	.137	3.393	2.660	.548	.399	.833	.007	2.131	.235	.319	.218	.218	.179	.002	11.142	10.743

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	1.081	1.213	0.811	0.154	3.259	2.205	0.542	---------	1.041	0.053	2.131	0.239	0.462	0.238	0.191	0.151	0.002	10.514	10.514
Direct solvent:																			
Plant 4*	1.156	1.283	.906	.167	3.512	1.848	.543	0.326	.776	.062	2.131	.232	.461	.212	.175	.133	.002	10.413	10.087
Plant 5	1.272	1.393	.984	.172	3.821	1.701	.543	.378	.717	.054	2.131	.226	.461	.173	.169	.125	.002	10.501	10.123
Screw press:																			
10 press*	1.038	1.172	.828	.133	3.171	1.920	.564	.080	1.117	.016	2.131	.236	.355	.232	.179	.140	.002	10.143	10.063
12 press	1.175	1.305	.922	.143	3.545	1.790	.564	.320	1.059	.016	2.131	.230	.355	.212	.174	.133	.002	10.531	10.211
Hydraulic: 24 press*	.977	1.111	.785	.128	3.001	2.660	.530	---------	.876	.007	2.131	.235	.353	.237	.211	.178	.002	10.421	10.421

ANNUAL CRUSH: 79,200 TONS

Direct solvent:																			
Plant 4*	0.984	1.111	0.785	0.152	3.032	1.848	0.528	---------	0.842	0.062	2.131	0.232	0.487	0.238	0.168	0.132	0.002	9.702	9.702
Plant 5	1.078	1.200	.848	.155	3.281	1.701	.528	0.378	.733	.054	2.131	.226	.487	.204	.161	.124	.002	10.010	9.723
Prepress solvent: Plant 5**	1.178	1.304	.921	.158	3.561	1.827	.528	.410	.911	.045	2.131	.227	.488	.204	.167	.131	.002	10.632	10.222
Screw press:																			
12 press*	.999	1.128	.797	.132	3.056	1.790	.540	---------	1.156	.016	2.131	.230	.401	.238	.166	.132	.002	9.858	9.858
14 press	1.081	1.211	.855	.135	3.282	1.740	.542	.230	1.101	.016	2.131	.228	.401	.220	.164	.129	.002	10.186	9.956
Hydraulic:																			
30 press*	1.010	1.145	.809	.133	3.097	2.660	.507	---------	.875	.007	2.131	.229	.399	.237	.203	.176	.002	10.523	10.523
36 press	1.087	1.222	.828	.136	3.273	2.537	.507	.380	.796	.007	2.131	.225	.399	.219	.198	.170	.002	10.844	10.464
40 press	1.125	1.255	.886	.136	3.402	2.394	.507	.532	.763	.007	2.131	.223	.399	.203	.191	.162	.002	10.916	10.384

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5**	0.964	1.091	0.771	0.142	2.968	1.827	0.513	---------	1.040	0.045	2.131	0.227	0.514	0.239	0.163	0.130	0.002	9.799	9.799
Direct solvent: Plant 5*	.887	1.012	.715	.140	2.754	1.701	.513	---------	.841	.054	2.131	.226	.512	.239	.158	.123	.002	9.254	9.254
Screw press: 16 press*	.937	1.064	.752	.127	2.880	1.660	.516	---------	1.155	.016	2.131	.224	.447	.238	.156	.123	.002	9.548	9.548
Hydraulic: 40 press*	.921	1.051	.743	.125	2.840	2.394	.484	---------	.874	.007	2.131	.223	.446	.238	.188	.161	.002	9.988	9.988

See footnote at end of table.

TABLE 102.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area V, 1949–50*—Continued

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue: Gross: Oil	Revenue: Gross: Meal	Revenue: Gross: Linters	Revenue: Gross: Hulls	Revenue: Gross: Total	Revenue: Net: Before paying dormant season labor	Revenue: Net: After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
ANNUAL CRUSH: 10,600 TONS											
Prepress solvent:											
Plant 1	40	12.0	73.587	73.587	41.269	29.231	8.000	2.034	80.534	6.947	6.947
Plant 2**	80	6.0	72.411	71.151	40.804	29.231	8.000	2.034	80.069	8.918	7.658
Direct solvent:											
Plant 1*	50	9.6	72.384	71.586	40.358	29.231	8.000	2.063	79.652	8.066	7.268
Plant 2	100	4.8	72.791	71.268	39.814	29.231	8.000	2.063	79.108	7.840	6.317
Screw press:											
2 press*	50	9.6	70.458	69.778	37.153	30.154	8.000	2.177	77.484	7.706	7.026
3 press	75	6.4	70.296	69.366	36.859	30.154	8.000	2.177	77.190	7.824	6.894
Hydraulic:											
4 press	40	12.0	71.557	71.557	36.250	30.154	8.000	2.212	76.616	5.059	5.059
6 press*	60	8.0	71.161	70.401	36.158	30.154	8.000	2.212	76.524	6.123	5.363
8 press	80	6.0	71.171	69.841	35.841	30.154	8.000	2.212	76.207	6.366	5.036
ANNUAL CRUSH: 13,200 TONS											
Direct solvent:											
Plant 1*	50	12.0	70.230	70.230	40.436	29.231	8.000	2.020	79.687	9.457	9.457
Plant 2	100	6.0	70.318	69.310	39.9[illegible]1	29.231	8.000	2.020	79.232	9.922	8.914
Prepress solvent: Plant 2**	80	7.5	70.270	69.514	41.099	29.231	8.000	2.000	80.330	10.816	10.060
Screw press:											
2 press*	50	12.0	68.593	68.593	37.225	30.154	8.000	2.101	77.480	8.887	8.887
3 press	75	8.0	68.551	68.021	37.131	30.154	8.000	2.101	77.386	9.365	8.835
4 press	100	6.0	68.814	67.934	36.806	30.154	8.000	2.101	77.061	9.127	8.247
Hydraulic:											
6 press	60	10.0	69.741	69.057	36.171	30.154	8.000	2.125	76.450	7.393	6.709
8 press*	80	7.5	69.252	68.454	36.101	30.154	8.000	2.125	76.380	7.926	7.128
ANNUAL CRUSH: 21,100 TONS											
Prepress solvent:											
Plant 2**	80	12.0	67.157	67.157	41.269	29.231	8.000	1.786	80.286	13.129	13.129
Plant 3	160	6.0	67.587	66.747	40.804	29.231	8.000	1.786	79.821	13.074	12.234
Direct solvent: Plant 2*	100	9.6	67.306	66.760	40.358	29.231	8.000	1.807	79.396	12.636	12.090
Screw press:											
4 press*	100	9.6	66.156	65.676	37.153	30.154	8.000	1.887	77.194	11.518	11.038
5 press	125	7.7	66.175	65.745	37.091	30.154	8.000	1.887	77.132	11.387	10.957
Hydraulic:											
8 press*	80	12.0	66.502	66.502	36.250	30.154	8.000	1.912	76.316	9.814	9.814
10 press	100	9.6	66.933	66.287	36.180	30.354	8.000	1.912	76.246	9.959	9.313
12 press	120	8.0	66.802	66.260	36.158	30.154	8.000	1.912	76.224	9.964	9.422

ANNUAL CRUSH: 26,400 TONS											
Direct solvent:											
Plant 2*	100	12.0	65.807	65.807	40.436	29.231	8.000	1.736	79.403	13.596	13.596
Plant 3	200	6.0	66.282	65.568	39.981	29.231	8.000	1.736	78.948	13.380	12.666
Prepress solvent: Plant 3**	160	7.5	66.177	65.673	41.099	29.231	8.000	1.715	80.045	14.372	13.868
Screw press:											
4 press*	100	12.0	64.850	64.850	37.225	30.154	8.000	1.816	77.195	12.345	12.345
5 press	125	9.6	65.271	64.851	37.153	30.154	8.000	1.816	77.123	12.272	11.852
Hydraulic:											
10 press*	100	12.0	65.469	65.469	36.250	30.154	8.000	1.841	76.245	10.776	10.776
12 press	120	10.0	65.865	65.380	36.171	30.154	8.000	1.841	76.166	10.786	10.301
ANNUAL CRUSH: 42,200 TONS											
Prepress solvent: Plant 3**	160	12.0	64.137	64.137	41.269	28.826	8.000	1.609	79.704	15.567	15.567
Direct solvent: Plant 3*	200	9.6	64.337	63.959	40.358	28.826	8.000	1.630	78.814	14.855	14.477
Screw press:											
7 press*	175	11.0	63.616	63.436	37.191	29.826	8.000	1.710	76.727	13.291	13.111
8 press	200	9.6	63.767	63.417	37.153	29.826	8.000	1.710	76.689	13.272	12.922
Hydraulic:											
16 press*	160	12.0	63.988	63.988	36.250	29.826	8.000	1.734	75.810	11.822	11.822
22 press	220	8.7	64.626	64.018	36.177	29.826	8.000	1.734	75.737	11.719	11.111
24 press	240	8.0	64.365	63.918	36.158	29.826	8.000	1.734	75.718	11.800	11.353
ANNUAL CRUSH: 52,800 TONS											
Direct solvent: Plant 3*	200	12.0	63.374	63.374	40.436	28.666	8.000	1.594	78.696	15.322	15.322
Prepress solvent: Plant 4**	240	10.0	63.858	63.532	41.178	28.666	8.000	1.573	79.417	15.885	15.559
Screw press:											
8 press*	200	12.0	62.874	62.874	37.225	29.707	8.000	1.674	76.606	13.732	13.732
10 press	250	9.6	63.350	63.000	37.153	29.707	8.000	1.674	76.534	13.534	13.184
Hydraulic:											
20 press*	200	12.0	63.587	63.587	36.250	29.707	8.000	1.699	75.656	12.069	12.069
22 press	220	10.9	63.652	63.395	36.210	29.707	8.000	1.699	75.616	12.221	11.964
24 press	240	10.0	63.738	63.339	36.171	29.707	8.000	1.699	75.577	12.238	11.839
ANNUAL CRUSH: 63,400 TONS											
Prepress solvent: Plant 4**	240	12.0	63.009	63.009	41.269	28.559	8.000	1.550	79.378	16.369	16.369
Direct solvent:											
Plant 4*	300	9.6	63.318	62.992	40.358	28.559	8.000	1.571	78.488	15.496	15.170
Plant 5	400	7.2	63.406	63.028	40.225	28.559	8.000	1.571	78.355	15.327	14.949
Screw press:											
10 press*	250	11.5	62.633	62.553	37.203	29.519	8.000	1.651	76.373	13.820	13.740
12 press	300	9.6	63.021	62.701	37.153	29.519	8.000	1.651	76.323	13.622	13.302
Hydraulic: 24 press*	240	12.0	62.911	62.911	36.250	29.519	8.000	1.675	75.444	12.533	12.533

See footnote at end of table.

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TABLE 102.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area V, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total)		Revenue						
					Gross					Net	
			Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Direct solvent:	*Tons*	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 4*	300	12.0	62.513	62.513	40.436	28,451	8.000	1.547	78,434	15,921	15.921
Plant 5	400	9.0	62.821	62.534	40.368	28.451	8.000	1.547	78.366	15.832	15.545
Prepress solvent: Plant 5**	400	9.0	63.033	62.623	41.199	28.451	8.000	1.526	79.176	16.553	16.143
Screw press:											
12 press*	300	12.0	62.254	62.254	37.225	29.290	8.000	1.627	76.142	13.888	13.888
14 press	350	10.3	62.582	62.352	37.153	29.290	8.000	1.627	76.070	13.718	13.488
Hydraulic:											
30 press*	300	12.0	62.919	62.919	36.250	29.290	8.000	1.651	75.191	12.272	12.272
36 press	360	10.0	63.240	62.860	36.171	29.290	8.000	1.651	75.112	12.252	11.872
40 press	400	9.0	63.312	62.780	36.189	29.290	8.000	1.651	75.130	12.350	11.818

ANNUAL CRUSH: 105,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Prepress solvent: Plant 5**	400	12.0	62.258	62.258	41.269	28.344	8.000	1.502	79.115	16.857	16.857
Direct solvent: Plant 5*	400	12.0	62.123	62.123	40.436	28.344	8.000	1.523	78.303	16.180	16.180
Screw press: 16 press*	400	12.0	62.002	62.002	37.225	29.061	8.000	1.603	75.889	13.887	13.887
Hydraulic: 40 press*	400	12.0	62.442	62.442	36.250	29.061	8.000	1.628	74.939	12.497	12.497

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush

TABLE 103.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area VI, 1949–50*

ANNUAL CRUSH: 10,600 TONS

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed																
			Unaffected by type of mill or size of crush							Affected by size of crush					Affected by type of mill				
			Seed f. o. b. gins	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Seed haul	Salaries	Office	Travel and auto	Total	Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	40	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.520	2.344	0.221	0.232	4.317	0.625	0.320		0.244	1.189
Plant 2**	80	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.625	.320		.244	1.189
Direct solvent:																			
Plant 1*	50	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.875	.480		.244	1.599
Plant 2	100	4.8	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.875	.480		.244	1.599
Screw press:																			
2 press	50	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.250			.934	1.184
3 press*	75	6.4	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.250			.934	1.184
Hydraulic:																			
4 press	40	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.250		0.690	.244	1.184
6 press*	60	8.0	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.250		.690	.244	1.184
8 press	80	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.520	2.344	.221	.232	4.317	.250		.690	.244	1.184
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1*	50	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.530	2.280	0.213	0.226	4.249	0.875	0.480		0.244	1.599
Plant 2	100	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.875	.480		.244	1.599
Prepress solvent: Plant 2**	80	7.5	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.625	.320		.244	1.189
Screw press:																			
2 press*	50	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.250			.934	1.184
3 press	75	8.0	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.250			.934	1.184
4 press	100	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.250			.934	1.184
Hydraulic:																			
6 press	60	10.0	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.250		0.690	.244	1.184
8 press*	80	7.5	49.866	.356	.291	1.350	.192	.050	52.105	1.530	2.280	.213	.226	4.249	.250		.690	.244	1.184
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2**	80	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.550	2.095	0.192	0.205	4.042	0.625	0.320		0.244	1.189
Plant 3	160	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.625	.320		.244	1.189
Direct solvent: Plant 2*	100	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.875	.480		.244	1.599
Screw press:																			
4 press	100	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.250			.934	1.184
5 press*	125	7.7	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.250			.934	1.184
Hydraulic:																			
8 press*	80	12.0	49.886	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.250		0.690	.244	1.184
10 press	100	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.250		.690	.244	1.184
12 press	120	8.0	49.866	.356	.291	1.350	.192	.050	52.105	1.550	2.095	.192	.205	4.042	.250		.690	.244	1.184

See footnote at end of table.

TABLE 103.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area VI, 1949–50*—Continued

Mill [1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed: Unaffected by type of mill or size of crush: Seed f. o. b. gins	Linter bagging and ties	Linter room expense	Repairs	Seed unloading labor	Lubricating and cleaning	Total	Affected by size of crush: Seed haul	Salaries	Office	Travel and auto	Total	Affected by type of mill: Fuel oil	Hexane	Press cloth and mending	Miscellaneous mill expense	Total
ANNUAL CRUSH: 26,400 TONS																			
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																			
Plant 2*	100	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.580	1.979	0.180	0.192	3.931	0.875	0.480		0.244	1.599
Plant 3	200	6.0	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.875	.480		.244	1.599
Prepress solvent: Plant 3**	160	7.5	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.625	.320		.244	1.189
Screw press:																			
4 press*	100	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.250			.934	1.184
5 press	125	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.250			.934	1.184
Hydraulic:																			
10 press*	100	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.250		0.690	.244	1.184
12 press	120	10.0	49.866	.356	.291	1.350	.192	.050	52.105	1.580	1.979	.180	.192	3.931	.250		.690	.244	1.184
ANNUAL CRUSH: 42,200 TONS																			
Prepress solvent: Plant 3**	160	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.730	1.680	0.147	0.157	3.714	0.625	0.320		0.244	1.189
Direct solvent: Plant 3*	200	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.875	.480		.244	1.599
Screw press:																			
7 press*	175	11.0	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.250			.934	1.184
8 press	200	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.250			.934	1.184
Hydraulic:																			
16 press*	160	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.250		0.690	.244	1.184
22 press	220	8.7	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.250		.690	.244	1.184
24 press	240	8.0	49.866	.356	.291	1.350	.192	.050	52.105	1.730	1.680	.147	.157	3.714	.250		.690	.244	1.184
ANNUAL CRUSH: 52,800 TONS																			
Direct solvent: Plant 3**	200	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	1.920	1.515	0.129	0.137	3.701	0.875	0.480		0.244	1.599
Prepress solvent: Plant 4*	240	10.0	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.625	.320		.244	1.189
Screw press:																			
8 press*	200	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.250			.934	1.184
10 press	250	9.6	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.250			.934	1.184
Hydraulic:																			
20 press*	200	12.0	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.250		0.690	.244	1.184
22 press	220	10.9	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.250		.690	.244	1.184
24 press	240	10.0	49.866	.356	.291	1.350	.192	.050	52.105	1.920	1.515	.129	.137	3.701	.250		.690	.244	1.184

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	240	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	2.020	1.380	0.116	0.119	3.635	0.625	0.320			0.244	1.189
Direct solvent:																			
Plant 4*	300	9.6	49.866	.356	.291	1.350	.192	.050	52.105	2.020	1.380	.116	.119	3.635	.875	.480		.244	1.599
Plant 5	400	7.2	49.866	.356	.291	1.350	.192	.050	52.105	2.020	1.380	.116	.119	3.635	.875	.480		.244	1.599
Screw press:																			
10 press*	250	11.5	49.866	.356	.291	1.350	.192	.050	52.105	2.020	1.380	.116	.119	3.635	.250			.934	1.184
12 press	300	9.6	49.866	.356	.291	1.350	.192	.050	52.105	2.020	1.380	.116	.119	3.635	.250			.934	1.184
Hydraulic: 24 press*	240	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.020	1.380	.116	.119	3.635	.250		0.690	.244	1.184

ANNUAL CRUSH: 79,200 TONS

Direct solvent:																			
Plant 4**	300	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	2.150	1.231	0.102	0.098	3.581	0.875	0.480		0.244	1.599
Plant 5	400	9.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.875	.480		.244	1.599
Prepress solvent: Plant 5*	400	9.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.625	.320		.244	1.189
Screw press:																			
12 press*	300	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.250			.934	1.184
14 press	350	10.3	49.866	.355	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.250			.934	1.184
Hydraulic:																			
30 press*	300	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.250		0.690	.244	1.184
36 press	360	10.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.250		.690	.244	1.184
40 press	400	9.0	49.866	.356	.291	1.350	.192	.050	52.105	2.150	1.231	.102	.098	3.581	.250		.690	.244	1.184

ANNUAL CRUSH: 105,600 TONS

Prepress solvent: Plant 5**	400	12.0	49.866	0.356	0.291	1.350	0.192	0.050	52.105	2.310	1.170	0.095	0.074	3.649	0.625	0.320		0.244	1.189
Direct solvent: Plant 5*	400	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.310	1.170	.095	.074	3.649	.875	.480		.244	1.599
Screw press: 16 press*	400	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.310	1.170	.095	.074	3.649	.250			.934	1.184
Hydraulic: 40 press*	400	12.0	49.866	.356	.291	1.350	.192	.050	52.105	2.310	1.170	.095	.074	3.649	.250		0.690	.244	1.184

See footnote at end of table.

TABLE 103.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area VI, 1949–50*—Continued

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor												Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
ANNUAL CRUSH: 10,600 TONS																			
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:																			
Plant 1	2.685	2.930	1.549	0.326	7.490	9.600	0.639	---------	1.133	0.037	0.986	0.391	0.241	0.257	0.575	0.750	0.007	22.106	22.106
Plant 2**	3.019	3.251	1.720	.359	8.349	5.760	.639	1.920	.939	.024	.986	.300	.241	.157	.402	.473	.005	20.195	18.275
Direct solvent:																			
Plant 1*	2.691	2.915	1.548	.355	7.509	6.912	.641	1.216	.892	.038	.986	.354	.238	.229	.454	.557	.005	20.031	18.815
Plant 2	3.290	3.511	1.864	.423	9.088	4.608	.641	2.320	.780	.027	.986	.282	.238	.109	.350	.392	.004	19.825	17.505
Screw press:																			
2 press	2.378	2.613	1.387	.246	6.624	5.952	.915	1.054	1.171	.021	1.534	.352	.226	.228	.423	.508	.005	19.013	17.959
3 press*	2.592	2.817	1.496	.253	7.158	4.960	.915	1.442	1.088	.016	1.534	.303	.226	.159	.378	.437	.004	18.620	17.178
Hydraulic:																			
4 press	2.313	2.567	1.363	.246	6.489	9.000	.882	---------	1.007	.021	1.534	.387	.223	.256	.559	.724	.007	21.089	21.089
6 press*	2.486	2.730	1.449	.241	6.906	7.200	.882	1.200	.855	.015	1.534	.327	.223	.206	.478	.595	.006	20.427	19.227
8 press	2.607	2.843	1.510	.256	7.216	6.300	.882	2.100	.791	.012	1.534	.297	.223	.155	.437	.530	.005	20.482	18.382
ANNUAL CRUSH: 13,200 TONS																			
Direct solvent:																			
Plant 1*	2.216	2.422	1.286	0.302	6.226	6.912	0.721	---------	0.940	0.037	1.208	0.354	0.238	0.257	0.455	0.563	0.005	17.916	17.916
Plant 2	2.650	2.839	1.507	.345	7.341	4.608	.721	1.536	.723	.026	1.208	.282	.238	.157	.351	.397	.004	17.592	16.056
Prepress solvent: Plant 2**	2.451	2.656	1.404	.299	6.810	5.760	.718	1.152	.961	.026	1.208	.300	.241	.194	.403	.480	.005	18.258	17.106
Screw press:																			
2 press*	1.961	2.175	1.155	.215	5.506	5.952	.862	---------	1.226	.021	1.227	.352	.226	.256	.418	.504	.005	16.555	16.555
3 press	2.130	2.334	1.239	.220	5.923	4.960	.862	.822	1.096	.016	1.227	.303	.226	.206	.373	.433	.004	16.451	15.629
4 press	2.391	2.591	1.376	.234	6.592	4.216	.862	1.364	1.001	.013	1.227	.279	.226	.156	.340	.379	.004	16.659	15.295
Hydraulic:																			
6 press	2.023	2.236	1.187	.215	5.661	7.200	.831	1.080	.867	.015	1.227	.327	.223	.236	.473	.591	.006	18.737	17.657
8 press*	2.122	2.329	1.237	.216	5.904	6.300	.831	1.260	.810	.014	1.227	.297	.223	.192	.432	.527	.005	18.022	16.762
ANNUAL CRUSH: 21,100 TONS																			
Prepress solvent:																			
Plant 2**	1.663	1.840	0.973	0.225	4.701	5.760	0.838	---------	1.031	0.028	1.540	0.300	0.241	0.257	0.400	0.488	0.005	15.589	15.589
Plant 3	2.164	2.324	1.230	.258	5.976	3.920	.838	1.280	.809	.017	1.540	.255	.241	.157	.317	.356	.003	15.709	14.429
Direct solvent: Plant 2*	1.776	1.939	1.029	.250	4.994	4.608	.840	.832	.794	.027	1.540	.282	.238	.229	.348	.406	.004	15.142	14.310
Screw press:																			
4 press	1.611	1.781	.945	.181	4.518	4.216	.916	.744	1.072	.014	1.540	.279	.226	.229	.334	.383	.004	14.475	13.731
5 press*	1.835	1.986	1.055	.193	5.069	3.674	.916	.667	1.000	.012	1.540	.267	.226	.198	.309	.344	.003	14.225	13.558
Hydraulic:																			
8 press*	1.457	1.636	.869	.174	4.136	6.300	.883	---------	.881	.015	1.540	.297	.223	.256	.426	.530	.005	15.492	15.942
10 press	1.576	1.751	.930	.179	4.436	5.760	.883	1.020	.824	.012	1.540	.279	.223	.229	.402	.492	.005	16.105	15.085
12 press	1.778	1.939	1.030	.191	4.938	5.100	.883	.855	.771	.009	1.540	.267	.223	.206	.372	.444	.005	15.613	14.758

ANNUAL CRUSH: 26,400 TONS

Direct solvent:																			
Plant 2*	1.467	1.619	0.860	0.214	4.160	4.608	0.880	---------	0.831	0.027	1.651	0.282	0.238	0.257	0.345	0.409	0.004	13.692	13.692
Plant 3	1.891	2.032	1.079	.246	5.248	3.264	.880	1.088	.652	.017	1.651	.245	.238	.157	.284	.312	.003	14.039	12.951
Prepress solvent: Plant 3**	1.787	1.937	1.025	.223	4.972	3.920	.877	.768	.880	.018	1.651	.255	.241	.194	.314	.359	.003	14.452	13.684
Screw press:																			
4 press*	1.340	1.497	.795	.160	3.792	4.216	.935	---------	1.103	.015	1.651	.279	.226	.257	.329	.384	.004	13.191	13.191
5 press	1.529	1.677	.890	.173	4.269	3.674	.935	.651	1.029	.013	1.651	.267	.226	.228	.305	.346	.003	13.597	12.946
Hydraulic:																			
10 press*	1.308	1.469	.780	.158	3.715	5.760	.902	---------	.861	.012	1.651	.279	.223	.257	.397	.493	.005	14.555	14.555
12 press	1.483	1.639	.870	.171	4.163	5.100	.902	.765	.791	.010	1.651	.267	.223	.236	.368	.445	.004	14.925	14.160

ANNUAL CRUSH: 42,200 TONS

Prepress solvent: Plant 3**	1.242	1.383	0.732	0.174	3.531	3.920	0.937	---------	0.933	0.019	1.817	0.255	0.241	0.258	0.303	0.363	0.003	12.580	12.580
Direct solvent: Plant 3*	1.303	1.436	.762	.187	3.688	3.264	.940	0.576	.715	.019	1.817	.245	.238	.230	.273	.316	.003	12.324	11.748
Screw press:																			
7 press*	1.217	1.355	.720	.148	3.440	3.255	.964	.279	.993	.011	1.817	.248	.226	.245	.274	.317	.003	12.072	11.793
8 press	1.266	1.403	.745	.150	3.564	3.100	.964	.543	.980	.010	1.817	.243	.226	.230	.267	.306	.003	12.253	11.710
Hydraulic:																			
16 press*	1.141	1.284	.682	.145	3.252	4.725	.929	---------	.812	.009	1.817	.252	.223	.257	.339	.420	.004	13.039	13.039
22 press	1.297	1.437	.763	.151	3.648	4.425	.929	.960	.717	.007	1.817	.239	.223	.214	.325	.399	.004	13.907	12.947
24 press	1.342	1.480	.786	.151	3.759	4.200	.929	.705	.702	.006	1.817	.236	.223	.187	.315	.383	.004	13.466	12.761

ANNUAL CRUSH: 52,800 TONS

Direct solvent: Plant 3**	1.105	1.237	0.657	0.168	3.167	3.264	0.960	---------	0.762	0.019	1.872	0.245	0.238	0.259	0.267	0.318	0.003	11.374	11.374
Prepress solvent: Plant 4*	1.260	1.394	.737	.171	3.562	3.360	.957	0.496	.876	.015	1.872	.240	.241	.339	.271	.324	.003	12.556	12.060
Screw press:																			
8 press*	1.078	1.213	.644	.139	3.074	3.100	.973	---------	1.020	.011	1.872	.243	.226	.258	.260	.307	.003	11.347	11.347
10 press	1.201	1.334	.708	.143	3.386	2.976	.973	.543	.962	.009	1.872	.237	.226	.230	.255	.298	.003	11.970	11.427
Hydraulic:																			
20 press*	1.061	1.199	.636	.138	3.034	4.680	.939	---------	.790	.008	1.872	.242	.223	.258	.330	.418	.004	12.798	12.798
22 press	1.092	1.225	.650	.137	3.104	4.425	.939	.405	.761	.007	1.872	.239	.223	.245	.318	.399	.004	12.941	12.536
24 press	1.136	1.272	.675	.139	3.222	4.200	.939	.630	.742	.007	1.872	.236	.223	.238	.308	.383	.004	13.004	12.374

ANNUAL CRUSH: 63,400 TONS

Prepress solvent: Plant 4**	1.095	1.228	0.649	0.156	3.128	3.360	0.966	---------	0.911	0.015	1.885	0.240	0.267	0.260	0.265	0.325	0.003	11.625	11.625
Direct solvent:																			
Plant 4*	1.171	1.297	.689	.170	3.327	2.816	.968	0.496	.700	.016	1.885	.233	.264	.231	.241	.286	.003	11.466	10.970
Plant 5	1.290	1.411	.749	.174	3.624	2.592	.968	.576	.636	.014	1.885	.227	.264	.189	.231	.270	.003	11.479	10.903
Screw press:																			
10 press*	1.050	1.184	.629	.134	2.997	2.976	.980	.124	.998	.009	1.909	.237	.226	.253	.249	.298	.003	11.259	11.135
12 press	1.190	1.320	.701	.144	3.355	2.775	.980	.496	.948	.008	1.909	.231	.226	.231	.240	.284	.003	11.686	11.190
Hydraulic: 24 press*	.992	1.127	.598	.130	2.847	4.200	.945	---------	.778	.007	1.909	.236	.223	.259	.300	.384	.004	12.092	12.092

See footnote at end of table.

TABLE 103.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area VI, 1949–50*—Continued

ANNUAL CRUSH: 79,200 TONS

Mill [1]	Cost per ton of seed crushed (affected by size of crush and type of mill)																		
	Plant					Labor			Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Total	
	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor										Including dormant season labor	Excluding dormant season labor
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent:																			
Plant 4**	0.996	1.122	0.596	0.154	2.868	2.816	0.891	----------	0.735	0.016	1.885	0.233	0.306	0.260	0.231	0.280	0.003	10.524	10.524
Plant 5	1.092	1.214	.645	.157	3.108	2.592	.891	0.576	.656	.014	1.885	.227	.306	.223	.221	.264	.003	10.966	10.390
Prepress solvent: Plant 5*	1.195	1.321	.699	.160	3.375	2.784	.888	.624	.815	.012	1.885	.228	.309	.223	.229	.278	.003	11.653	11.029
Screw press:																			
12 press*	1.011	1.141	.606	.133	2.891	2.775	.932	----------	.988	.009	1.906	.231	.272	.260	.231	.280	.003	10.778	10.778
14 press	1.093	1.221	.648	.136	3.098	2.697	.932	.357	.984	.008	1.906	.229	.272	.241	.227	.275	.003	11.229	10.872
Hydraulic:																			
30 press*	1.025	1.160	.616	.135	2.936	4.200	.898	----------	.762	.007	1.906	.230	.268	.259	.293	.380	.004	12.143	12.143
36 press	1.106	1.241	.659	.138	3.144	4.005	.898	.600	.712	.006	1.906	.226	.268	.239	.285	.366	.003	12.658	12.058
40 press	1.146	1.277	.678	.138	3.239	3.780	.898	.840	.682	.005	1.906	.224	.223	.222	.275	.350	.003	12.647	11.807

ANNUAL CRUSH: 105,600 TONS

Mill [1]	Depreciation	Interest	Taxes	Insurance on building and machinery	Total	Production	Meal grinding and product loading	Dormant season labor	Electric power	Water	Meal bags	Laboratory services	Brokerage fees	Insurance on stocks	Social security	Workmen's compensation	General liability	Including dormant season labor	Excluding dormant season labor
Prepress solvent: Plant 5**	0.976	1.104	0.583	0.143	2.806	2.784	0.844	----------	0.878	0.013	1.885	0.228	0.350	0.261	0.225	0.275	0.003	10.552	10.552
Direct solvent: Plant 5*	.897	1.022	.543	.141	2.603	2.592	.846	----------	.721	.015	1.885	.227	.347	.261	.216	.261	.002	9.976	9.976
Screw press: 16 press*	.948	1.076	.571	.128	2.723	2.573	.882	----------	.967	.008	1.900	.225	.319	.260	.217	.262	.002	10.338	10.338
Hydraulic: 40 press*	.937	1.068	.567	.127	2.699	3.780	.850	----------	.747	.006	1.900	.224	.315	.260	.270	.347	.003	11.401	11.401

ANNUAL CRUSH: 10,600 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Prepress solvent:											
Plant 1	40	12.0	79.717	79.717	43.611	27.149	8.000	3.786	82,546	2.829	2,829
Plant 2**	80	6.0	77.806	75.886	43.036	27.149	8.000	3.786	81.971	6.085	4.165
Direct solvent:											
Plant 1*	50	9.6	78.052	76.836	42.640	27.149	8.000	3.838	81.627	4.791	3.575
Plant 2	100	4.8	77.846	75.526	42.037	27.149	8.000	3.838	81.024	5.498	3.178
Screw press:											
2 press	50	9.6	76.619	75.565	39.415	28.393	8.000	4.042	79.850	4.285	3.231
3 press*	75	6.4	76.226	74.784	39.075	28.393	8.000	4.042	79.510	4.726	3.284
Hydraulic:											
4 press	40	12.0	78.695	78.695	38.555	28.393	8.000	4.104	79.052	.357	.357
6 press*	60	8.0	78.033	76.833	38.397	28.393	8.000	4.104	78.894	2.061	.861
8 press	80	6.0	78.088	75.988	38.046	28.393	8.000	4.104	78.543	2.555	.455

ANNUAL CRUSH: 13,200 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
Direct solvent:											
Plant 1*	50	12.0	75.869	75.869	42.772	27.341	8.000	3.838	81.951	6.082	6.082
Plant 2	100	6.0	75.545	74.009	42.208	27.341	8.000	3.838	81.387	7.378	5.842
Prepress solvent: Plant 2**	80	7.5	75.801	74.649	43.363	27.341	8.000	3.786	82.490	7.841	6.689
Screw press:											
2 press*	50	12.0	74.093	74.093	39.537	27.971	8.000	4.042	79.550	5.457	5.457
3 press	75	8.0	73.989	73.167	39.376	27.971	8.000	4.042	79.389	6.222	5.400
4 press	100	6.0	74.197	72.833	39.016	27.971	8.000	4.042	79.029	6.196	4.832
Hydraulic:											
6 press	60	10.0	76.275	75.195	38.429	27.971	8.000	4.104	78.504	3.309	2.229
8 press*	80	7.5	75.560	74.300	38.336	27.971	8.000	4.104	78.411	4.111	2.851

ANNUAL CRUSH: 21,100 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue, Gross: Oil	Revenue, Gross: Meal	Revenue, Gross: Linters	Revenue, Gross: Hulls	Revenue, Gross: Total	Revenue, Net: Before paying dormant season labor	Revenue, Net: After paying dormant season labor
Prepress solvent:											
Plant 2**	80	12.0	72.925	72.925	43.611	27.629	8.000	3.786	83.026	10.101	10.101
Plant 3	160	6.0	73.045	71.765	43.036	27.629	8.000	3.786	82.451	10.686	9.406
Direct solvent: Plant 2*	100	9.6	72.888	72.056	42.640	27.629	8.000	3.838	82.107	10.051	9.219
Screw press:											
4 press	100	9.6	71.806	71.062	39.415	28.012	8.000	4.042	79.469	8.407	7.663
5 press*	125	7.7	71.556	70.889	39.333	28.012	8.000	4.042	79.387	8.498	7.831
Hydraulic:											
8 press*	80	12.0	72.823	72.823	38.555	28.012	8.000	4.104	78.671	5.848	5.848
10 press	100	9.6	73.436	72.416	38.436	28.012	8.000	4.104	78.552	6.136	5.116
12 press	120	8.0	72.944	72.089	38.397	28.012	8.000	4.104	78.513	6.424	5.569

See footnote at end of table.

TABLE 103.—*Calculated costs and revenue per ton of seed for different cottonseed oil mills for each of specified volumes of seed crushed annually, in mill area VI, 1949–50*—Continued

ANNUAL CRUSH: 26,400 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Cost per ton of seed crushed (total): Including dormant season labor	Cost per ton of seed crushed (total): Excluding dormant season labor	Revenue: Gross: Oil	Revenue: Gross: Meal	Revenue: Gross: Linters	Revenue: Gross: Hulls	Revenue: Gross: Total	Revenue: Net: Before paying dormant season labor	Revenue: Net: After paying dormant season labor
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Direct solvent											
Plant 2*	100	12.0	71.327	71.327	42.772	27.725	8.000	3.838	82.335	11.008	11.008
Plant 3	200	6.0	71.674	70.586	42.208	27.725	8.000	3.838	81.771	11.185	10.097
Prepress solvent: Plant 3**	160	7.5	71.677	70.909	43.363	27.725	8.000	3.786	82.874	11.965	11.197
Screw press:											
4 press*	100	12.0	70.411	70.411	39.537	28.032	8.000	4.042	79.611	9.200	9.200
5 press	125	9.6	70.817	70.166	39.415	28.032	8.000	4.042	79.489	9.323	8.672
Hydraulic:											
10 press*	100	12.0	71.775	71.775	38.555	28.032	8.000	4.104	78.691	6.916	6.916
12 press	120	10.0	72.145	71.380	38.429	28.032	8.000	4.104	78.565	7.185	6.420

ANNUAL CRUSH: 42,200 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Prepress solvent: Plant 3**	160	12.0	69.588	69.588	43.611	27.869	8.000	3.786	83.266	13.678	13.678
Direct solvent: Plant 3*	200	9.6	69.742	69.166	42.640	27.869	8.000	3.838	82.347	13.181	12.605
Screw press:											
7 press*	175	11.0	69.075	68.796	39.458	28.061	8.000	4.042	79.561	10.765	10.486
8 press	200	9.6	69.256	68.713	39.415	28.061	8.000	4.042	79.518	10.805	10.262
Hydraulic:											
16 press*	160	12.0	70.042	70.042	38.555	28.061	8.000	4.104	78.720	8.678	8.678
22 press	220	8.7	70.910	69.950	38.429	28.061	8.000	4.104	78.594	8.644	7.684
24 press	240	8.0	70.469	69.764	38.397	28.061	8.000	4.104	78.562	8.798	8.093

ANNUAL CRUSH: 52,800 TONS

Mill[1]	Seed crushed per 24 hours	Length of season	Including dormant season labor	Excluding dormant season labor	Oil	Meal	Linters	Hulls	Total	Before paying dormant season labor	After paying dormant season labor
Direct solvent: Plant 3**	200	12.0	68.779	68.779	42.772	27.917	8.000	3.838	82.527	13.748	13.748
Prepress solvent: Plant 4*	240	10.0	69.551	69.055	43.469	27.917	8.000	3.786	83.172	14.117	13.621
Screw press:											
8 press*	200	12.0	68.337	68.337	39.537	28.070	8.000	4.042	79.649	11.312	11.312
10 press	250	9.6	68.960	68.417	39.415	28.070	8.000	4.042	79.527	11.110	10.567
Hydraulic:											
20 press*	200	12.0	69.788	69.788	38.555	28.070	8.000	4.104	78.729	8.941	8.941
22 press	220	10.9	69.931	69.526	38.514	28.070	8.000	4.104	78.648	9.122	8.717
24 press	240	10.0	69.994	69.364	38.429	28.070	8.000	4.104	78.603	9.239	8.609

ANNUAL CRUSH: 63,400 TONS											
Prepress solvent: Plant 4**	240	12.0	68.554	68.554	43.611	27.858	8.000	3.785	83.255	14.701	14.701
Direct solvent:											
Plant 4*	300	9.6	68.805	68.309	42.640	27.858	8.000	3.838	82.336	14.027	13.531
Plant 5	400	7.2	68.818	68.242	42.479	27.858	8.000	3.838	82.175	13.933	13.357
Screw press:											
10 press*	250	11.5	68.183	68.059	39.504	28.077	8.000	4.042	79.623	11.564	11.440
12 press	300	9.6	68.610	68.114	39.415	28.077	8.000	4.042	79.534	11.420	10.924
Hydraulic: 24 press*	240	12.0	69.016	69.016	38.555	28.077	8.000	4.104	78.736	9.720	9.720
ANNUAL CRUSH: 79,200 TONS											
Direct solvent:											
Plant 4**	300	12.0	67.809	67.809	42.772	27.749	8.000	3.838	82.359	14.550	14.550
Plant 5	400	9.0	68.251	67.675	42.647	27.749	8.000	3.838	82.234	14.559	13.983
Prepress solvent: Plant 5*	400	9.0	68.528	67.904	43.483	27.749	8.000	3.786	83.018	15.114	14.490
Screw press:											
12 press*	300	12.0	67.648	67.648	39.537	27.980	8.000	4.042	79.559	11.911	11.911
14 press	350	11.3	68.099	67.742	39.415	27.980	8.000	4.042	79.437	11.695	11.338
Hydraulic:											
30 press*	300	12.0	69.013	69.013	38.555	27.980	8.000	4.104	78.639	9.626	9.626
36 press	360	10.0	69.528	68.928	38.429	27.980	8.000	4.104	78.513	9.585	8.985
40 press	400	9.0	69.517	68.677	38.442	27.980	8.000	4.104	78.526	9.849	9.009
ANNUAL CRUSH: 105,600 TONS											
Prepress solvent: Plant 5**	400	12.0	67.495	67.495	43.611	27.641	8.000	3.786	83.038	15.543	15.543
Direct solvent: Plant 5*	400	12.0	67.329	67.329	42.772	27.641	8.000	3.838	82.251	14.922	14.922
Screw press: 16 press*	400	12.0	67.276	67.276	39.537	27.880	8.000	4.042	79.459	12.183	12.183
Hydraulic: 40 press*	400	12.0	68.339	68.339	38.555	27.880	8.000	4.104	78.539	10.200	10.200

[1] Single asterisk denotes most profitable mill of a given type for the specified crush, except where double asterisk is used to denote most profitable mill of any type for the specified crush.

VII. GENERAL ECONOMIC EFFECTS OF DIFFERENT TYPES OF COTTONSEED OIL MILL INDUSTRIES

This chapter is concerned with the final query of this study: How would industrywide change in type of oil mill affect (1) the supply, (2) the price of cottonseed oil, and (3) the returns to growers?

EFFECT OF CHANGE IN TYPE OF COTTONSEED OIL MILL INDUSTRY ON TOTAL SUPPLY AND PRICE OF COTTONSEED OIL

As previously stated, change in type of mill would leave the supply of meal and linters the same as before. It would reduce the supply of hulls somewhat, but not enough to have any appreciable effect on the price of hulls. How, then, would oil supply from given seed be affected by an industrywide change in type of mill?

In handling this question, calculations were based on the average cottonseed oil production of 323 pounds per ton of seed in the crop year 1949–50 (*10*). In that crop year, most of the seed was handled by the hydraulic process.

The normal operating rate of hydraulic mills is 10 tons per press per 24 hours. (Table 3.) For this reason, it was assumed that 323 pounds of oil per ton of seed was approximately equivalent to the outturn of a completely hydraulic industry operating at 10 tons of seed per press per 24 hours on 1949–50 quality seed.

On the assumption that all processes were operating at their normal rates, table 104 shows that shifting from the hydraulic to the screw-press industry would increase cottonseed oil supply by approximately 2.1 percent as compared with an increase of nearly 9 percent and 10.8 percent by a shift to the direct-solvent and prepress-solvent processes, respectively.[18] The same table shows the importance of specifying the rate at which the hydraulic industry was presumed to operate in calculating the effect on oil supply of a shift to other types of oil mill industries. For example,

[18] This was based on the 1949–50 January stocks on hand as well as the differences in oil outturns per ton of seed by various types of mills.

TABLE 104.—*Calculated effects of industrywide change in types and operating rates of cottonseed oil mills on oil recovery per ton of seed, and on cottonseed oil supply and price, 1949–50*

Type of mill and operating rate	Oil recovery per ton of seed		Cottonseed oil supply from given seed		Supply of fats and oils, excluding butter and lard used in food products		Price of cottonseed oil per pound [5]	Change in price of cottonseed oil [2]
	Total [1]	Increase [2]	Total [3]	Increase [2]	Per capita [4]	Increase		
	Pounds	*Percent*	*Million pounds*	*Percent*	*Pounds*	*Percent*	*Cents*	*Percent*
Hydraulic:								
8 tons per press per 24 hours (minimum)	325. 1	0. 6	2, 316	0. 6	30. 51	0. 3	11. 61	−0. 5
10 tons per press per 24 hours (normal)	323. 0	0	2, 303	0	30. 42	0	11. 67	0
12 tons per press per 24 hours	321. 2	−. 6	2, 293	−. 4	30. 36	−. 2	11. 71	+. 4
14 tons per press per 24 hours (maximum)	319. 0	−1. 2	2, 280	−1. 0	30. 27	−. 5	11. 77	+. 9
Screw press:								
20 tons per press per 24 hours (minimum)	335. 2	3. 8	2, 375	3. 1	30. 90	1. 6	11. 35	−2. 7
25 tons per press per 24 hours (normal)	331. 2	2. 5	2, 351	2. 1	30. 74	1. 1	11. 46	−1. 8
30 tons per press per 24 hours	327. 2	1. 3	2, 328	1. 1	30. 59	. 6	11. 55	−1. 0
35 tons per press per 24 hours (maximum)	323. 2	. 1	2, 305	. 1	30. 43	0	11. 66	− . 1
Direct solvent:								
Minimum	360. 2	11. 5	2, 522	9. 5	31. 87	4. 8	10. 74	−7. 9
Normal	358. 2	10. 9	2, 510	9. 0	31. 79	4. 5	10. 79	−7. 6
Maximum	356. 2	10. 3	2, 498	8. 5	31. 71	4. 2	10. 84	−7. 1
Prepress solvent:								
Minimum	366. 2	13. 4	2, 557	11. 0	32. 10	5. 5	10. 60	−9. 1
Normal	365. 2	13. 1	2, 551	10. 8	32. 06	5. 4	10. 63	−8. 9
Maximum	364. 2	12. 8	2, 545	10. 5	32. 02	5. 3	10. 65	−8. 8

[1] Oil recovery of 323 pounds reported by U. S. Census as the actual yield and assumed to be equivalent to yield of a complete hydraulic industry operating at 10 tons per press per 24 hours. Yields for other mills computed on basis of oil gains for different processes and rates as shown in table 7.

[2] Base=hydraulic mill operating at 10 tons per press per 24 hours.

[3] Calculated on basis of 5,868 tons of cottonseed sold to mills times corresponding oil recovery per ton of seed plus 408 million pounds of cottonseed oil in stocks at factories and warehouses, Jan. 1, 1950.

[4] Calculated on basis of cottonseed oil supply per person for 151.3 million persons plus 15.2 pounds of other edible oils, excluding butter and lard, per person.

[5] Based on 1949–50 average price of 11.67 cents per pound assumed as received by hydraulic industry operating at normal rate and adjusted for other rates and processes by use of demand-price relationships for cottonseed oil developed by Bureau of Agricultural Economics.

a shift from a hydraulic industry, operating at its normal rate (10 tons per press per 24 hours), to a screw-press industry operating at its maximum rate (35 tons per press per 24 hours) would have virtually no effect on total cottonseed oil supply. However, the oil supply would be increased by nearly 3.1 percent if the shift were made to a screw-press industry operating at its minimum rate (20 tons per press per 24 hours).

The variability of oil recovery at different operating rates is much greater for either the hydraulic or screw-press processes than for either of the solvent processes. For example, the minimum hydraulic rate recovers more than 6 pounds more oil per ton of seed than the maximum rate, and a similar difference between the minimum and maximum screw press rates is 12 pounds. On the other hand, the oil recovery at the minimum operating rate of the prepress-solvent process was estimated as only 2 more pounds per ton of seed than at its maximum rate. The same principle applies to a less extent to the direct-solvent process.

The effects of the increased supply of cottonseed oil, arising from different types of milling industries, on the price of oil are shown in table 104. These effects were calculated by means of formulas developed by the Bureau of Agricultural Economics on the supply-demand relationship for cottonseed oil. The selected market factors used in connection with this relationship are shown in table 105.

The statistical analysis, carried out by the Bureau of Agricultural Economics, yielded the following equations for the supply-demand relationship on the price of oil, where all variables are expressed in logarithms:

$$X_1 = 1.37 - 1.57X_2 - 1.11X_3 + 1.37X_4$$
$$X'_1 = -0.94 + 1.14X_1$$

In the equations:

X'_1 = Price of cottonseed oil per pound, crude, tanks, f. o. b. Southeast mills (cents)
X_1 = Wholesale price of edible fats and oils, excluding butter and lard, at leading markets, index numbers (1947–49 = 100)
X_2 = Supply of fats and oils used in food products, excluding butter and lard, per capita (pounds). The separate items used in computing this variable are shown in table 105.
X_3 = Supply of lard per capita (pounds)
X_4 = Personal disposable income per capita (dollars)

In calculating the effect on price of an increase in the supply of cottonseed oil, all variables in the first equation were kept constant at values shown in table 105, except that the supply of cottonseed oil per capita (which is a part of X_2) was recalculated for different yields per ton of cottonseed crushed.[19] The use of these equations and selected market factors in table 105 gave an estimated cottonseed oil price of 17.2 cents per pound in 1949–50. This price was substantially higher than the actual price of 11.7 cents because of the marked influence of factors other than those included in the analysis in that particular year. However, the percentage decreases in the value of oil, arising from the similar percentage increases in supply, may be assumed to be the same at either of these oil prices. The effects on price of increased supplies of oil, arising from the change in type and operating rates of oil mills, under 1949–50 actual

[19] Cottonseed oil per capita equaled:

$$\frac{\text{Cottonseed sold to mills} \times \text{yield per ton of cottonseed crushed} + \text{stocks at factories and warehouses}}{\text{Total population July 1}}$$

TABLE 105.—*Selected market factors used in connection with supply-demand relationship of cottonseed oil, 1949–50*

Market factor	Unit	Amount
Cottonseed oil:		
Yield per ton of cottonseed crushed [1]	Pound	323
Stocks at factories and warehouses [2]	Million pounds	408
Cottonseed:		
Production, less quantity used for planting [1]	1,000 tons	6, 280
Sold to mills [1]	do	5, 868
Supply per person:		
Lard [3]	Pound	17.
Other fats and oils used in food, excluding butter—		
Cottonseed oil	do	13.
Other than cottonseed oil	do	15.
Total other [3]		29.
Disposable income per person [3]	Dollar	1, 237
Total population [4]	Million	151.

[1] Year beginning August.
[2] Jan. 1, 1950.
[3] Calendar year 1949.
[4] July 1, 1949.

Source: Data provided by Bureau of Agricultural Economics.

oil prices, are shown in table 104. If oil prices had been higher, in 1949–50, the effect of changes in type of oil mill processes on oil supplies would have resulted in a larger decrease in terms of cents per pound of oil.

EFFECT OF CHANGE IN TYPE OF COTTONSEED OIL MILL INDUSTRY ON RETURNS TO FARMERS

To determine how industrywide change in types of mills may affect the value of cottonseed sold by farmers requires comparison of the costs and revenue of the marginal mill (or mills) of the current industry with those of marginal mills under assumed alternative industry conditions.

The term "marginal mill" is here used to signify the smallest mill whose total cost (including depreciation, interest, taxes, and insurance on investment) must be met in order to induce the industry to maintain a given flow of product.

In this sense, the marginal mill is not necessarily the highest cost mill in the industry. Because of differences in operating conditions, such as managerial ability, seed supplies, meal and hull markets, and state of equipment, there are usually a substantial number of other mills, either smaller or larger, which are always making some contribution to any given output by the industry as a whole but whose cost does not need to be fully covered in order to induce the industry to maintain a given level of output. Such mills may be disregarded in calculating the smallest mill (or mills) of a given type for which seed prices must be low enough to enable it to meet its total cost. They are disregarded in the definition of the "marginal mill" as given above. It is generally recognized that, under stable long-run competitive conditions, the price of cottonseed must be low enough to enable the total value of products per ton of seed to cover the cost of the industry's marginal mill (or mills) as just defined.

If there were no technological advance and no change in the ratio of prices paid to prices received, such a mill (or mills) would continue indefinitely, barely meeting its total costs because it is too big or efficient to make any less and too small or inefficient to make any more. But such "ifs" do not prevail under conditions of stable competition and technological advance because these forces are always changing the nature of an industry's marginal plant by forcing it to operate within an ever-narrowing spread between costs and revenue in order to stay in business.

MARGINAL MILL OF CURRENT INDUSTRY

Ideally, the most desirable method of finding the marginal mill of the current cottonseed industry would consist in obtaining all costs and returns of individual mills and from them determining the average relationship between size of mill and cost per ton of seed, on the one hand, and returns per ton of seed, on the other. The point at which the lines representing these relationships intersect would represent the marginal mill as just defined. This method is impractical, however, because it is not possible to obtain the necessary sample. Therefore, recourse had to be made to other methods. The one used was based on information already set forth in this publication.

An examination of the six small mill areas, previously mentioned, showed that the marginal-size mill varied appreciably among broad regions because of changes in important cost rates, seed density, size of local meal and hull markets, and both local and wholesale meal prices as well as hull prices. These factors for 14 widely scattered mill areas in the Southeast showed that the marginal-size mill in mill area I (southeastern North Carolina) would be somewhat larger than in the other southeastern localities, but the difference would not be substantial. The amount of the local meal and hull market and the level of meal and hull prices were the only factors which varied enough among southeastern mill areas to have any appreciable bearing on the size of the marginal mill. Meal and hull returns in mill area I were among the highest in the Southeast. (This may be calculated by use of data in table 5.) All southeastern mill areas had approximately the same wage rates and seed costs f. o. b. gins. In some mill areas seed haul costs would be somewhat lower than in area I (owing to difference in the density of seed production) but not enough to make any appreciable difference in the size of the marginal mill. The same principle applies to electric power.

The same kind of variation was present in the regions (North and South Delta, Texas, Oklahoma, and the Far West) surrounding each of the other five small mill localities. The marginal-size mill was appreciably larger in the Southeast than in the Delta, Texas, and Oklahoma regions, but it was substantially smaller in the Southeast than in the Far West. The smallest mills in the industry were highly concentrated in the Southeast.

Therefore, it was assumed that the size of the marginal mill, as determined by the cost-price (1949–50) relationships in mill area I of southeastern North Carolina, would be about the same as that which might be calculated by means of a probability sample of the industry, if such a sample were obtainable.

TABLE 106.—*Calculated sizes of marginal cottonseed oil mills, in mill area 1, by type of mill, 1949–50*

Type of mill	Marginal-size mill			Product revenue per ton of seed				Total revenue or cost	Cost									
									Unaffected by type or size of mill or size of crush			Affected by type or size of mill or size of crush						
	24-hour crushing capacity at normal operating rate	Length of operating season	Annual crush	Oil	Meal	Linters	Hulls		Seed f. o. b. gins	Other [1]	Total	Seed haul	Salaries	Plant [2]	Labor	Electric power	Other [3]	Total
	Tons	*Mo.*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Hydraulic	40	6.8	6,000	35.60	26.50	8.00	3.41	73.51	45.25	4.83	50.08	2.06	2.46	9.36	6.36	0.86	2.33	23.43
Screw press	50	4.8	5,300	36.52	26.50	8.00	3.37	74.39	45.25	4.83	50.08	1.99	2.48	10.95	5.35	1.20	2.34	24.31
Direct solvent	50	4.9	5,400	39.56	26.50	8.00	3.21	77.27	45.25	4.83	50.08	2.00	2.47	12.56	6.21	.94	3.01	27.19
Prepress solvent	40	6.1	5,400	40.34	26.50	8.00	3.17	78.01	45.25	4.83	50.08	2.00	2.47	12.38	7.44	1.04	2.60	27.93

[1] Includes cost of repairs, meal bags, linter bagging and ties, linter room expense, travel and auto expense, office expense, and lubricants and cleaning supplies.

[2] Includes depreciation, interest, taxes, and insurance on investment cost of new plant.

[3] Includes cost of fuel oil, miscellaneous mill expense, water, laboratory services, brokerage fees, social security, workmen's compensation, general liability, insurance on stocks, hexane (solvent mills only), and press cloth and mending (hydraulic mill only).

Using, then, the cost-price relationships in this area, the marginal mill of the present (1949–50) industry was approximated by reducing the size of crush of 10,600 tons for the 4- and 6-press hydraulic mills to the point where the total value of products per ton of seed in each case was equal to total cost, including depreciation and interest on capital investment in a new mill. It turned out, as shown in table 106, that the marginal mill was the 4-press mill, having an annual crush of 6,000 tons and operating for nearly a 7-month season at the normal rate of 10 tons per press per 24 hours.[20] Depreciation and interest on this plant was calculated at $47,200. Were this written off as it is in case of many actual mills, an operator would find it profitable to handle crushes much smaller than 6,000 tons, as such plant costs are the principal ones which increase per ton of seed as the annual crush becomes smaller.

Persons familiar with mill operations throughout the Cotton Belt were then asked, How big an operation would be required to meet all costs year in and year out? The replies were surprisingly close to the calculated figure of 6,000 tons for a 6-press hydraulic mill. In the past, mills crushing appreciably less than this figure have continued to stay in business but Kromer and Smith (*5*, p. 6) found a steady decline in the number of small mills from 1926 through 1949, indicating that they are on the way out.

ALTERNATIVE TYPE INDUSTRIES

The next step in getting an idea of the extent to which returns to farmers may be affected by industrywide shifts in type of mill consists in constructing alternative type industries and comparing their marginal mill costs and revenues with those of the current industry.

Four alternative industries were constructed: Hydraulic; screw-press; direct-solvent; and prepress-solvent. Three steps were involved in these constructions.

First, it was assumed that both the present industry and each of the alternative industries would handle a total crush of approximately 5 million tons of seed, this being the average from 1948 through 1951 (*11*).

Second, each alternative industry was made to correspond as nearly as possible to the present industry. (Exact correspondence was not possible, as the sizes of mills available for each alternative industry were not the same as those in the present industry. For example, the alternative hydraulic industry did not include any 14-press mills, whereas the present industry does.) As shown in figure 86 and table 107, this correspondence was accomplished by distributing the total crop of 5 million tons of seed among the different sizes of mills (used in this study) in each

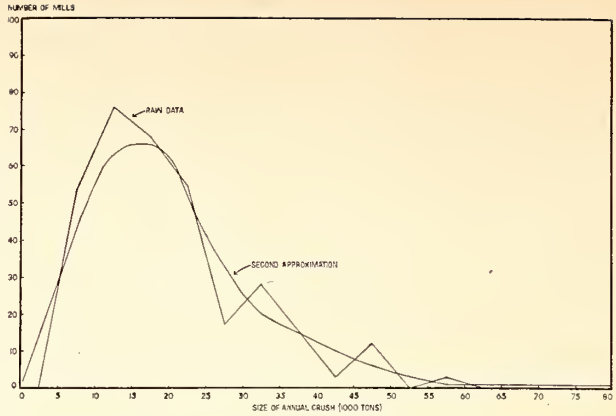

FIGURE 86.—Frequency distribution of cottonseed oil mills, by annual crush, United States, 1950.

alternative industry in approximately the same proportions as in the present industry. For example, in both the present and each alternative industry, 10 percent of the total seed crop is handled by mills crushing 10,600 tons or less. The same principle applied to each of the other crushes.

Third, the least efficient (marginal) mill in each of the assumed industries was considered as having a 10,600-ton crush. Having the same crush for the marginal mill in each assumed industry is necessary in order to compare the effects of change in *mere types* of mills on the value of seed sold by growers.

But alternative industries might have been constructed for analysis purposes with either a smaller or a larger size (10,600 tons) marginal mill. Why was not a smaller size selected; especially in view of the fact that, in terms of new mills, a larger crush is required by the hydraulic process to enable an operator to break even than for any other type of process, as shown in table

TABLE 107.—*Calculated distribution of total cottonseed crush, by size of mill*[1]

Size of mill (tons crushed at normal rate)	Proportion of total crush
	Percent
10,600	10.0
13,200	13.8
21,100	19.7
26,400	15.3
42,200	8.2
52,800[2]	13.6
63,400[2]	6.2
79,200[2]	6.4
105,600[2]	6.8
Total	100.0

[1] Based on 1949 and 1950 seasons.

[2] Minor adjustments in proportions of total crush (figure 86) were made to take account of known changes since 1950.

[20] A larger crush was required to enable the six-press hydraulic mill to meet all its costs because of its higher capital requirements.

106? The answer is that net revenues, as shown in tables 98 through 103, were not regarded as warranting the construction of a new mill of any type if less than approximately 10,000 tons of seed were available. It would probably be more economical to assemble a mill through the purchase of second-hand hydraulic or screw presses.

Alternative industries with marginal mills of more than 10,600-ton crush were not assumed, as such a radical increase in the size of the smallest mills is unlikely in the foreseeable future. At the same time, it is recognized that if no more than 10,600 tons of seed were available to an operator he would probably do well to buy up second-hand screw presses instead of investing in a new mill of any type. His investment would be much less and therefore his net revenue would be as much or more from his "second-hand" mill as from a new (10,600-ton) prepress-solvent mill.

MARGINAL MILL COSTS AND REVENUES OF THE PRESENT AND ALTERNATIVE INDUSTRIES AND THEIR EFFECT ON FARMER-RETURNS

Two assumptions were used in comparing the effects on farmer-returns of the revenues and costs of the marginal mill (or mills) of the current industry with those of the alternative industries. (1) It was assumed that both the present industry and each alternative industry are subject to stable competitive conditions.[21] (2) The same selling prices of product were assumed for both the present industry and each alternative industry except insofar as the shift to the higher-oil-yielding types of mills lowered the price of oil by increasing its supply.

As the annual crush of marginal mills in the current industry was only 6,000 tons of seed, as compared with 10,600 tons in each of the alternative industries, farmer-returns would be affected by change in (1) *size* of marginal mill as well as (2) the type of marginal mill. The size factor may be isolated, as shown in table 108, by comparing the costs and revenue of the marginal mill of the present industry with that of the alternative hydraulic industry, which made available to growers $3.85 more per ton of seed.

The larger marginal hydraulic mill received a slightly lower (68 cents) total value of product per ton of seed because it was necessary to sell a larger proportion of its meal and hulls wholesale instead of locally. But, because of the superior efficiency of larger-scale operations, its total cost ($23.73 per ton of seed), exclusive of seed, was $4.53 less than that ($28.26) of the smaller marginal mill. As its total revenue was 68 cents less than that of the smaller mill, an additional $3.85 showed up as increased price of seed and was so included in its total revenue or cost in table 108. The reason for this is the fact that in cottonseed processing, seed is the only important item that has a fixed supply; and this fixed supply is substantially less than the supply needed for continuous operation of the industry, at normal rates. Under this circumstance, more efficient mills can drive out the less efficient only by forcing up the price of cottonseed, given stable competitive conditions. Continued competition among mills in the more efficient industry will force them to maintain seed prices at a higher level than did competition in the older and less efficient industry.

The influence of change in mere type of cottonseed oil mills on returns to growers may now be isolated by comparing the total product revenues and costs (exclusive of seed) of marginal mills of the alternative hydraulic, prepress-solvent, direct-solvent, and screw-press industries, as shown in table 108. This is true because these mills (1) have the same size annual crush of 10,600 tons and (2) costs, including seed, are equal to their respective revenues.

This comparison yielded two important conclusions. First, shift from the current industry (with marginal hydraulic mill of 6,000-ton annual crush) to either a prepress-solvent or a direct-solvent type industry (with a marginal mill of 10,600-ton annual crush) would be more beneficial to consumers than a shift to a hydraulic industry with the same size marginal mill. For the shift to the prepress-solvent process would substantially lower the price of oil through increasing the oil supply, whereas the shift to larger hydraulic mills would leave the oil supply, and hence the price, the same as before. But it would be less beneficial to growers, even though the total revenue under these reduced oil prices would be greater than that of hydraulic mills, without reduced oil prices. The cost of the prepress-solvent process, exclusive of seed, is enough higher to make less money available to growers for seed. The same principle applies to the direct-solvent process.

The second conclusion is that a shift from the current industry to a screw-press industry (with a marginal mill of 10,600-ton crush) would carry some benefit to consumers, but it would benefit growers more than any other type of shift. Through increasing total cottonseed oil supply by only 2 percent and edible oils (excluding butter and lard) by 1 percent, it was calculated to benefit consumers by only 1.8 percent lower oil price as compared with 8.9 percent by the prepress-solvent shift. But from the grower's standpoint the benefit was calculated at $4.60 per ton of seed, as shown in table 108.

It should be emphasized that the preceding conclusions resulted only because the analysis used alternative industries with marginal-size mills of 10,600-ton crush as compared with 6,000-ton crush for the current (dominantly) hydraulic industry. The result would be different if substantially larger marginal mills, with, for example,

[21] Although each alternative industry included approximately 225 mills as compared with approximately 325 active mills in the present industry, there was no certainty that this small number of total mills would do away with stable competitive conditions. If it did, there is no way of knowing how change in type of mills might affect returns to farmers.

TABLE 108.—*Calculated effects of industrywide change in types of cottonseed oil mills on values of cottonseed sold by growers, in mill area I, 1949–50 cost-price relationships*

Type of mill	Marginal-size mill			Product revenues per ton of seed				Total revenue or cost per ton of seed[1]	Cost per ton exclusive of seed cost f. o. b. gins	Amount of money available to pay for seed (total cost—cost f. o. b. gins)[2]	Gin charges per ton of seed[3]	Amount of money per ton available to cottonseed growers		Increased returns to growers
	24-hour crushing capacity at normal operating rate	Length or operating season	Annual crush	Oil	Meal	Linters	Hulls					Total (Col. 10–Col. 11)	Additional	
	Tons	*Mo.*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Pct.*
Present (1949–50)	40	6. 8	6, 000	35. 60	26. 50	8. 00	3. 41	73. 51	28. 26	45. 25	3. 00	42. 25	--------	0
Alternative types:														
Hydraulic	60	8. 0	10, 600	35. 58	26. 14	8. 00	3. 11	72. 83	23. 73	49. 10	3. 00	46. 10	3. 85	9. 1
Screw press	75	6. 4	10, 600	35. 85	26. 14	8. 00	3. 07	73. 06	23. 21	49. 85	3. 00	46. 85	4. 60	10. 9
Direct solvent	50	9. 6	10, 600	36. 33	26. 14	8. 00	2. 95	73. 42	25. 24	48. 18	3. 00	45. 18	2. 93	6. 9
Prepress solvent	80	6. 0	10, 600	36. 73	26. 14	8. 00	2. 91	73. 78	25. 23	48. 55	3. 00	45. 55	3. 30	7. 8

[1] For marginal plants total costs are equivalent to total revenue. The net decrease in revenue and cost exclusive of seed is here included as an increased price of seed.

[2] This amount would be spent for seed, since in cottonseed processing, seed is the only important item the supply of which is fixed; and this fixed supply is substantially less than the amount needed for continuous operation of the industry.

[3] This was the charge deemed equitable under the price-support program.

TABLE 109.—*Calculated effects on returns to cottonseed growers of shifts from present industry with marginal-size mill of 6,000-ton annual crush to alternative industries with marginal-size mills of 42,200-ton annual crush, assuming stable competitive conditions, in mill area I, 1949–50 cost-price relationships*

Type of mill	Marginal-size mill			Product revenue per ton of seed				Total revenue or cost per ton of seed[1]	Cost per ton exclusive of seed cost f. o. b. gins	Amount of money available to pay for seed[2]	Gin charge per ton of seed[3]	Amount of money per ton available to cottonseed growers		Increased returns to growers
	24-hour crushing capacity at normal operating rate	Length of operating season	Annual crush	Oil	Meal	Linters	Hulls					Total	Additional	
	Tons	*Months*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
Present (1949–50)	40	6. 8	6, 000	35. 60	26. 50	8. 00	3. 41	73. 51	28. 26	45. 25	3. 00	42. 25	0	0
Alternative types:														
Hydraulic	160	12. 0	42, 200	35. 13	25. 48	8. 00	2. 76	71. 37	18. 32	53. 05	3. 00	50. 05	7. 80	18. 5
Screw press	175	11. 0	42, 200	35. 45	25. 48	8. 00	2. 73	71. 66	18. 15	53. 51	3. 00	50. 51	8. 26	19. 6
Direct solvent	200	9. 6	42, 200	36. 33	25. 48	8. 00	2. 60	72. 41	18. 77	53. 64	3. 00	50. 64	8. 39	19. 9
Prepress solvent	160	12. 0	42, 200	36. 25	25. 48	8. 00	2. 57	72. 30	18. 60	53. 70	3. 00	50. 70	8. 45	20. 0

[1] For marginal plants total costs are equivalent to total revenue. The net decrease in revenue and cost exclusive of seed is here included as an increased price of seed.

[2] This amount would be spent for seed, since in cottonseed processing, seed is the only important item the supply of which is fixed; and this fixed supply is substantially less than the amount needed for continous operation of the industry.

[3] This was the charge deemed equitable under the price-support program.

TABLE 110.—*Calculated total net revenue of different types of cottonseed oil mills, in mill area I, by size of annual crush, 1949–50*

Annual crush (tons)	Size of mill (24-hour crushing capacity at normal operating rate)				Total net revenue					
					Hydraulic		Screw press		Direct solvent	Prepress solvent
	Hydraulic	Screw press	Direct solvent	Prepress solvent	Assuming depreciation and interest	Assuming no depreciation and interest	Assuming depreciation and interest	Assuming no depreciation and interest	Assuming depreciation and interest	Assuming depreciation and interest
	Tons	*Tons*	*Tons*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
6,000	40				0	47, 340				
10,600	40	50	100	80	33, 359	82, 326	52, 356	102, 675	61, 037	73, 065
10,600	60	75			40, 667	93, 319	55, 630	110, 320		
10,600	80				40, 308	95, 082				
13,200	60	50	100	80	58, 238	112, 042	77, 629	129, 848	99, 462	111, 210
13,200	80	75			67, 056	123, 024	83, 477	140, 078		
13,200		100					80, 018	143, 220		
21,100	80	100	100	160	131, 641	194, 198	157, 281	226, 322	195, 128	212, 045
21,100	100	125			128, 811	196, 205	161, 357	239, 395		
21,100	120				136, 414	211, 475				
26,400	100	100	200	160	180, 787	251, 222	213, 127	285, 437	268, 356	292, 037
42,200	240	175	200	160	336, 822	282, 163	376, 527	489, 688	481, 832	507, 302

an annual crush of 40,000 tons, were used, provided the advent of such mills did not do away with stable competitive conditions. Under this circumstance, shift to the solvent process would be more beneficial to growers as well as consumers. The reason is that, at large tonnages, differences between prepress-solvent and hydraulic mill costs, exclusive of seed, are much less than at small tonnages, as shown in table 109.

As previously stated, the average decline in all mills, crushing less than 20,000 tons, has been approximately 11 mills per year since 1926, and those crushing 10,000 to 20,000 tons of seed annually have been declining at an average rate of approximately 3 mills per year. These facts suggest that the industry is tending toward a marginal mill crushing which would fall somewhere between 20,000 and 40,000 tons.

It cannot be said, however, that the advent of solvent mills would drive out the little hydraulics (or screw-press mills), at least in the visible future, for two main reasons. First, many such mills, operating for a relatively short season, can supplement their income from cottonseed operations through using their management and facilities in side-line businesses such as seed and feed distribution, fertilizer-mixing, and the like. In this way, they can substantially reduce management and other overhead costs that must otherwise be charged to cottonseed processing.

Second, many small mills have already written off their depreciation and interest on their initial investment. As illustrated in table 110 analysis of data in this study suggests that not until the annual crush exceeds 20,000 tons of seed do either prepress- or direct-solvent mills show a competitive advantage over hydraulic mills which have written off their investments.

As older type mills wear out or become inefficient to the point where new plant investment is required, it would be advantageous to shift to the more efficient type mills. As the investment on solvent mills becomes written off over a period of time, the competitive position of the less efficient type mills will be weakened. If this adjustment should continue until almost all mills have shifted to the more efficient types, the remaining mills would be increasingly squeezed between falling oil prices and rising seed cost. If the adjustment should further continue, under stable competitive conditions, until the whole industry shifts to the more efficient type processes, the gains in efficiency would have been passed on to the users of cottonseed oil, on the one hand, and to the growers of cottonseed, on the other hand.

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