AN ANALYSIS OF THE WHOLESALE DEMAND FOR PINEAPPLES IN SYDNEY

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Pineapples are probably not a commodity of primary importance in the Sydney fruit trade. However, the availability of figures relating to supply and price over a number of years made an analysis possible and it is hoped that the following material, combined with that of a previous article[1], will contribute to a better understanding of the demand for fruit in general.

The analysis covers a period of seven years from June, 1952, to April, 1957. It was established that during this period a relationship existed between the quanities of pineapples which arrived on the Sydney market on the one hand and the prices recorded there on the other. It was also shown that the demand during the Summer months differed considerably from that in Winter.

This means that with a supply of say 4,000 cases per week during the Summer it could be expected that the average price would be approximately 40s. 2d., whilst during the Winter it would be only 30s. 7d. Furthermore, the elasticity of the two curves differ, which means that during Winter a smaller change in price occurs in response to a given change in the supply than during Summer. For example, a reduction in supply from 4,000 to 3,000 cases during the Summer would mean an increase in price of 6s. 5d. to 46s. 7d., but an increase of only 2s. 5d. to 33s. 0d. in Winter.

Another conclusion which can be drawn from the analysis is that no significant changes in the price levels have occurred since 1952. This means that, given rising costs of production and marketing, the grower has absorbed these higher costs, either by more efficient production or by surrendering some of his net income. Although the problems of production are strictly outside the scope of this inquiry, in this context it is interesting to note that in 1957 "many farms [had] recently made adjustments in their cultural practices, or [proposed] making them in the near future",[2] and that "the majority of the farmers interviewed in this survey considered rising production costs to be the biggest problem confronting pineapple farmers to-day."[3]

By far the greater proportion of pineapples marketed in Sydney are the produce of Queensland; only small quantities are received from the North Coast of New South Wales. The figures in Table I illustrate the relative importance of pineapple production in the two States.

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[1] J. van der Meulen, "The Demand for Bananas in the Sydney Wholesale Market", this *Review*, Vol. 26, No. 3 (September, 1958).

[2] *An Economic Survey of the Pineapple Industry in Queensland,* conducted by Division of Marketing, Department of Agriculture and Stock and Council of Agriculture: sponsored by Pineapple Sectional Group Committee of the Committee of Direction of Fruit Marketing (1957), p. 9.

[3] *Ibid.*, p. 10.

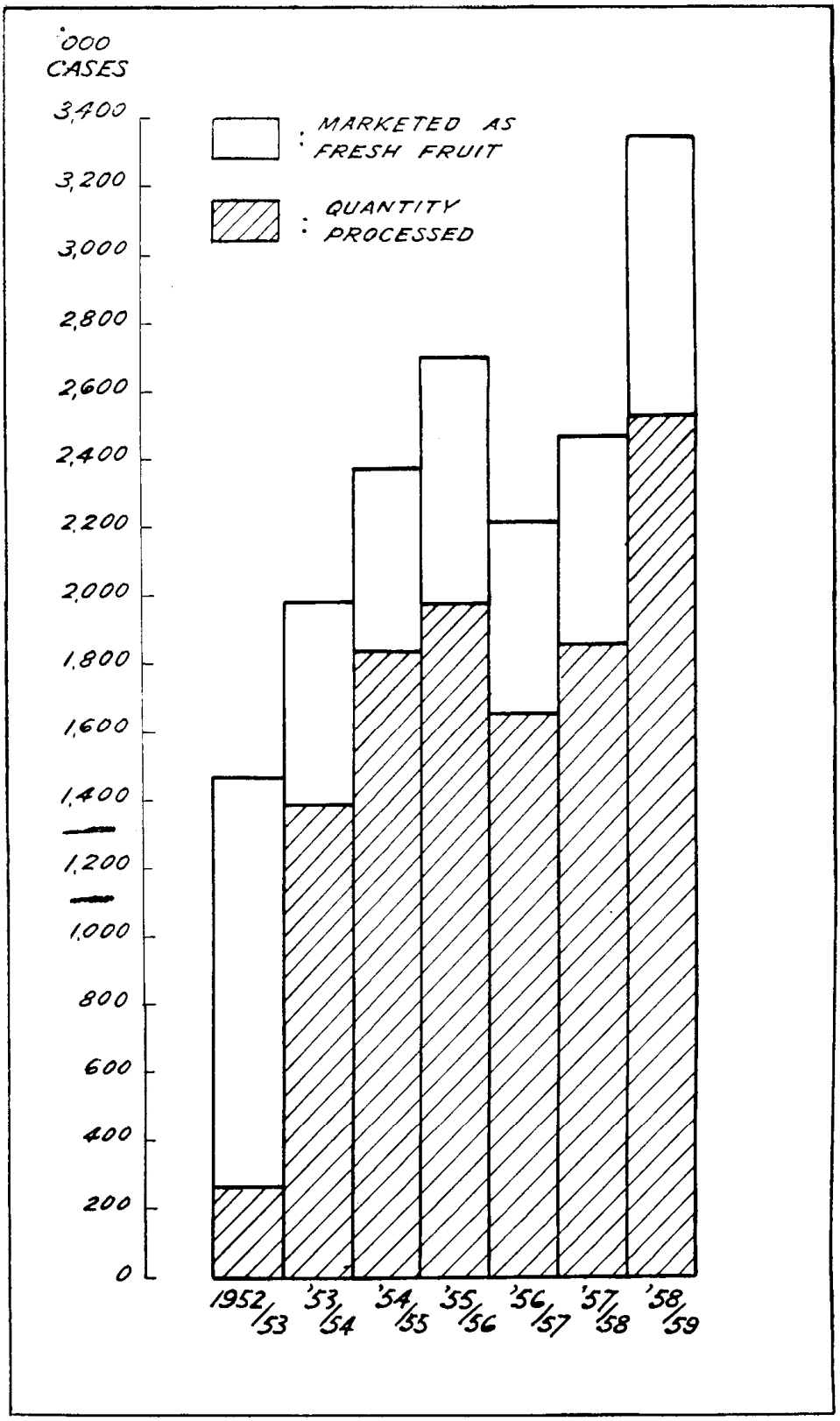

Fig. 1—Quantities of Pineapples, Marketed as Fresh Fruit and Processed, 1952-53 to 1958-59.

TABLE I

Gross Value of Production

Year	New South Wales	Queensland
	£	£
1952-53	45,050	2,461,255
1953-54	67,970	2,255,062
1954-55	67,260	2,231,257
1955-56	60,300	2,526,449
1956-57	79,000	2,391,673
1957-58	74,630	2,317,862

Source: Commonwealth Bureau of Census and Statistics.

A considerable proportion of the Queensland production is processed, as shown in Figure 1. The Queensland growers are entirely free in their decision to send their pineapples either to the cannery or to the fresh fruit market. The minimum price paid by the canneries is determined twice annually by the Fruit Industry Sugar Concession Committee and has been unchanged since 1955, as follows:

£25 per long ton f.o.r. grower's sending station for first-grade fruit;

12s. 4d. per case, plus freight and/or cartage to factory for purchases on the fresh fruit market.

The grower is thus assured of a minimum price at the cannery and will place his fruit on the market only if he thinks that his returns there will be higher.

Most of the pineapples in the Sydney markets are sold through one channel, the Committee of Direction of Marketing, which handles some three-quarters of the total supply. This organisation was established in 1923 under the Queensland Fruit Marketing Organisation Act and besides organising the transport of Queensland pineapples and other produce, it also acts as a selling agent in the Sydney markets in competition with other co-operative and private agents.

With such a large proportion of the supply concentrated in the hands of one firm we might expect price leadership, as the balance of the supply is spread over a large number of agents. However, this leadership is somewhat weakened by the fact that the Committee of Direction makes use of several "selling floors", which are spread over the markets, the managers of which have a fairly free hand in attempting to realise a price as high as is possible according to their estimation of the market.

The figures used for supply relate only to arrivals from Queensland. These are recorded for each train, which arrive twice weekly, on Monday and Thursday. In the analysis, totals for each week (Monday to Friday) have been used. The price data comprise weekly average prices collected by the Division of Marketing and Agricultural Economics of the New South Wales Department of Agriculture. These prices are weighted according to the reporting officer's impression of the market each day and from these weighted prices a weekly average is calculated.

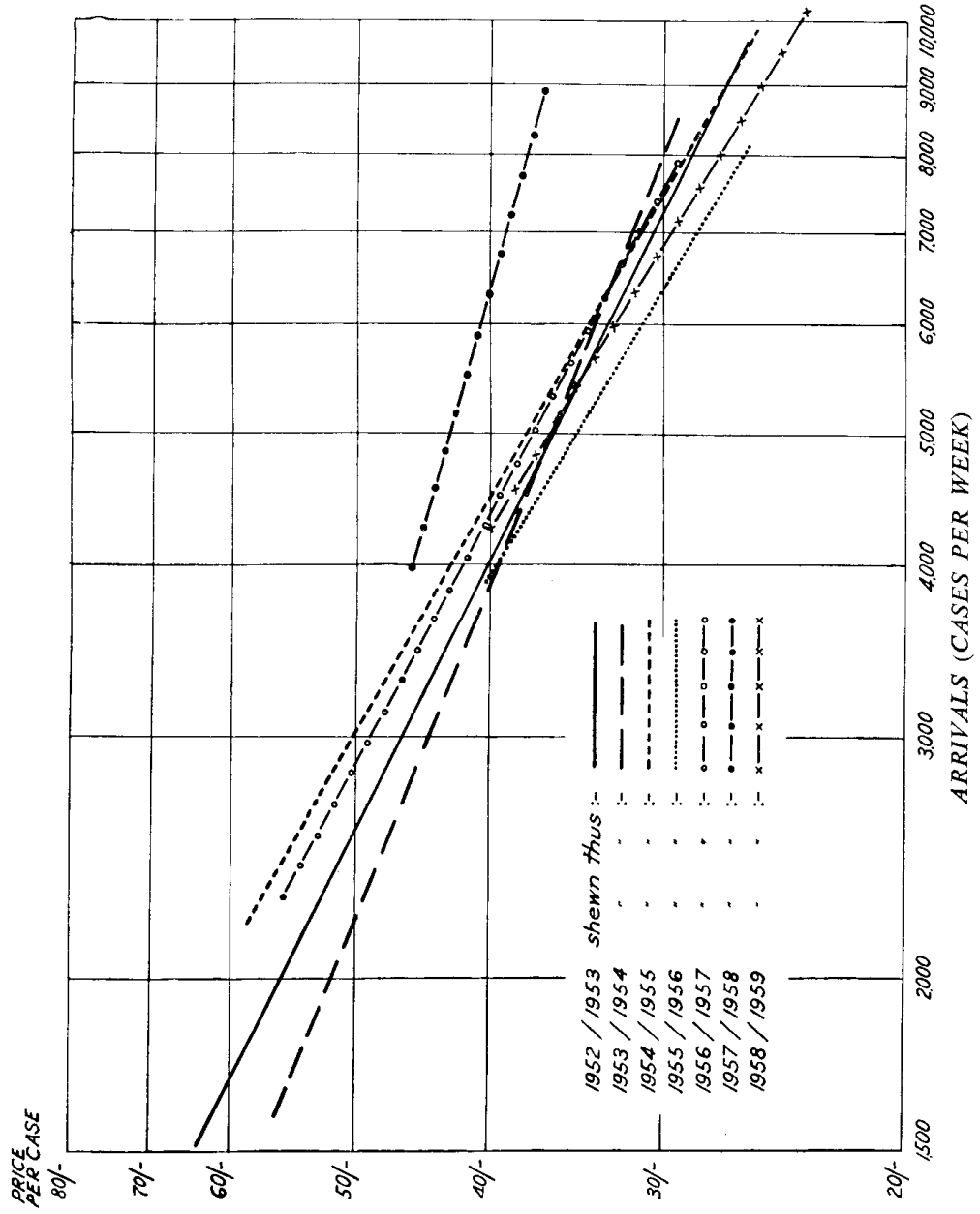

Fig. 2—Price-Supply Relation during Summer Season, 1952-53 to 1958-59.

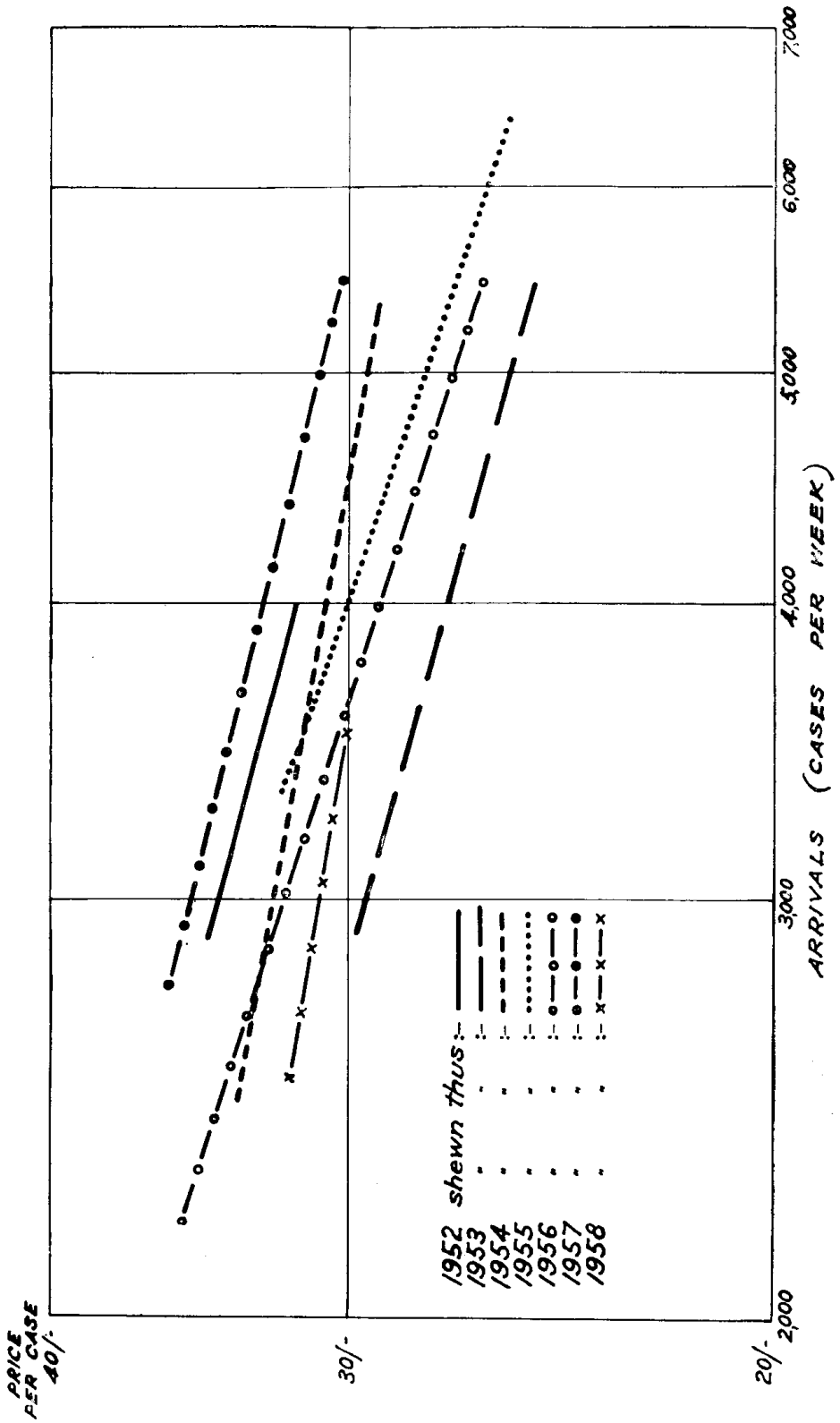

Fig. 3—Price Supply Relation during Winter Season, 1952 to 1958.

The Scatter

When the price-supply points were plotted on a scatter diagram two facts became evident. In the first place, there were two distinct patterns, one for the summer months, one for the winter. It appeared that a transition from the Winter to the Summer demand pattern and vice versa occurred usually during September and May, respectively. The data for these two months were therefore deleted from the analysis and whenever the term "Summer" is used it refers to the months from October to April of the following year, inclusive, whilst "Winter" covers the months June, July and August.

In the second place, in plotting the points it became clear that the relationship was a linear one on double logarithmic scale, and therefore the analysis was made in terms of logarithms.

The Summer Curves

Where Y represents the average weekly price in shillings per case and X the total number of cases which arrives per week on the Sydney market the equations of the demand curves are as follows:

Summer	1952-53	log	$Y=3.3673-0.4891$	log	X;	$r=-0.944$
Summer	1953-54	log	$Y=3.0290-0.3975$	log	X;	$r=-0.602$
Summer	1954-55	log	$Y=3.6666-0.5659$	log	X;	$r=-0.745$
Summer	1955-56	log	$Y=3.7633-0.6004$	log	X;	$r=-0.704$
Summer	1956-57	log	$Y=3.5398-0.5322$	log	X;	$r=-0.782$
Summer	1957-58	log	$Y=2.6375-0.2722$	log	X;	$r=-0.372$
Summer	1958-59	log	$Y=3.8307-0.6139$	log	X;	$r=-0.770$

These curves are plotted on Fig. 2. It is evident that with the exception of demand in 1957-58, the curves show much conformity. Indeed, when the curves (1957-58 excluded) were subjected to a co-variance analysis the result showed that neither the slope nor the distances between regression lines differed significantly, as is shown below:

	df	*Mean Square*	*F*
Ascribable to regression	1	1.6456	
Ascribable to differences between regression coefficients	5	0.0042	< 1.0
Ascribable to distances between regressions	5	0.0063	1.36
Unaccountable	167	0.0046	

With 5 and 167 degrees of freedom, the variance-ratios are well below the 5 per cent level of significance, 2.27. It may therefore be concluded that the data can be represented by the single regression line:

$$\log Y=3.4462-0.5114 \log X;\ r=-0.816$$

which is shown in Fig. 4.

The fact that demand in 1957-58 was different from the pattern in other years can be explained by seasonal factors. The year was extremely dry and the supply of most other fruit was well below average. The pineapple supply was maintained at a fairly high level, indeed only during 1958-59 was the average number of cases received higher than in 1957-58, as Table II shows.

TABLE II

Average Weekly Arrivals and Average Prices, 1952-53 to 1958-59

Year	Average Number Cases Arrived per Week	Average Price per Case
		s. d.
1952-53	5,363	40 0
1953-54	4,033	42 0
1954-55	5,840	36 0
1955-56	5,738	33 0
1956-57	4,883	40 0
1957-58	6,337	41 0
1958-59	7,383	30 0

This high level could be maintained by the re-allocation by growers of pineapples from the canneries to the fresh fruit market. The low correlation coefficient of the 1957-58 curve must be noted, however, with N = 30 it is barely significant at the 5 per cent level in contrast to the high correlation coefficients for the other curves.

The Winter Curves

The winter demand curves shown in Fig. 3 are represented by the following equations:

Winter 1952 $\log Y = 2.5186 - 0.2840 \log X$; $r = -0.415$

Winter 1953 $\log Y = 2.0805 - 0.1645 \log X$; $r = -0.604$

Winter 1954 $\log Y = 2.1119 - 0.1735 \log X$; $r = -0.381$

Winter 1955 $\log Y = 2.6755 - 0.3321 \log X$; $r = -0.280$

Winter 1956 $\log Y = 2.6120 - 0.3185 \log X$; $r = -0.746$

Winter 1957 $\log Y = 2.3892 - 0.2483 \log X$; $r = -0.639$

Winter 1958 $\log Y = 2.0514 - 0.1614 \log X$; $r = -0.380$

With N = 14 for 1954 and 1955 and N = 13 for the other years, only the curves for 1953, 1956 and 1957 are significant at the 5 per cent level (1956 at 1 per cent).

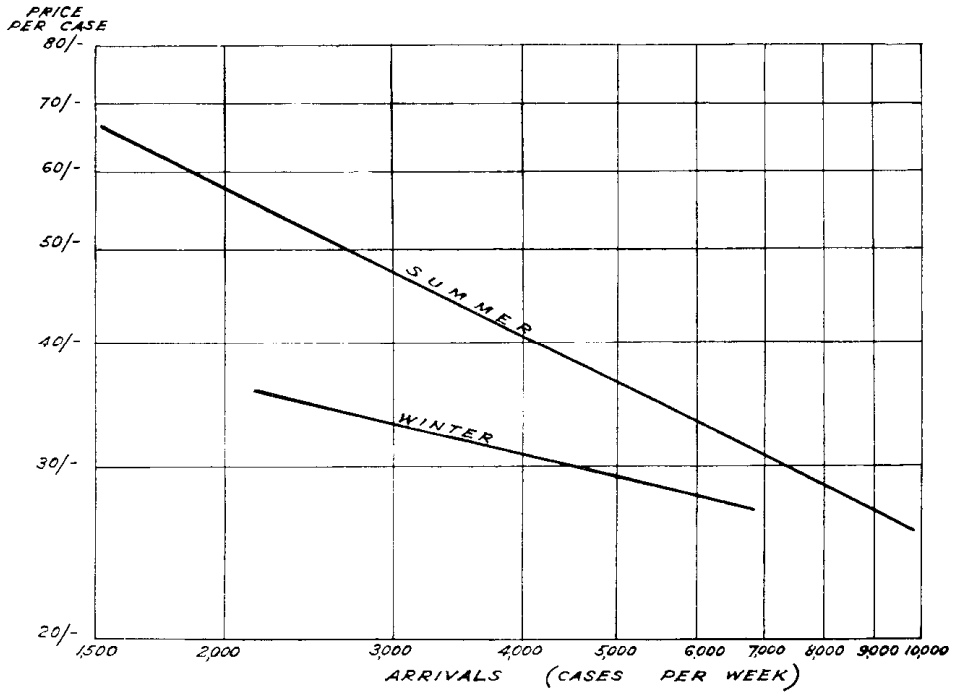

Fig. 4—Joint "Summer" Curve 1952-59 (1957-58 Season Excluded) and Joint "Winter" Curve 1952-58.

These curves also were subjected to a covariance test with the following results:

	df	*Mean Square*	*F*
Ascribable to regression	1	0.059019	
Ascribable to difference between regression coefficients ..	6	0.000637	< 1
Ascribable to distances between regressions	6	0.003510	1.21
Unaccountable	79	0.002890	

The 5 per cent significance level for 6 and 79 degrees of freedom at 2.21 has not been reached and here again we may represent all data by a single regression equation

$$\log Y = 2.3860 - 0.2501 \log X; \; r = -0.435$$

which is reproduced in Fig. 4. With N=93 the correlation coefficient is well above the 1 per cent significance level of 0.267.