THE FIRST FIFTY YEARS OF AGRICULTURE IN NEW SOUTH WALES.

By

C. J. KING, M.A., B.V.Sc., D.P.A., Chief, Division of Marketing and Agricultural Economics.

(This is the sixth in a series of sketches by the author on the problems met with in the early agricultural settlement of this State. Previous essays were published in the August, September, and October issues of this Review. It is hoped to continue the series in succeeding issues, this, however, depending upon convenience in publication. The full study will probably embrace sixteen separate essays.)

6. FARMING—ITS PRACTICE AND TECHNICAL DIFFICULTIES DURING THE FIRST FIFTY YEARS OF SETTLEMENT (1788-1842).

Introduction: The Bigge Report, Evidence and General Position of Agriculture in 1820; Hoe Husbandry v. Horse Husbandry; The Exhaustion of Farming Lands and the Problem of Fertilisers; Crops and their Failures; Atkinson and a Description of Farming Practices in 1826; Agricultural Theories; General Summary of Position in 1842; Conclusions.

INTRODUCTION.

It is a matter for conjecture what course the colony would have taken if first settlement had not been made on the shores of Botany Bay and later Port Jackson, and if, for instance, agriculture had been established at a more fertile area on the coast, for it is certain that farming never really flourished in the first fifty years of settlement in New South Wales.

Many reasons can be put forward to explain why this should have been so. In the first place, the County of Cumberland, within which for the whole of the first period of early settlement the main agricultural districts were situated, was largely very poor country. Excepting the alluvial flats of limited extent on the rivers, it is largely a barren soil. (1) Composed of shale and sandstone derivative, it lacks humus and, because of acidic and phosphorus-deficient characteristics, requires repeated liming, manuring and intense tillage to bring it, even now, into any sort of fertility. Unfortunately, it was never able to receive all three of these in the formative years of settlement, for the simple reason that the settlers, or at least the proportion of them who were willing to attempt anything, were never quite sure just what treatment should be given to the land. Moreover, even if the proper treatment had been known, large-scale animal refuse-manuring and liming were out of the question, for neither fertiliser was available in quantity. It is then not to be wondered at that the land that was farmed produced in a fashion typical of its character. The soil failed to retain surface moisture, and this must explain the extreme susceptibility which the country

showed to the uncertain and low rainfall, and the constant references that are made in the Gazettes of the times to the "blights" which dried up and destroyed the crops. These lands away from the rivers, in such districts as Parramatta, Airds, Camden and Campbelltown, constituted very difficult material for farming, even under the best of conditions. But on the rivers, where alone any hope of success could be anticipated, there were other troubles, for the periodic floods did immense damage. Following the floods, the farms were overrun with weeds and debris, and in some cases even sand, which completely ruined the underlying fertile alluvium.

If, then, the soil of the Cumberland area and the location of the better farms on lands subject to flood damage was the first hurdle for the early farmers to cross, heavy timbering and the immense difficulties involved in clearing must be considered the second. Near the coast, the country was just a sandy waste, but further inland, it was everywhere on the coastal littoral thick forest and brush. The timber was hardwood, deeply rooted with wide horizontal spreading laterals. To clear it, there were axes, saws and fire, but nothing else. Animal or other motive power was not available. The hardness of the timbers blunted the axes. Commonly, the trees were cut through two or three feet above the ground, and the top trunk and foliage burnt in sections. This was as much as most men could afford. For more than thirty years no attempt, except on isolated properties, was made to remove the stumps because of the considerable expense which this would have involved. In fact, destumping would have ruined most men, both on account of the costs involved, and secondly, because of the consequent delay in receiving the first returns of production. Thus the arable land for much of the early period of settlement consisted of scattered plots, pockmarked with stumps every few feet or few yards. Upon such land ploughing was in most cases impossible. Cross cultivation or the drilling of grain in rows, whether by hand or machine, was likewise impracticable. William Cox seems to have been the only man who in the early settlement was able to use a horse-drawn plough to cultivate such land. (2) The land was then usually treated with a hand hoe. If the soil was hard, the top surface was merely scratched and the seed sown broadcast, just as on the arable open fields of England, before Jethro Tull, the same system had been practised and was still being practised at the turn of the 18th century. Successful tillage, once the seed had germinated, under these same conditions was impracticable, and weed control mostly out of the question. The grain then grew over-reaching and, in a good season, in competition with the weeds. Naturally enough, there could never have been any such thing as a pure seed, and disease, if present, was thus inevitably spread and perpetuated from one crop to another. This question of clearing was in fact always recognised as a difficult task work. The Society of Arts in England thought it of such vital importance even so late as 1821 that if offered a prize for the best method evolved of dealing with stumps (S.G., 24.3.1821). At the Grose Farm, Druitt in late Macquarie times, as it has been seen, spent much time in experiments before he finally hit upon the idea of burning out the stumps.

Under modern conditions, by comparison, the usual method of clearing is, of course, to ringbark and sucker, but it has to be remembered that in the early years of settlement, the ordinary farmer was obliged to take almost immediate steps to bring his land under cultivation. He was supplied from the stores at first, for a period of eighteen months, but when this was later cut down to six months, his difficulties were wellnigh hopeless and the urgency of his farming immediate. No one but a wealthy man with capital could then have afforded to keep himself for a lengthy period and await the results of ringbarking and suckering. Again, it must not be overlooked that in controlling timber growth on land it sometimes proves that the costs of continuing upkeep and suckering are greater than those of the initial clearing.

A third major difficulty which hampered agricultural development in the early colony was the shortage of stock. In the earliest years, none but "capitalists" could afford to buy or breed them, and for the poorer settlers this was a great hardship. In England, sheep were "folded" over the cultivation paddocks, but this was hardly possible in the early colony. Even though Governor King in 1803 publicised the advantages of using oxen and horses for ploughing, this advice was largely over the heads of the small farmers, for they had simply not the means at their disposal to buy or keep them. Government was, moreover, unable to supply the wants of the farmers, because of the limited number of stock available for distribution. Thus the settler was deprived of the assistance which animal tractive power would have provided, and of the manure which stock alone would have supplied. The settlers thus, were forced to farm under constant disadvantages, so that even in the early '20's there were few men in the colony who could handle horses in horse-drawn ploughs. ([3]) Moreover, another difficulty existed in the fact that there were no fences. The stock trespassed on neighbouring properties, and the effects of the Impounding Acts which were gazetted to cure this evil were such that, by 1831, the marketing of pigs and salt cured pork was denied to the small farmer. ([4]) In cases where stock were carried, the method adopted was to herd them together in a confined improvised paddock. The stock were injured and this rendered their marketable value as meat less than it should have been. Generally, there was a complete divorcement between stock raising and agriculture, and this was one of the main causes of the failure of agriculture. It would never have been possible to have successfully combined the two on small farms of thirty to fifty acres, where sheep alone in the poor Cumberland country required two acres for satisfactory subsistence the whole year round. ([5])

Finally, in this overall picture, the incidence of rainfall deserves a comment. It is impossible to overestimate the importance which the droughts and floods exercised upon early agricultural development. The winter was usually a drought, in any case, for stock. They pined in condition in the usual winter starvation, degenerating, as they did also under similar circumstances in the contemporary England, where hand feeds were not provided or winter crops grown, into "half starved looking runts." Droughts were

"blights"; floods were "innundations." Between the two extremes there were all sorts of variations, but rainfall, as is always the case, was one of the ruling factors in success or failure with crop growing.

These problems and broad issues may be seen to be acknowledged in articles published in the New South Wales Magazine, in 1843 issues, as consideration was then coming to be given to the then present embarrassments of the colony and of the similar distresses of the years before. The general conclusion reached was that "Certainly we have not selected our best lands, and those we have chosen are not properly farmed" (6). It was considered that the colony possessed alluvial flats of sufficient extent to produce corn for ten times the then population (150,000), and that if only it were "decently farmed" it would yield thirty to forty bushels to the acre. The average for the colony, however, in contra-distinction to this estimate, was only 14 bushels per acre, and reasons had to be found why this should be so. Many of the favourable flats were near the coast and rivers, and so were not liable to "frequent excessive droughts," but why was so little of this land in cultivation? There were not even 10,000 acres of this rich land under wheat, but why no more? The answer, thought the writer of the articles, was "simply because the primary outlay in clearing, fencing, draining and breaking up before it can be cropped, is too large to be undertaken in face of almost duty-free importations in a country where capital is scare and dear although the result would be ultimately remunerative." Again, even the lands which were arable were not properly farmed. The reasons were fairly obvious: "Because some lands here may be farmed without manure, it is generally assumed that manuring is unnecessary, and so our agricultural slovens go on year after year ploughing and sowing without manure, without green crops to be fed off, to obtain an inferior crop in moist, and little or none in dry seasons. Even in the County of Cumberland, we all see the straw grown within thirty miles, carried into Sydney, but who ever saw a load of manure going out, except in a market gardener's dray?" One reason was because there was an "entire disjunction of agriculture and stock farming," since "no man can purchase land for the mixed purposes of agriculture and pasturage, and . . . . the agriculturist, if he possessed stock (keeping) it upon a run 200 to 300 miles from his farm . . . ." If this were not so "the straw . . . . now on some farms burned at the barn door would be converted into manure in the stock yard. Green crops would be grown . . . . to be fed off as the cheapest mode of manuring, and carrying with it the advantage of freshening the stock for market also." It was "idle to say of the fair arable land of the colony generally, that it did not require manure. It made a more grateful return for it than English land, and required it more, that its strongest crops might resist a degree of drought under which a poor and weakly crop would perish." Accordingly it was put forward "Agriculture should be an adjunct to dairy farming wherever the market be not too distant . . . ." But for all this there was required not only a large influx of the labouring population, not so burdensome to England, but "agriculturalists of high and middle grade."

This summary provides a key to much that was ill-balanced in early farming, and some suggestion of the incidental technological problems involved. Systems of farming, of course, varied over the fifty years of settlement, 1788-1842, but it is convenient to single out some of the more important difficulties and problems which were encountered, and to draw a distinction also, between the first stage of primitive farming, which may be conveniently called the "Hoe husbandry stage" and the later period, which may, likewise, be referred to as the "Horse husbandry stage." No attempt will be made to survey every difficulty of farming, but at least some attention should now be paid to the salient factors involved in the struggle by the infant agriculture to provide a self-sufficiency in foodstuffs for the population of the colony, and to draw a picture of actual farming practices and problems.

EARLY FARMING—PRACTICES, THEORIES AND PROBLEMS.

A convenient starting point to begin an analysis of early farming practice in the colony is the year 1820, and the Bigge investigations.* Probably the clearest picture given of the conditions of the time is to be found in the Transcripts of Evidence, in which the questions asked by the Commissioner in cross-examining certain witnesses and the answers given to the questions are recorded. There is an enormous amount of material to be sieved in these records, now held in the Mitchell Library, Sydney. Upon the information which he thus collected, the Commissioner later

John Thomas Bigge, graduate of Christchurch College, Oxford, and a London lawyer, was commissioned by the British Government in 1819 to fully investigate the affairs of the Colony of New South Wales and to inquire into the administration of Governor Macquarie. The investigation had been decided upon in view of the Parliamentary agitation in the England of the times and the many accusations made against the Colonial administration, some of them emanating from discontented elements in the Colony itself. Bigge was in the Colony from 1819 to 1821. On his return to England he prepared three very full reports on his observations which were later published in 1822-23 in Parliamentary papers. Additionally Bigge kept a record of the evidence which he took in the course of his detailed inquiry. Transcriptions of this evidence are preserved in the Mitchell Library, Sydney. The transcriptions occupy 27 boxes of records. Whilst the Bigge reports and transcriptions cannot be wholly accepted as an impartial account and interpretation of the times, they furnish an immense amount of material evidence, descriptive and otherwise, of the State of New South Wales as it was in the years 1818-1821 and preceding years.

An authentic and carefully documented account of the British events preceding the Bigge Commission and throwing much light on the pettiness and rumour-mongering of the Commissioner, and the way in which he was influenced by Macarthur, is given by M. H. Ellis in Jour. Proc. R.A.H.S. Vol. XXVII, Part II, 1941, pp. 93 et. seq.

Ellis has this to say concerning the effect of the Bigge reports:— "New South Wales had reached the stage when its development called for the investment of large capital backed with ample, cheap labour. English crime called for a terrorist transportation policy. The British Government preferred to bury at once the memory of a decade in which there had been leniency and humanity, in which the welfare of the under-dog had been the first consideration of the administration." There followed the introduction of British capital into the Colony, the abandonment of the idea of emancipist land settlement and a full scale pastoral occupation and expansion of the Colony, with Government encouragement. The plan was for convict transportees to furnish the cheap labour necessary for this development.

formed his opinions and wrote his reports, finally printed in 1822 and 1823. It is clear from the evidence that Bigge is examining the whole framework of Macquarie emancipist farming settlement. He is considering the financial position of the farming community, the way they live, the way they farm, the reported exhaustion of the soil, the reasons why fertility cannot be retained, the general impoverishment of the small farmers. His conclusions are, in fact, inevitable. The position, as he finds it, is that farming in New South Wales, on 30 to 50 acre plots, is a failure. One or other of several systems is being practised. In some cases, the farms are all under crop. Wheat is being sown, year after year, on the same land, with a progressive lessening of harvests, for the soil is becoming exhausted. This is true particularly of the lands away from the rivers, settled by Macquarie from 1813-20, to first of all place new farms out of reach of the floods, and secondly, because the good lands of the rivers are mostly taken up. Two crops only are being grown, maize and wheat, which in the yearly cultivations draw heavily from the soil and return nothing. Even the straw is burnt, for there are no stock to feed it off and turn the useless straw into the profitable dung manure. The farmers cannot keep stock, for their acreages are too small, and they have neither the fences, the room nor the conveniences to maintain them. Where wheat is not being grown, year after year, in the same field, a simple alternation of wheat one year, maize the next, is being followed, but the results are much the same as a yearly cropping with wheat. No alternation of crops is being followed; no rotation; no system of farming. It is all hopelessly primitive, but little can be done about it. Production, moreover, is lessened by the fact that the usual practice followed in clearing is to cut down the trees and burn the foliage, leaving the stumps untouched. Complete grubbing is impracticable, though advantageous, for the reason that it is too expensive and laborious. This renders ploughing very difficult, if indeed not impossible, on heavily timbered lands; a proper drilling of grain and intensive cultivation, ploughing, harrowing and cleaning, out of the question. The tools of trade of the worst farmers are a pot in which to cook, a hoe with which to farm, a bark shanty to house them. There are countless failures in this type of farming, sellings up and bankruptcies. Some of the farmers dispossessed of properties they had once owned, work as labourers for wages, or else rent small blocks from more prosperous landholders.

On the better lands of the rivers, the same system is being followed—successive croppings of wheat or alternations of maize and wheat. The flats of the Hawkesbury and Nepean are, however, richer, and in good years, return productive harvests. The floods are the greatest danger, not alone to the individual settlers but to the community at large, since, when the floods do come, they completely devastate all the low-lying country of the Hawkesbury district, destroying not alone the crops in the field, but also the stacks of the preceding harvest. The floods do other damage as well, for they spread weeds and rubbish everywhere. But not all is on the debit side, for the floods restore the fertility of the badly treated soil and renew its alluvial nature.

"BUNGARRIBEE HOMESTEAD."

One of the oldest dwellings in Australia, and one with a most colourful and romantic history is "Bungarribee," which was built in 1822 by Captain John Campbell, about twelve months after he had arrived in Sydney aboard the "Lusitania." On the recommendation of Earl Bathurst, then Secretary of State in England, Campbell was given a grant of 2,000 acres of land between Prospect and Rooty Hill, which estate he named "Bungarribee," meaning burial place of a king. With the aid of convict labour, he built the old homestead with a verandah 160 feet long, and a round withdrawing room, which was reputed to be the only one of its kind in the Colony. Behind the house was the barn, also built of bricks which had been brought out from England as ballast and hauled from Sydney by women convicts harnessed to little handcarts. The servants were housed in another brick building behind the barn. After rising to distinction in the neighbourhood as a magistrate, Campbell died in 1828. The next owner was a Mr. Icely, who recognised the estate as a valuable appendage to his large pastoral property in the country, and used it for breeding and fattening purposes.

In 1839, "Bungarribee" was purchased by a Mr. Kater, a graduate of Cambridge University, and a man intensely interested in the breeding of bloodstock. His son, Henry Edward Kater, became a noted pastoralist, was appointed to the Legislative Council, and died in 1924.

Early in the 1840's "Bungarribee" was purchased by the wealthy Charles Smith, "the sporting butcher," who achieved fame as one of the most eminent horse breeders in the Colony.

In 1845 the property was occupied by the East India Company and used as a depot for horses intended as remounts in India. During the next ten years a tradition of romance and colour grew up around the house, in which officers of the Company lavishly entertained their lady guests from Sydney and Parramatta. In 1860 the house was occupied by the Cleeves family, and later was to become the home of Major J. J. Walters.

(Cf. Journal and proceedings of Parramatta District Historical Society, Vol I, No. 3; "Home," 1st June, 1935—by courtesy of Mitchell Library, Sydney.)

At the close of the Macquarie period, the position is, in fact, simple. There are good lands on the rivers but these are dangerous for farming and for the economic security of the settlement; there are poor lands elsewhere; agriculture is primitive in the extreme, except on a few farms of the most advanced and wealthy settlers; a dilemma exists between the advantages of river farming and its disadvantages; there is no solution of the problem of small scale farming off the rivers, or the adaptation of stock raising and farming together, for in this alone are there to be seen any prospects of success. It has all been visionary, this small scale settlement, hypothetical in the extreme, with results inescapable on the largely poor and otherwise dangerous country of New South Wales, with its droughts, floods, pests and other deficiencies. The Commissioner finally concludes that continued emancipist settlement on small acreages should be abandoned as part of Government policy. Specially deserving convicts may be given small maintenance blocks to keep a cow, raise vegetables, poultry and miscellaneous agricultural productions, with which the larger farmers will not concern themselves. But in general it is far better for the ex-convicts to work for wages. Incoming free immigrants should be given substantial blocks proportionate to the capital they have to invest, and other assistance as well. The pastoral capabilities of the country are then more hopeful, and it is to this field that energies are to be more particularly directed. Ex-convicts are to be given their blocks on specially selected fertile areas in the neighbourhood of towns.

From 1821 onwards, it is this recommendation which is followed by the Home Government. Emancipist settlement more or less ceases from Brisbane's assumption of office in 1821, and free emigrant settlement commences in a ripple which becomes a wave. In the years which follow, 1821-1842, the farming lands of the Hawkesbury and its districts and the poor land of Cumberland, continue as the field of the small farmers, just as in the years preceding. There is a considerable development of the Hunter, but here the blocks are of considerable size; there is capital to develop them, and farming and stock raising are, in part, maintained together. Elsewhere farming is haphazard, with no considerable settlement anywhere, because of distances from markets and other factors. The country cannot raise enough food to provide sustenance for a rapidly growing population, and imports from abroad are necessary to maintain the colony. Stock raising and sheep in particular are the fields in which development is concentrated. But, in these years, many attempts are made to adopt in the colony English farming and practices. There is considerable attention given to the literature on farming; there are many debates on theories. It is all a fascinating facet of colonial development and expansion.

In following essays consideration will be given to many of the more significant economic and agricultural problems of the times, but it is now necessary to try and draw something of a picture of the actual details of farming practice in the first fifty years. So as to make the position clearer, it may be convenient to describe the years 1788-1821 as the era of "Hoe Husbandry," the years 1821-1842 as that of "Horse Husbandry."

HOE HUSBANDRY FARMING, 1788-1821.

Possibly the best lead to an understanding of farming and its many difficulties, as reached in 1820, is given in the evidence by John Oxley, William Cox, John Macarthur, Archibald Bell and Gregory Blaxland at the time of the Bigge inquiry. Since the bulk of this evidence is of essential importance and wide significance in the general argument of this study, it is considered advisable to quote at considerable length from the actual manuscripts, for otherwise the atmosphere would be lost, the searching for solutions of problems overlooked. There is some rearrangement of the material, and it is set out in the form of questions and answers.

JOHN OXLEY—EXAMINATION BY COMMISSIONER BIGGE.

"Q. What do you know of farming in the colony?—A. Not one-eighth of the whole effective population is engaged in agriculture. . . . I have a general knowledge of the habits and characteristics of the small emancipated settlers. . . . They are far from industrious, addicted to drink, and prefer a licentious and unsettled life to the attention requisite for the proper cultivation of their land. . . . I believe they live very hardly. . . . Generally they cultivate with the hoe. . . . Nine out of ten of them have no means of raising manure. . . . They do exhaust their lands by perpetual cropping. . . . They generally cultivate about twenty of their fifty acres, though many cultivate the whole.

"Q. What do you consider would be the average production?—A. The average produce on good forest or hilly ground would be about 20 bushels, on alluvial lands from 20 to 25 bushels, but I do not think the general average of the colony is 10 bushels per acre. This is with reference to wheat. The produce in maize is from the same lands from 30 to 60 bushels per acre. . . . Without manure and with constant cropping, alluvial land will continue to give good crops for some years and then fertility is renewed by floods. . . . Forest lands soon wear out, but I know instances of very inferior land producing quite as good crops as the same sort of land in England by a proper course of cultivation.

"Q. Is the colony more indebted to climate than to soil? Is the want of rivers which is so conspicuous in most parts of the colony compensated by the moisture of the atmosphere?—A. I think it is. . . .In dry seasons the dews are very heavy, and in almost every part of the country there are extensive chains of ponds which in wet weather communicate with the rivers. . . . They dry out at times, and in 1815 and 1816 the drought was excessive and the want of water was severely felt.

"Q. Have you ever made an estimate of the expense of bringing forest land into cultivation, and if so, what is it?—A. If the timber is merely felled and burnt off and the stumps left, it will rarely exceed fifty shillings per acre, but if the timber is grubbed and entirely removed, it cannot be done under £5, and this last price will vary according to the timber on the land. Certainly

I consider the removal of the trees and stumps very essentially contributes to the augmentation of the produce, and on common lands, at least one-eighth is gained by grubbing the trees, because the roots of the trees in this Colony are chiefly horizontal and occupy a considerable space, and their removal facilities the cultivation of the land by the plough, which otherwise, in tracts heavy timbered would be impossible.

"Q. Do you know what is the usual price of hoeing or ploughing an acre of land where the trees are felled and burnt and the stumps left?—A. The price so far as it relates to the labour of convicts is regulated by general orders, but those settlers who employ hired teams for the purpose pay twenty shillings per acre, and that generally in property.

"Q. How many convicts would a settler of 50 acres require to cultivate his lands?—A. Supposing himself to labour, I think two besides himself; but, if the whole was in cultivation, I think he would require aid during the harvest. . . . Grubbing by free men is priced at 40s. per acre (not fixed by Government).

"Q. Are you of opinion that the present stock of cattle, sheep and hogs is sufficient for the present heavy and increasing demand of animal food for the convicts?—A. Certainly not, and so great has been the consumption that I think it would be difficult to find 500 four-year-old bullocks fit for slaughter. . . . The settlers in the country usually provide for their convicts by salting down hogs at the proper season, and an occasional slaughter of sheep and bullocks.

"Q. Does the Commissary purchase food for the stores?—A. He purchases salt pork, but very little fresh pork is ever offered, as at the price of 5d. per lb. it is not a sufficient remuneration.

"Q. What would be a fair price?—A. That would in a great measure be regulated by the success of the maize crop with which pigs are chiefly raised.

"Q. From your observations of the class of small settlers, do you think that the cultivation of the land of this Colony can be made productive to it or them with the small means they possess?—A. By industry and some capital they might, but they generally begin these undertakings with very inadequate means . . . They are allowed labourers on the store for a limited period, generally one to those with fifty acres, but the Governor has the power of increasing it if he thinks proper . . . If not victualled from the store, they are employed in job work by their more opulent neighbours and often by plunder and robbery.

"Q. Does it appear that a very large proportion of the land granted in the County of Cumberland is still uncleared and in a state of nature?—A. By far the largest proportion, and will remain so as long as the quantity of produce is regulated solely by the wants of Government. There have been a few instances of successful industry in the class of small settlers, but as soon as they acquire a little property they return to the towns and chiefly to Sydney, where they find more profitable employment in retailing merchandise and spirituous liquors.

"Q. What would be the expenses and other factors involved in running a property of 50 acres?—A. Take a period of three years. Suppose the settler to take possession of his land in March. He will probably begin by falling the first year. Clearing, burning off, ploughing and planting and clearing the maize on 10 acres would cost £42 10s. 0d. Adding to this dulling, husking, removing stalks and marketing, additional costs would bring this figure to £71 5s. 0d. Supposing 300 bushels of maize were sold, total returns would be £77 4s. 0d. The profit on the first year would be £5 19s. 0d. His profit for the second year, if further land were brought under cultivation, would be £49 10s. 0d., and for the third year £36 8s. 0d. From the end of the third year, supposing the settler to continue 25 acres in alternate cultivation in the best manner he is able, without the assistance of manure, which it is probably out of his power to procure, his lands will continue decreasing in produce, so that at the end of six years the soil will be entirely exhausted, and if none of the remaining portion of his 50 acres is fit for cultivation, he must seek elsewhere for a settlement and subsistence for his family, but if he is enabled to manure his farm, either by possessing a little stock himself or by the flocks of others being folded over it, his land will not be considerably deteriorated, as such dressing will last not less than three years, still presuming the land to be constantly cropped with wheat and maize, or alternate and different portions annually. This course of proceeding, bad as it is, supposes the settler to understand something of farming, and desirous to make the most of his land, but the greater number of the settlers having been originally mechanics, or not used to agricultural labour, such attention to their own interests is rarely found among that class. . . . . In the preceding calculation . . . . no estimate is made of the value of the poultry which may, and, in fact, is reared in considerable numbers on such a farm. Neither is the labour of the settler himself allowed for . . . . All the preceding calculations . . . . are founded upon the certainty of a market for his produce at 10s. for wheat and 4s. per bushel for maize, respectively . . . . If he possessed a horse and cart with the necessary farming implements, the profits of his land would be very considerably more . . . . for instead of paying for the carriage of his produce to market, harrowing his land, etc., it could be done by himself without any additional charge for extra labour . . . . The lands under the circumstances before stated, are as yet without either fences or buildings, except a bark hut originally erected, but a careful, industrious man might appropriate at least £10 per annum towards enclosing his farm and rendering his habitation more decent and comfortable, without feeling the means of subsisting his family in plenty, much diminished. I believe, however, that few of this class of settlers look upon their farms as likely to remain permanently in their possession. They are, consequently, in general, unimproved and open."

WILLIAM COX (WINDSOR), J.P.—EXAMINATION BY COMMISSIONER BIGGE.

"Q. What was the position of farming some years ago?—A. In 1800, tillage was conducted entirely by hand husbandry, all lands being worked by the hoe . . . . The reasons for so working were chiefly from the want of horses and bullocks for ploughing. Neither were harrows used, the seed being covered with the hoe. The settlers also had an idea they could not plough the land in consequence of the number of stumps . . . . Usual at that time to leave the stumps in the ground about 2 or 3 feet high . . . . It is only within these last four years they have begun to take out the stumps . . . . The hoe system certainly required more labour and expense in the proportion of five men to two, and certainly that is now so where the stumps are taken out of the ground . . . . A settler required more labourers then than now.

"Q. Were the convicts of that day better fitted for the purpose of agriculture than they are now?—A. The chief of the men we had then were from Ireland, sent out on account of the rebellion, nearly the whole of whom were able-bodied men fit for field labour. But of the convicts which we now receive and have for several years past, not one-half of them are fit to do a day's work in the field. The English ships bring a great many boys from the manufacturing towns and London and those from Ireland have a great many old men and cripples.

"Q. What was the average produce of land cultivated in that manner per acre?—A. From 15 to 25 bushels. The same land now cultivated in that manner would not produce more than half that quantity.

"Q. What do you consider of ploughing land with the stumps already on it?—A. It is considered more practicable and profitable to plough land though stumps still remaining . . . . When the large surface roots are taken off and the plough can be brought near the stem . . . . It is also more profitable notwithstanding the wear and tear of implements of husbandry required, but I think it would be impossible to revert to the hand hoe system on account of the comparatively weak state of the convicts.

"Q. What were the districts at first tilled?—A. The districts were then near Parramatta, called Field of Mars, the Ponds, the Northern Boundaries, Castle Hill, which was the Government Farm, the Seven Hills and Prospect, as well as Concord on the Parramatta Road. At the Hawkesbury, there was the lower part of Richmond, the lower part of the South Creek, parts of Wilberforce, Pitt Town and Windsor. At that time the districts of Airds, Liverpool, Appin and Bringelly were not in a state of cultivation . . . . The lands then produced well because of the natural freshness of the soil. The same lands, now cultivated and without manure in any manner, would not produce two-thirds of the quantity it formerly did . . . . Nine-tenths of the lands near the Hawkesbury have had wheat successively from the period it has been first cleared. The highlands during the same period were sooner exhausted, and then left to go to waste. The chief

of the farms in the districts of the Ponds and Northern Boundaries, consisting generally of 30 acres each, were not worked for many years, and have since been purchased by larger capitalists, who are now working them on a better system . . . . Those of the Seven Hills and Prospect have retained their fertility . . . . The larger settler can, by raising artificial food such as rape, clover, turnips and English grasses, maintain a flock of sheep and the manure from them will enable him to raise his crops of wheat.

"Q. What was and is now the average crop on the Hawkesbury? —A. Average produce, from 1804-1814, from 20-25 bushels, but since that period, from 15-20 . . . . A great proportion of lands in the district of Wilberforce and Pitt Town are so very foul from the floods and bad culture that they are scarcely worth cultivating, except for maize which they yield very abundantly . . . . Still the whole of the district is under cultivation.

"Q. Do you conceive that it will soon be necessary to adopt a better system of husbandry in those lands to make them productive?—A. Most certainly; if they were appropriated to the growth of maize, according to a new system lately and successfully adopted of ploughing for maize and cleaning it likewise with the plough, I think the crops of the Hawkesbury district would still be very productive.

"Q. Have you observed that the small settlers who become possessed of those wild tracts have increased their fortunes, or have they on the contrary been spendthrifts and are still in difficulty?—A. Several of them are now doing well and have considerable stock. That proportion, however, is not large. A great number have sold their lands and are reduced to poverty . . . . The wheat grown on the low lands of the district is not so good as that grown on the high lands, nor will it weigh so much to the bushel, but I conceive that the wheat on the high lands is equal to that grown in the other parts of the Colony . . . . Many of the small settlers now keep carts, and those who keep only one horse join their horses to those who keep more, and make a plough team . . . . I have no doubt that lands of the Hawkesbury district, if converted into pasturage, would be more profitably cultivated than in their present state, if we could obtain grasses that would withstand the force of the inundation.

"Q. From the average quality of the land in this Colony do you think that an emancipated convict obtaining 30 acres and with the means that such a person may be generally supposed to possess, can so work the land or improve it as to be able to maintain himself and a family or turn it to account?—A. Most certainly not, with the exception of the land called the Cow Pastures, and an emancipated convict had much better remain as a labourer than cultivate his 30 acres, if he be obliged to live upon it . . . . I mean that if he were to live upon it he would starve, and that it is better for him not to have it at all . . . . I could point out many who now have large families and a considerable stock and who began with nothing more than the land they got and a few utensils allowed them by Government and a pig and seed wheat for the first season, but they are the exceptions.

"Q. Do you think that it would be a better mode of establishing this class of person to restrict the quantity of land granted, to as much as would afford them a tenement and garden, and perhaps land enough to feed a cow, and by that means, to ensure a continuance of their industry as a labourer?—A. I certainly do, provided the land is good and that it would enable him to bring up his family much better than by obtaining a part of lands in the woods . . . . The people obtain credits in anticipation of their crops, and, of course, this expedient affords a regular resort to the worthless . . . . Generally, the public house keepers profit by it, who are likewise shopkeepers, and sell things of the first necessity, such as tea, sugar, tobacco, wearing apparel and rum.

"Q. Is there any renting of land?—A. There are a number of persons who rent land, and if the impossibility of obtaining good land were increased, I think the number of tenants would be greatly increased also, as well as their respectability . . . . Leases are less than seven years and usually rents are 20s. in money, or 30s. in grain per annum . . . . Few of these small tenants have any farming stock or capital . . . . They begin with an iron pot or a hoe. There are certainly exceptions to this in cases where, as convicts, they have behaved well and have saved anything by their good behaviour, and generally by remaining several years in a place . . . . They usually take from 5 to 20 acres, and when one person takes 20 acres he procures another with him to work the ground.

"Q. Do you conceive that the price paid by Government for wheat will repay the cost of clearing and stumping ordinary forest land?—A. I think it will if managed in a proper manner.

"Q. Do you think that the substitution of maize as part of the ration would be advantageous?—A. Most certainly, I think that two-thirds of maize flour ought to be given in the ration, as I do not think this country can produce wheat in sufficient abundance or cheapness to afford an entire wheat ration . . . . If half wheat and half maize, it would have the effect of satisfying convicts to remain in the interior . . . . The average produce is 40 bushels on river land; upper land about 30 . . . . I have often recommended to Governor Macquarie the adoption of maize as part of the Government ration.

"Q. What are the causes of loss of grain?—A. There is a very considerable loss on grain that is left in this country. On an average one-eighth to one-tenth loss in six months, but this varies according to the seasons. Some years the fly moths are very destructive. In other seasons they do not exist at all. The weevils when they breed have the same effect, but not to so great an extent as the fly moth.

"Q. Have you cultivated English grasses?—A. We have cultivated them and found that the White Dutch Clover and the Meadow Fescue succeed the best. They stand the dry weather, but the Rye Grass does not.

"Q. What is the reason for the constant taint of the wheat at Bathurst with the smut?—A. I do not know."

ARCHIBALD BELL, Esq., J.P.—EXAMINATION BY COMMISSIONER BIGGE.

"Q. Has the practice of manuring land become general?—A. By no means. The smaller descriptions of settlers have not the means of converting their straw into dung from want of cattle or means of grazing them. But the majority, or I believe the whole of them, are in possession of the flat, rich alluvial lands which render manuring unnecessary . . . . I consider the land on the north side of the Hawkesbury, which is not subject to floods, to be well adapted for agriculture—in fact, is more adapted than the south side . . . . I have 1,700 acres . . . . The wheat on the land is of the very best quality . . . . It is unnecessary to feed my cattle. The country is not suitable for sheep . . . . I have great difficulties occasionally with cattle in obtaining feed and water for them.

"Q. Is the land occupied by the small settlers of 50 acres subject to perpetual exhaustion, and does it never receive any manure?—A. Most of the small settlers are on the banks of the Hawkesbury which are renovated by inundations, and some few receive improvement by manure.

"Q. How many years will the forest land bear cropping without manure or fallow?—A. I have had some which has carried wheat for six successive years; but now it is in a state of exhaustion, but this is not the case with the forest land generally.

"Q. Is the wheat not subject to blight or smut?—A. It is so at times, but not more so than in Europe, but I have found that those crops that are sown earliest are the least liable to smut and are scarcely ever affected by rust."

GREGORY BLAXLAND—EXAMINATION BY COMMISSIONER BIGGE.

"Q. What do you think of the wheat grown in the Colony?—A. I do not think that the English soft wheats thrive here, but the hard wheats of warmer climates succeed very well . . . . I have found some wheat brought by the present Governor from Persia to be successful where others had failed. I find that the other wheats which have been longest sown in the Colony assimilate themselves to the climate and produce the best.

"Q. What are the best natural grasses?—A. The best is oat grass, but which I have observed of late years has failed as a feeding grass. There is not now one-tenth as much abundance of feed for cattle on lands not converted into tillage as formerly. Where much stock has been kept, the oat grass has nearly disappeared, and a new and inferior has appeared . . . . Except for lucerne, soil is not as favourable to clover and other artificial grasses as England, but I think white clover would answer the best. If the Guinea Grass and grasses of that sort could be brought to stand the winter, it would be the most profitable.

"Q. Do you think that the expense of clearing heavy timbered land would be repaid by laying down the land in artificial grasses for cattle or sheep?—A. I am decidedly of opinion that without the assistance of a large run of forest land and the introduction

of some other grasses which would stand the summer heat and produce greater bulk than clovers, etc., the returns would not be adequate . . . . Turnips are not generally successful because the seasons are too uncertain. But rye or winter barley, fed off or cut, would answer well, and I have no doubt that sugar cane cut green in summer would also answer . . . . One ton of clover hay is produced at the most if properly cultivated in a wet season.

"Q. You do not think that if this practice of husbandry was pursued you could offer to sell your meat at 5d. per lb.?—A. I am convinced I could not sell it for less than 8d. per lb. to the butcher . . . . I would sell it to the store at 7d.

"Q. Well then, do you think the interior is the best for cattle?—A. I think the interior would answer well for breeding, but it is too far to drive fat cattle. They would deteriorate by such a drift.

"Q. Do you consider this climate favourable for the growth of fine wools?—A. I do, peculiarly so."

JOHN MACARTHUR—EXAMINATION BY COMMISSIONER BIGGE.

"Q. Do you think that the class of convicts now arriving are worse than before you left in March, 1809?—A. The convicts are certainly more difficult to manage now than they were when I left . . . . They are less respectful and now claim many of those indulgences as a matter of right which they used to receive thankfully as the reward of merit . . . . Most of the farm servants are neglectful and idle, and the loss in my stock alarmingly great . . . . Some of my men never laboured in their lives before their transportation, and most of them who have been labourers have acquired such habits of idleness that not one in ten can be induced to feel any pride in the performance of his duty . . . . I employ some free and some ticket of leave men to perform those things for which I cannot get Government servants.

"Q. How long is it since you paid attention to sheep?—A. More than twenty-six years since . . . .

"Q. Do you find it necessary for the improvement of the wool to drive your sheep from place to place or to change their pastures?—A. No, until last year my merino sheep were fed since their first introduction upon the same estate, and the whole extent of their pastures did not exceed 300 acres . . . . During the lambing time I give turnips and rape to the merino flock, and sometimes feed them upon forward rank wheat . . . . If I had sufficient men to convert a proper quantity of land into tillage I would feed all my breeding flocks in a similar manner . . . . I have succeeded only partially in the cultivation of turnips . . . . It is a hazardous crop in this climate, for during the season of sowing, February or March, we have sometimes severe droughts, and at others are subject to heavy falls of rain which interrupt the cultivation and injure the growth of the young turnips . . . . Rape is more certain . . . . If the droughts are long continued

the grasses suffer exceedingly, but the flocks are not often materially damaged . . . . Land varies much in quality, but I think it unsafe to stock the best lands with more than a sheep to the acre.

"Q. What are the diseases of sheep?—A. The scab is very fatal if neglected, but it is to be subdued without great difficulty by a careful shepherd.

"Q. What are your cattle?—A. I have about 700 head, founded upon Bengal, Cape and English, the last being a mixture of Devon, Suffolk and Lancashire . . . . They have been killed as heavy as 1,100 lb., but latterly the practice has been to kill them young, and they seldom now exceed 700 lb. . . . . Some improvident settlers kill them as light as 200 lb. . . . . I have at least 10,000 acres for my flocks and herds and upwards of 100 horses.

"Q. Do you think the present price of 10s. per bushel for wheat fully repays the expense of cultivation in this country?—A. I think it affords the grower a sufficient profit.

"Q. Can you form an estimate of what it would cost to bring an acre of land into cultivation?—A. I cannot pretend to give a correct estimate, but I think it may be done in the usual slovenly manner for £5 per acre.

"Q. Are you of the opinion that the distillation of spirits from grain would be advisable in the present state of the Colony, either with reference to its cultivation or its population?—A. It would be a dangerous undertaking. Besides, it appears to me that there is no probability of our soon producing more grain, unless respectable settlers be introduced, than would be required for bread and indispensable uses. . . . The native born youths are active and intelligent, but I think will be enterprising whenever a proper field is opened to their industry. . . . At present many of them have little instruction and their future prospects are very confined. I have never seen an instance to the contrary of the native born youth being sober and honest, and I believe there have been but few—the youths are capable of making greater exertions in this climate than Englishmen."

It is quite evident from the foregoing that, with a few exceptions, the farmers of the first period of settlement were very much "Vandals and Goths" in agricultural affairs. They were probably, however, not much worse than the small arable field farmers in the England of the time, who so offended Arthur Young in his travels. Their extraordinary difficulties, nevertheless, should not be lost sight of, as apart from consideration of their habits and characters.

It seems clear from the evidence of Cox that no general attempt at fully clearing lands by the removal of all stumps was attempted until somewhere about 1815 or 1816, and that ploughing by horse or bullock teams was not carried out to any extent before then, notwithstanding Macarthur's use of a plough many years before and Cox's advocacy and use of ploughing. The simple facts were that the ordinary farmer on a few acres could not afford to grub

his land and then buy a horse and plough or make use of a hired team. It has then to be understood that practically the whole work of early farming was undertaken by manual means—a terrific ordeal under New South Wales conditions. This becomes clear if one notes a viewpoint of the difference in costs, both in labour and money, between manual working of the land and the use of farm animals, given in this letter written by one of the more enterprising settlers to the *Gazette,* and published in the issue of 7th July, 1816:—

> "Having observed the rapid improvements in agriculture produced by the introduction of the Horse Husbandry System in England, I have been led to adopt the same system since I engaged in Agriculture in the Colony. It is needless to observe the superiority of the horse—one of which is equal to six men —when manual labour is so very expensive and the expense of keeping horses comparatively so trifling. This useful animal can now be purchased by almost every description of settler and without which no man can make much progress in farming. To introduce the horse husbandry it is necessary in the first place to clear the ground of all roots and stumps; which will greatly add to the beauty of the cultivated land as well as to augment the produce—nine acres of cleared land being equal to ten uncleared. In falling where the timber is very heavy, the common method of falling with saws and axes is the best and least expensive, but where the ground is thin of timber and the trees are not large, proper falling may be undertaken by digging and cutting the roots. In burning off, in which I make very little use of either saw or axe, cutting the logs into lengths by fire, the first thing is to keep timber for posts and rails for fencing and building. After the logs are cross burnt, open the roots of the large stumps, roll the logs against them and there make the fires. It is essential to spread all the ash, as it contains the greatest quantity of pot ash. After the stumps are burnt low, burn off anywhere the rest of the timber. If any she oaks are encountered, split by wedges and twist out with a lever, 14 feet long.
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> "*Breaking up.*—Before breaking up, rake over the ground with a rake drawn by one horse, which will rake 5 to 6 acres in a few hours. One man can with a good light plough and a pair of horses, plough an acre of ground in a day and it would require ten men to hoe an acre in the same time and as well.
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> "*Sowing.*—In drilling wheat there is a great saving of seed and in the light soils of the country, the ground should always be rolled. . . . Potatoes can be cultivated entirely by horses—ploughed into the ground, hilled up and ploughed out of the ground. It is in the cultivation of Indian corn the staple green of the country, where immense saving of manual labour will be found. One man can with a pair of horses plough, plant, hill, hoe and cut down 40 acres of corn in one season. The corn drill will plant one acre of corn in one hour, drawn by one horse. There are much better results by drilling. . . . There is an improved cultivation by using the expanding

scuffle. . . . This will hoe 4 acres of corn land in one day with one horse. . . . Corn is cut by the expanding scuffle. It is then raked together with a rake. By all these means I can cultivate corn and keep the ground as clear as a dead fallow with one man and one horse, which by the old method is the most expensive grain to grow, requiring so much manual labour. I am much surprised that where manual labour is so expensive, those means are not taken to decrease it. In America, even shovels are worked by bullocks which are very steady drawing animals, but cannot be worked on a plough by one man, nor do they walk so fast. So where a farmer has not much cultivated land I should recommend horses as being animals of more general utility.

"*Clearing.*—Clearing an acre of ground in this country is a very heavy expense, and whether it produces much or little, the working of it is attended with the same expense. Therefore, everyone should be made to produce the greatest crop possible: 'It is not the acres sown but the bushels reaped that count.'

"*South Wales.*—In South Wales there is the same bad system of farming which is now practised in this country, but the land there is all fenced in and cleared, and most of the farmers have more arable land than they keep in cultivation at once. They therefore crop in one part until the crop is not worth carrying, then they let that rest to begin upon another, and proceed by fair cropping to keep the ground in heart, but if worn out it is very difficult to recover it.

"*Sowing.*—I think the loss in seed in sowing wheat late, as it will then not have time to tiller, is made up by its coming to perfection in a much shorter time, and consequently draws the ground less.

"*To the Grazier.*—I suggest a very simple and easy method of making good pasturage and meadows . . . . First scarify the ground then sow a little Trefoil, White Dutch Clover and Meadow Fescue. (All implements can be obtained from Mr. Bostock of Hunter St.)

"I suggest that more experienced persons repeat these experiments . . . The labouring part of the community would then be employed in grubbing, fencing, etc., instead of doing that which that useful animal the horse, now suffered idly to range the forest, would do more effectually and with greater expedition. Whoever has seen the Isle of Thanet must admit that it is one of the neatest and most beautiful spots in England. Every part represents garden beds more than arable land for the common purpose of agriculture, and there is no work performed by a man which can be done by a horse (Agricola)."

This quotation makes the early farming, at least up to 1816, almost incredible. One is amazed at the gigantic tasks which faced every settler, starting off on one uncleared, perhaps heavily timbered, block of fifty acres, single-handed to work out his fortune and destiny. The wonder is not that these men failed but that any of them ever succeeded without capital, sufficient to purchase ploughs, horses, oxen, or hire adequate labour. To anyone who has ever fallen or seen a heavy tree felled, the heart-breaking task of clearing single-handed, even one acre of heavy timbered land, is at once obvious. A settler was given a man—Oxley thought two, perhaps more, necessary—but what if the man were a cripple, aged, or a useless boy, as apparently so many of them were in later Macquarie times? No plans were made to place a settler on land already whole or part cleared for him, as was done, at least in part, by Brisbane after 1821. This makes in itself the Macquarie period and the years before, an era of unparalleled farming hardship. The facts are that until 1816-1820, a considerable part of the granted lands were uncleared, probably the bulk of that which was partly cleared, remaining cluttered up with useless stumps that rendered any proper system of cultivation impossible. The more fortunate settlers were placed with some land which was possible of being cultivated—the remaining portion of their grant an encumbrance. To the unskilled man or to the man who was not strong, or unlucky in the lot drawn, it must have been something of a nightmare; the condition of the convict labourer depending on that of his master. Notwithstanding the views of "Agricola," only the comfortable settlers were in a position to purchase horses, particularly broken-in trained horses.

If these facts are realised, then much of the complaint raised by Macquarie against the slovenly agriculture, improvidence and uselessness of the small settlers fails to awaken a similar reaction. Bigge's conclusions seem to indicate a more realistic approach. The early part of the nineteenth century was a harsh age, but nowhere is this harshness seen so well as in the expectations that were entertained of a man in physical effort and endurance.

"HOBARTVILLE."

The Hobartville estate, which lies above the Richmond railway station, originally belonged to Lieutenant, later Captain, Cox, of the First Fleet, whose first post was in command of convicts at Hobart. This fascinating old home, laid out in attractive gardens planted with numerous beautiful oak trees, had all the appearance of an old English home.

Captain Cox was probably the Mr. Cox mentioned in old records as having been placed in command of the district by Governor Macquarie. On the death of the Captain "Hobartville" passed into the hands of his son, William, who died in 1850 at the age of eighty years. After the death of William Cox, his wife went to England to live, and her son, Sloper Cox, took over management of the estate. He resided there for a number of years and was the last of the Coxes at "Hobartville."

The next owner was a man of large girth and commanding presence, one Andrew Town, "a citizen known and honoured for his great hospitality, generous and of a kindly disposition." His carriages and horses were ever at the disposal of prominent visitors, and many State Governors came to enjoy the hospitality of "Hobartville," not the least among whom was Sir Hercules Robinson, "the most racy Governor we ever had."

It was during Mr. Town's ownership that "Hobartville" became famous for its stud of draught and blood horses, and on the day of the annual bloodstock sales a regular fair was held in the grounds. The sales were held under the oak tree-lined avenue which approached the house from the Richmond-Yarramundi road entrance; large marquees were erected to cater for the luncheon and entertainment requirements of numerous dealers who used to assemble at the estate from all parts of Australia. The home and property is at present occupied by the Reynolds family, and the "Hobartville" studs of Hereford cattle and blood stock are renowned in stock-breeding circles in this country.

(Cf. Windsor and Richmond Gazette, 6th July, 1928, "Reminiscences of Richmond"—by courtesy of Mitchell Library, Sydney.

What is there to say of the farming itself, of the pitiable efforts made in desperation to eke out a subsistence from a few acres of ground? On the rivers the land was probably easy to work. In itself, this was a considerable advantage as apart from the natural richness of the soil, for it must not be lost sight of that men do not plough, even with machines, when the ground is hard. A picture can be conceived of the damage caused by a flood, of the weeds which followed, of the constancy of the toil required to kill and hoe out first the original growth and then the later seedlings. The weeds did win, in many cases, as, again, it is clear from Cox's evidence. But away from the rivers, on the poorer forest lands, who can blame the farmer for attempting to make as much as he could by forcing his cultivation, year in, year out, with the same two crops of maize and wheat. It is not improbable that the bulk of them had no knowledge whatsoever of manures other than stock manure, or of any alternative method of rotational cropping to refresh soil in danger of exhaustion. Their position was always such that it was necessary for them to obtain some income each year. Therefore, the growing of a green crop, as an alteration from wheat or maize for feeding off or ploughing in, was an impracticable ideal even if, as is doubtful, it was ever seriously considered, except by the theorists. The land was then given up to successive croppings and to eventual exhaustion, for one fails to see any alternative that could have been adopted. The ploughing and cultivation, oftentimes a mere scratching of the surface soil, is a matter for the imagination. Moreover, even in the case of those with money and opportunity to experiment, is it not clear that most of the suggestions offered to Bigge were theoretical? For example, turnips are suggested and then it is stated that they are uncertain; rye grass is a failure; English soft wheats do not succeed; oat grass is dying out in the pastures; the land is not suitable for clover and there are many other failures as well. Blaxland hoped for Guinea Grass and Sugar Cane, but, presumably, without the slightest knowledge that they would do well, or fill the void in agricultural needs. There was overcrowding of the pasture lands, which for stock were one-tenth as good as they had been before. (Blaxland's estimate.)

It is needless to pursue this argument further. By 1820, the circumstances of the Colony are that cattle raising in the Cumberland area, as with the primitive agriculture of the period, is beset with innumerable problems, of which nobody knows the solution. There are fundamental reasons for the overall difficulties which are present—the first, divorcement of stock raising from farming, which thus rendered impossible the supply of animal manure, the two being complementary in the knowledge of the times; the second, the dangers and difficulties of river farming, but for which there is no alternative offering; the third, small acreages, high costs of clearing, lack of capital, unsuitability of labour, inability to apply the "Horse Husbandry." Then again, there is not a paternal Government, but one singularly lacking in any understanding of the problems of the period, failing to furnish farmers, free of cost, with the means of clearing their lands, neglecting positive action to provide mechanical means of farming—such as, for example, might have followed a free lending of ploughs and

horses—and miserably abandoning the farming community to its fate at such times as it closed the stores in seasons of plenty, or tightened its purse strings when it was impolitic to do so. There is to be noted further the hopelessness of the policy which ordained that wheat should be grown, when, after all, it would have been much easier, more certain and more profitable to have grown maize on the better lands of the rivers. There is the evidence of Cox that he spent much time in trying to persuade Macquarie to so alter his policy, and the fact that Bigge later did so recommend an alteration. And to do it all there were the "leavings of the halter", the hopeless, unskilled men and boys from the towns.

There is much that could be written in explanation and as comment on the farming as it is disclosed in the years of early settlement, but, after all, it must not be forgotten that the events which are being portrayed occurred at a period when agriculture as we know it was in its early dawn, and confusion was in the forefront of every theory put forward.

It has been seen above that in 1816, horses are being recommended for ploughing. Atkinson (1826) gives a flat contradiction in his advice(7). Horses, so he thinks, are not well adapted for draught at all. A pair cannot be purchased under £100, and, moreover, they are too expensive otherwise "being short lived, requiring shoeing and hand feeding." To his mind, "Well broken oxen, four years old and fit for work" and costing very much less, are more suitable. One additional advantage is that they can be worked for four years at least, on grass alone, and then sold for beef. There is the further statement by "Agricola" that oxen cannot be worked in a plough by one man. There is, again, a flat contradiction by Atkinson: "I never use other draught cattle than oxen; they plough in pairs, guided by the ploughman without a driver. They are harnessed with collars, bridles and bits in their mouths precisely like horses. I allow three oxen to each plough, changing one every day. The usual day's work is three-quarters of an acre except when breaking up new land, then four are used to each plough and half an acre is done each day." Who is the farmer to follow, "Agricola" or Atkinson? There is confusion and uncertainty, even in such a simple matter as animal draught, where experience is available and no higher knowledge is necessary. Farming as a science is, however, just beginning. By comparison, were not the same confusions present in the England of the times, as it has been noted in a previous chapter?

Nowhere, however, do these conflicting ideas become so apparent as in the theories applying to the manuring of land. They were destined to remain confused until the science of chemistry, in modern times, has solved the problems and explained the reasons, for it must not be lost sight of that science, as we know it, is no more than fifty years old.

In Macquarie times, all that can be read in Government Notices are exhortations to the settlers to "adopt habits of industry" and to give "sedulous attention to their farms," but there is no positive advice, no comments on actual farming techniques or procedures. It is alone this necessity for hard work. It is beyond the Governor or his advisers to suggest anything further. All they are interested

in are results—the "orderliness" of farms, the maintenance of supplies to the stores, and "the interests of the Crown." Almost the first notice of improved methods is an article which appears in the 9th December, 1815, issue of the *Gazette,* on "Harvesting, from an Experienced Gentleman Farmer in England." This was followed, in June, 1816, by a letter by "Agricola" advocating the horse husbandry, and as referred to above. In December of the same year, there is an article on the manuring of lands, being in the form of correspondence shown to the editor of the *Gazette* by "a gentleman newly returned from England." (S.G., 26th October, 1816). In this article, the recommendations made concern the value of "burning clay or adhesive subsoil into ashes for manure." The burning, it is suggested, can be carried out quite easily with turf or sods. It is stated that such a manure is better than dung for turnips. But how hopeless is this flaunting of an untried theory, bodily transplanted from England to the new Colony! In January, 1817, there is an article on how to cure diseases in potatoes (S.G., 11th January, 1817) ; in the same month a further article on the manuring of land in England with a compost of chalk, marl and dung, pipeclay perhaps being substituted for the chalk (S.G., 17th January, 1817). A new criticism in farming methods, a confident tone heralding the first effects of the agricultural revolution on opinions in the Colony, where before there has been a mere acceptance of fate, comes to be seen in the accounts of conditions. There is this illustration:—

"We are happy to learn from a person who had charge of an extensive drove of cattle at Bathurst Plains . . . . that the wheat grown there and at present in several stacks is of excellent quality . . . . The wheat stacks lost by Mr. May contained 1,000 bushels of wheat . . . . The grain was very poor. This was due to a late sowing last year, due to the floods of May and June . . . . Sowing was delayed to the end of June and even to the beginning of July . . . . It was not the same this year" (S.G. 3rd May, 1817).

Now, a Dr. Anderson enters the field and contributes a lengthy article on the new science of dairying, suggesting the testing of the milk of each cow in a herd, a rather extraordinary suggestion to find more than 125 years ago. This is just what is being done nowadays in herd recording schemes (S.G., 14th June, 1817).

One of the most illuminating of these early articles is a contribution by a settler or gentleman, calling himself "Civis," and as published in the 8th November, 1817, issue of the *Gazette*:—

"I must call attention that in an infant colony, agriculture is the very 'Primum Mobile'; it is the great wheel on which the performance of the whole machine depends. . . I must make a few remarks on the adoption of a proper system of manuring the lands in cultivation . . . The use of lime has been long decidedly established; its purpose is to reduce to mould all the dead vegetable matter which may be found in the soil. Marl is valuable in proportion to its calcareous content. It is an excellent manure for clay soils, but before its application, the land should be cleared of weeds. Barley and oats are the best to introduce after marling. In Cornwall and the Maritime States of America, sea sand is

laid on the ground in considerable quantities . . . Chalk and powdered shells also answer the same purpose . . . The true nourishment of vegetables . . . consists of water, coal, salts and different kinds of earth which the chemists have ascertained to be the only substances common equally to vegetables and to soils in which they grow . . . Sir Humphry Davy has given to the world a most enlightened work on this very interesting subject . . . . Dung and marl . . . . chalk, sand, etc., are suitable manures . . . Seaweed and the weeds of rivers are to be employed to considerable advantage as manure, but in all cases dung is the best possible manure the farmer can make use of . . . with regard to dung that of sheep is unquestionably the best . . . It is a great advantage to be derived by all farmers no matter how small, from keeping a proportionate number of sheep."

The dates of the articles listed above are in themselves illustrative of the impact of the newer theories arising in England. There is the work of Davy becoming known, through his lectures and later publication of his "Principles." The conclusion, however, must be that as things largely stood in 1820, agricultural theory was not being applied to the Colony to any but a limited extent, and that only by a few of the more enterprising small and large-scale gentlemen farmers. The County of Cumberland is becoming exhausted for both stock raising and agriculture. On the rivers the farming is uncertain, some thinking that it would be a good thing to turn the land into pasture or else abandon wheat growing altogether and convert the agriculture to the growing of maize, which is the "staple of the Colony." There is no diversified farming, nothing but a few tentative experiments with new crops. Stock raising is the field of the large landholder—his exclusive prerogative. The settlers raise a few pigs and poultry, perhaps also a few sheep or cattle. On the Hawkesbury there is the provision of a common which does assist the smaller farmers to graze a few head of cattle. Manuring is an unknown quantity, animal manure impracticable to obtain; seaweed, sand, lime, marl, chalk, possibilities talked of.

So far as farming is concerned, and the immense labour of clearing and burning off, hoeing, tilling, hilling, threshing, cleaning, and so on, practically everything is being done by hand and conditions are of the most primitive kind. The labour is heart-breaking under the hot Australian sun, and with the crudest of implements. To retain perspective, however, it is necessary to glance at and draw comparison with the prevailing conditions in England in the wake of the Industrial Revolution.

In 1816, the social conditions incidental to the process of industrialisation were so serious as to be engaging the attention of Parliament through select committees. There is the evidence of Sir Robert Peel before one such committee: "Large buildings are now erected, not only as formerly on the banks of streams, but in the midst of populous towns, and instead of parish apprentices being sought after, the children of the surrounding poor are preferred, whose masters being free from the operation of the former Act of Parliament are subjected to no limit of time in the prosecution of their businesses, though children

are frequently admitted there to work thirteen or fourteen hours per day at the tender age of seven years, and even in some cases still younger."([8]) Robert Owen, before another committee has similar evidence that in a Stockport mill a girl of four years had been employed, a boy of three years, "some at five, many at six, and a greater number at seven."([9]) He said that a sixteen-hour working day ruled in woollen and flax mills. Samuel Coulsen disclosed before a later committee that in cotton mills, small girls worked from 3 a.m. until 10 p.m. "in the busy time," for 3s. 7½d. wages per week. "In the early time we had to take them up asleep and shake them, when we got them on the floor to dress them, before we could get them off to their work."([10]) It may be safe to argue then, that whilst conditions were bad and so much was expected of the labour of a man in the Colony, they were probably no worse than were the accepted conditions in the England of the time. Perhaps they were better. Rev. Lawry wrote home to his parents in 1818: "The following causes may operate to make the farmers mere slaves and beggars. In the first place, the soil is very poor, composed of clay and a kind of sandy rock, save only on the River Hawkesbury where the land is good, but the extent of this is so small as scarce to be worth mentioning. . . . Secondly, the distance of their markets. Many of the farmers have 100 miles to carry their produce before they can sell it on any conditions whatever. Thirdly, the character of the workmen and servants. These are convicts sent out from England. When they arrive here they are placed about amongst those who can employ them. A farmer perhaps wants half a dozen men. These he gets from the Governor (perhaps half of them shoemakers and tailors) . . . . these men he provides with so many pounds of beef and so many pounds of flour per week, which is enough for their subsistence. They also receive £10 per year in wages. So he sets them to work. Some of them are unable to do much in this hot climate and many more are unwilling. At three o'clock they leave work whether they have done little or much. If they do not please their master, he has no redress. He cannot send them to Botany Bay, for they are there already, and the man that has many of these in his employ will soon know that he is there too. Hence you may observe that to men who have no relatives or who care nothing about their transportation, it is really no punishment, but rather an encourager of vice, and sure I am if many of our poor labourers in England knew what was implied by being sent to Botany Bay they would soon contrive to get a passage thither . . . ."([11])

HORSE HUSBANDRY FARMING—1821-1842.

From 1821 onwards, newer theories are known. There is an Agricultural and Horticultural Society formed in the Colony in late Macquarie times. Macquarie had objected to it being founded by Jamison, Cox, Marsden, the two Blaxlands and Dr. Townson, because persons who had been convicts were not likely to be admitted.([12]) Bell, in explanation, told Bigge that so-called emancipist large farmers, "although they may possess great tracts of land yet they are not generally occupiers of it, nor do they live on their estates (notwithstanding that emancipists are in possession

of very considerable estates in the Colony) nor can they be considered as practical farmers, while those who proposed forming the Society were gentlemen actually residing on their estates and cultivating very largely under their immediate direction."

Books on the Colony, starting with Wentworth's, came to be published from 1820 onwards, such as those by Atkinson and Cunningham, and later still, a series of "Guides for Emigrants." All give different versions of how to farm and what to sow, although there is unanimity on the question of the profits to be made by capital investment in stock. To cover the many theories put forward and tested in these years would probably make the reading tedious. It is considered best to summarise just a few of the early observations and then to take a final reckoning of the different ideas being entertained in 1842-43.

Atkinson's (1826) is the most complete picture of the farming of this time, and it is important that some note should be taken of his book and its conclusions.([13]) Various headings are underlined. These do not appear in the original text, but have been inserted for simplicity of reading:—

> "In the early days of the settlement, the Colony was almost wholly dependent upon *the flooded lands of the Hawkesbury and Nepean* for its grain; the inundations were then followed by a scarcity that sometimes almost amounted to a famine; cultivation within the last fourteen or fifteen years has principally extended on the forest lands, and these inundations, though still disastrous to the immediate occupiers of the Banks, are of less importance to the general prosperity of the Colony. It is, however, to be hoped that the greater part of these lands will before long be converted into fattening pastures, for which they are admirably adapted (page 10). . . . The settlers (of the lower orders) . . . . have seldom any live stock, except perhaps a few pigs and poultry; no manure is therefore made upon the farm, and it is a common practice to burn the straw and corn stalks. . . . The wheat sheaves are carried to a clear place and built into a stack; some slight covering is put over it, but as it is common to thrash it out immediately, this is not always done. The grain is threshed out upon the ground by the side of the stack, and cleaned by the wind. . . . The system . . . . such as it is, was the only husbandry known in the Colony for some years after its first establishment; many of the finest tracts were thus ruined and exhausted; and though this class of people are fast giving place to others possessed of more industry than skill, yet the mischief that arose from the plan of giving grants of land to men of this description, who were possessed neither of capital nor rural knowledge, are many of them irremediable (pp. 32-33).
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> "With the *better sort of settler,* even so, there is a most lamentable deficiency of agricultural knowledge and rural experience. Many (are) tradesmen, others Army or Navy officers, and I do not believe it possible at the present time to name ten individuals in the whole Colony who can properly be called farmers (p. 34).

"*Working cattle* employed are oxen. . . . *Proper carts* for manuring are seldom met with; only too little attention is paid to manuring by the majority of farmers. *Waggons* are sometimes seen for carrying wool and wheat. *Drags* are sometimes used. . . . The *harrows* used are simple and frequently of rude construction and only used for covering seed. . . . Large pulverising harrows, grubbers, scarifiers, drills or other more complicated agricultural machinery seldom seen. . . . In general use is the *Swing Plough*. There have been a great many *iron Scotch ploughs* imported and they are very good. *Ploughs with wooden mould boards* are made in the Colony at about £3 to £3 10s. each. . . . They are seldom made on correct principles and do work badly. . . . Best perhaps for general purposes, made with iron foot and mould board and wooden beam and handles. Not so expensive and more easily repaired. . . . A *wrought iron share* is the best for breaking up new land, but after ground is completely cleared of roots and large stones, *cast iron shares* may be used with advantage (p. 35 *et seq*).

"*System of agriculture*.—No system of agriculture can be said to have been as yet established in New South Wales. Even on the best cultivated farms, very little is done to introduce a proper rotation of crops; the same destructive recurrence of wheat year after year is too generally practised without the intervention of green crops and with little aid from manure to recruit the fertility of the soil. . . . The first crop is generally wheat or maize. It is best to break up new land in the Spring before the ground gets too hard and then let it lie until February or March, then cross plough it well with a strong harrow, . . . then plough it again and sow it with wheat upon the furrow. In this way the turf has sufficient time to rot before being again disturbed and new land has the benefit of exposure to air and summer sun (p. 37).

"*Maize or Indian Corn* on low and flooded land is much planted as the first crop. Hand labour is required to fit it for the reception of wheat as a succeeding crop . . . . *Potatoes* in upland districts where maize will not do well is a good first crop and makes an excellent preparation for wheat. . . . Best time to break up new land to be sown with wheat in February or March, is September and October. This also is the season for planting potatoes as a field crop. . . . Plough two or three times and a good open furrow is obtained. . . . Plough taken up and a thin flag pared off as fleet as possible and turned down into the open furrow. . . . Upon this sets are placed. . . . Plough then let out and brought round again in same place taking up the mould from the bottom and turning it over the sets. . . . In this manner operation is continued placing a row of potatoes in every fourth furrow. . . . Surface immediately over the seed afterwards broken with a hoe to cover more effectually and when plants are at proper height earthed up in same manner. . . . If seed is prepared beforehand, two persons may attend the plough and will plant half an acre

per day. . . . This plan cannot be adopted where there are many roots or stones in the ground but where it can be practised, it will well repay the expense of seed and labour, though the return will be small compared to what it might be were the lands properly broken and pulverised (p. 38 *et seq*).

"I am of opinion that when *a proper system of agriculture is introduced,* maize will be very little cultivated except as a first crop or in peculiar situations on alluvial lands. . . . It is useful as a saving crop on lands that have not been sown as the season for planting is after every other grain. . . . The *best rotation,* I think, on all upland situations where the soil is tolerably light will be wheat, turnips, barley or oats, grasses and peas (p. 39).

"When the *wheat season* comes sufficiently early to admit of ground being ploughed, turnips may be sown the same summer and fed off with sheep in time to sow the *barley* early the ensuing Spring. The *grasses* must be sown with barley or oats. The grain will be ripe in December or January and the grasses must be fed off with sheep through the remaining part of the Summer and Autumn. The next year it may be cut for *hay.* This may be done in November and . . . pastured and folded over with sheep until August which is the best season for sowing peas (p. 39).

"*Rotation of five crops* set out will occupy four years. Some will think it better to omit crop of peas and sow wheat at once upon the clover *lay;* but in the upland districts where maize does not do well, peas are one of the most valuable crops that can be raised. . . . Pork is in great demand both for sale and domestic consumption, but cannot be fattened on barley alone . . . but peas or something equivalent also required. . . . Peas make an excellent season for wheat (p. 39).

"The making of *hams and bacon* hitherto has been little attended to. . . . Indeed many thought climate was too hot. Hams equal to best English may be made for four or five months in winter season. . . . They sell readily at good prices in the Colony and when they become plentiful and cheap *a market may be found in the East Indies for any quantity* (p. 40).

"*The principal impediment* to the introduction of a proper rotation has been the want of demand for *Barley* or for any grain other than wheat or maize, but breweries and distilleries are now becoming numerous, and good malting samples of barley will also sell readily. Green crops were also formerly of very little value, the natural grasses being competent even in the County of Cumberland to fatten a sufficient supply of meat for the Sydney markets, but now by the exhaustion of the natural grass and the great increase in the number of livestock, *the principal flocks and herds* are removed to such immense distances in the interior that it will be impossible to bring down fat stock, particularly in the winter season, without a considerable loss of flesh. It will,

therefore, become necessary to fatten stock bred in the interior upon artificial food raised nearer the markets. Thus it is not possible to grow green crops at a very considerable profit independently of the improvement that would thereby be effected in the land and consequent increased production of grain (pp. 40-41).

"Wheat and other grains are generally sown broadcast on the furrow and harrowed in. Very little *drill husbandry* has hitherto been practised, although in many instances its introduction would be highly beneficial. Wheat is sometimes ploughed in and the plan has been attended with good success particularly in dry seasons. The *roller* is very little used—there are not six in the whole Colony (pp. 40-41).

"The stumps of the trees are a very serious impediment to good husbandry. They are perpetually in the way in every operation. It is impossible to drill crops among them. Though it is possible to plough and harrow, yet it is attended with great inconvenience and is continually the means of breaking the implements. *At present probably three-quarters or at any rate one-half of cultivated lands in the Colony have stumps remaining in them* (p. 41).

"*All kinds of grain are usually reaped with a sickle,* the *scythe* being little in use. Moderate sized stacks and barns that admit a free circulation of air are best suited to the climate, *as grain in the straw is very subject to weevil and fly moth* (p. 42).

"Very few farms are furnished with *Threshing* and *Cleaning Machines.* In general they are not of good construction. Usual way is to thresh out grain by hand and to winnow with sweeps and fanners or in a current of air, and to this imperfect manner of cleaning the corn and negligence in preparing the seed may be attributed the prevalence of *drake,* which is a great pest to the farmer and materially injures the crop. *Granaries* of a good construction are very rare (p. 45).

"The *varieties* of wheat are lammas and creeping wheat, also a variety called the Macquarie Wheat having been introduced by Governor Macquarie and a native either of Syria or Egypt. Red may be sown late and ripens early. It is subject to smut. The grain is heavy and large and produces good flour. Quantity of seed is two bushels to the are. Creeping wheat is to be sown early. It ripens after the red. It is little subject to smut, is plump and small. . . . Excellent flour. . . . Sown at 1½ bushels to the acre. . . . *Average does not probably exceed 15 bushels per acre.* On farms which are properly managed, produce is much the same as in England. *Rust sometimes* appears but is not very common. Prevention of *Smut* by steeping seed wheat in strong brine and afterwards mixing a small quantity of lime with it. It is advisable to keep sheep feeding down wheat if winter be moist . . . until end of August. *Average produce of maize is 40 bushels per acre on forest lands, 80 bushels on flooded lands.* Other kinds of grain are little cultivated (p. 46).

> *"It is extremely difficult to obtain a true sample of seed of any description.* Systems of husbandry are so slovenly that all the different varieties are jumbled together in the strangest manner, wheats ripen at different times and is wasted, becoming the prey of quails and parrots. . . . Most important point in good husbandry—change of seed—is greatly neglected, this explaining the inferior quality of the barley in the Colony (p. 47-48).
>
> *"No attempts are made to feed or fatten livestock upon artificial food except very partially with sheep.* There is no system of farm management with a view to the production and preservation of manures. The stable, pig sties and calf pens are the only places about the farm yard where manure is collected. As these are seldom . . . the quantity made is very small. . . . Indeed, the whole obtained upon many large farms is frequently expended upon the gardens which in general are much too large and only rob the rest of the farm. Green barley is chiefly devoted to feeding swine. *Green barley* and *oats* are used as winter feeds for horses. . . . Every variety of *turnip* in the Colony. . . . *Rape* cultivated as food for sheep, a little *Tobacco.* Flax has been cultivated with success. (Its production at present limited to the demand for the factory at Parramatta and other domestic purposes.) *Hops* a little . . . . nearly all *English grasses,* clovers, etc., have been introduced and some of the principal settlers have sown considerable quantities, but in general the process of laying down the land and grass has been ill executed. *White Clover* is spreading everywhere through the country but it withers and almost disappears with the summer's drought. *Lucerne* tried with great success. *Red Clover* flourishes but does not seed well." (pp. 50-51)

This description by Atkinson is an invaluable portrayal of farming life in the early 1820's. It is interesting to note the references made to several types of agricultural machinery—harrows, pulverising machines, threshers and cleaners, scarifiers, grubbers, drills and so on—for it was not until 1815-16 that in England so many patents were taken out for these machines. The ten years between 1816 and 1826 had given sufficient time for them to be tested and further improved, and by now, apparently, their usefulness is accepted. Rotations and the newer systems of farming are, also, seen to have influenced Atkinson, satisfied that only by such means could the infant agriculture in the Colony be improved. The problems of livestock management are at once obvious in his descriptions. The lands of the County of Cumberland are poor; insufficient to support on the natural pastures an increasing number of stock. Efforts are being made to grow English grasses, clovers and lucerne, but of these time will show that only lucerne will survive and flourish on the alluvial lands, clovers, other than white clover, to an insignificant extent elsewhere. As cattle are driven from the interior to the Sydney market, their condition is lost. There are no railways to transport the stock over the last hundred or two hundred miles. Of the crops, little more than maize, wheat and potatoes are grown.

Attempts are being made to work out suitable rotations and to adapt sheep raising with wheat growing, but there is a limited market for alternative crops that might be used in such a rotation, as, for example, barley. On the smaller farms, there are a few pigs and poultry but no farming husbandry by which stock manure can be conserved and used for fertilising the field crops. There are various pests, some difficulty with pure seed, a disastrous inter-mixture of varieties in all crops and uncertainty as to the best times for sowing. The list could be further extended, but it is sufficient to note the technological problems involved.

But, as apart from difficulties in actual farming techniques, there are other causes operating to hamstring progress. As Atkinson saw the position, "the Agriculture of the Colony is in a very rude and infant state and will require many years and much fostering from Local Government to bring it to any perfection." The difficulties that, in the years that had passed, had exerted most influence in frustrating proper development, were:—

> "1. Principally *a want of capital and skill* in the majority of the settlers. This defect nothing but time and due encouragement held out to induce respectable men of capital to emigrate can remedy. . . .
>
> "2. *The difficulty of obtaining good farming servants* and especially good ploughmen has always been a serious impediment, and still continues so. But were the masters generally possessed of more practical knowledge, it would be of less importance since many well-disposed men may be found among the convicts who might be taught to plough and perform other operations, had the masters sufficient skill for the purpose. . . .
>
> "3. The *want of mechanics* is an evil not so easily remedied as the last. The Government formerly retained the whole of the convict mechanics that arrived for the purpose of constructing magnificent public works while the majority of the settlers were destitute of decent habitations and convenient buildings for their business; and none but very particular favourites could ever obtain the assignment of a mechanic. There is a somewhat more liberal distribution now practised, but a charge of 3s. 6d. per week is charged for each mechanic assigned. This is a very great hardship. . . .
>
> "4. *Want of skilled assistance.*—It would be much better for the Government to train the new arrivals and make them mechanics or sawyers, for they are useless on the land . . .
>
> "5. *Irregularity and Uncertainty of the Markets . . . .*"

There can be no point in entering into a lengthy description of the new techniques recommended during the years which followed, to 1842. Much was attempted but little succeeded. Suffice it to note just one illustration from a mass of detailed directions given in publications to assist emigrants in settling

in the Colony. This concerns a new technique called "dibbling," to be used in the cultivation of wheat, and the reference occurs in the Australian Settlers Guide, June, 1835 (Mitchell Library):

> "We would recommend to the attention of our readers the following mode of setting wheat. We believe it has not as yet been attempted in the Colony, but this method of cultivation, it has been considered, is one of the greatest modern improvements in husbandry, and we are induced to bring it under the notice of our readers as peculiarly suitable to settlers when they first locate . . . It was first tried in the garden of a small farmer near Norwich; when it was found that the crop was larger, the corn was better, and much less seed required. This gradually made a powerful impression. It was remarked that the crop appeared thin during Autumn and Winter, but in the Spring the plants side-shoot and spread out prodigiously. The ears were longer, the grain larger and heavier, per bushel, than the wheat which is sown; six pecks of seed are saved in setting an acre; consequently a saving to the settler, which, if universally practised in the Colony, would cause an immense decrease of expense in the article to the public.
>
> "The land having been previously prepared with the plough or hoe (and it does not require so much care as when prepared for sowing) a man, called a Dibbler, furnished with two setting irons—somewhat bigger than ramrods, but considerably thicker at the lower end and pointed at the extremity (a wooden dibble might be substituted)—places himself in a position having the ridge, which was turned up ten inches wide by the plough, between his legs, serving as a directing line, proceeds backwards making holes an inch deep and four inches apart everywhere; he is followed by a dropper (women, boys or girls) who drop two grains of wheat in each hole, that being quite sufficient. After this a gate, bushed with thorny boughs, is drawn over the land to fill up the holes. By this method of setting, three pecks of corn is sufficient to an acre, and the grain being automatically covered up is secured from birds, etc. The regularity with which the wheat rises affords the best opportunity of keeping it clean by weeding or hand hoeing . . . It has been estimated that in fine weather, an acre may be set by one dibbler and three droppers in two days."

This description of "dibbling" and "dropping," selected from a number of other "revolutionary ideas" is in itself a sufficient commentary upon the progress that had been achieved by 1835. In 1788, the practice is sowing widespread by scattering the grain and then perhaps hoeing in or otherwise disturbing the surface soil. Now, nearly fifty years later, hand sowing is still being recommended, but it is something more precise, by "dibbling" and dropping," even though Atkinson, nine years before, refers to machine drilling. It is all a mirror of the times.

Some consideration must now be given to a summing up of the position as reached in 1842-43. Here again, it would be possible to enter into considerable detail. Suffice it to note, however, the reckoning of the New South Wales Magazine in 1843 issues, on the position of agriculture and its technical problems, as reached at the close of the first fifty years of settlement in Australia. Here are probably the best and most concise statements of the major problems of the times. In the October, 1834, issue (p. 524) there is this summary:

> "We are disposed to think that in the general practice of agriculture in New South Wales, some of the leading principles have been materially neglected, and that if a stricter attention to them were observed, the returns from the soil would be considerably greater than at present. The chief desiderata in our methods of farming are the observance of a proper system of rotation, and the re-invigorating and cleaning of the land by regular fallowing and manuring . . . Sir Humphry Davy seems to have entertained a similar opinion when he says that 'Although the general composition of plants is very analogous, yet the specific difference in the products of many of them proved that they must derive different materials from the soil'."

According to the Magazine there were two accepted sorts of rotations, called "Alternate husbandry" and "Convertible husbandry." In the first of these the farming system consisted in an alternation of cereal grasses, roots, pulses and plain fallow. But since all soils would not bear this unremitting succession of crops, the lighter descriptions were therefore periodically subjected to a few years of pasturage in order to allow the land to resume its cohesive properties. When this conversion from cultivation to pasture was made, this was "convertible husbandry." Unfortunately, however, neither of these methods, as adopted in English practice, could be carried out in the Colony, for very obvious reasons. In the first place, the climate was unsuitable for many of the crops required in "alternate husbandry," whilst it had been satisfactorily proved, after considerable experiment and trial and error, that no artificial grasses fit for pasture and suitable for a "convertible husbandry" could be grown in the Colony. Turnips, for instance, could not be produced with any general success, and potatoes only in a few limited districts. Furthermore, as stall feeding of cattle and stock was so entirely unnecessary in the Colony, the cultivation of turnips for cattle was little attended to. Moreover, of all the artificial grasses that had been tried, the only one with which any success at all had been achieved was lucerne, but this was impracticable and "a very troublesome commodity" in a 3, 4, 5, 6 or 7 shift rotation. It required some years to attain full growth, and as it was a deep-rooted plant, it could not be easily eradicated at pleasure, to prepare the land for a crop of grain. Although, therefore, lucerne was a very desirable crop for continued pasturage, it would have no value in any system of rotation. Other pasture or forage grasses were either unsuitable for the climate, or else grew as troublesome weeds. These systems being impracticable, what were the alternatives?

Something was necessary to get away from "the disgraceful and too prevalent habit of cropping unremittingly until the land becomes exhausted."

In the agriculture of the Colony, the common practice with which everyone was familiar, was to clear a piece of land in the winter season, then to plough it in the following spring, with the stumps in the ground, for a crop of maize. After the maize was gathered in April, the land was immediately ploughed again for wheat and every successive year saw it progressively "wasting its strength by over-cropping, without manure or change, until it (became) so perfectly powerless, or so foul with oats from dirty seed, as to be allowed to exercise its last feeble efforts in a crop or two of wild oats for hay, before it perish(ed) amongst couch grass and every description of pernicious weeds." On leasehold farms of short tenure, thought the Magazine, there might be some excuse for such irregularity by the tenant, but it regretted to observe that this "unpardonable and unfarmerlike practice obtain(ed) too frequently among the landed proprietors who farm(ed) their own estates." Short leases were strongly deprecated since they had such a tendency to lead to these results, but that agricultural land-owners should "prosecute their agricultural pursuits in such a slovenly manner" was a matter of great surprise, since so many of them had emigrated from districts in the mother country particularly famous for "regular and systematic principle in farming operations." It was feared that "the British farmer too often comes here with all his early pre-possessions for the routine and practice which he has been accustomed to in his native land, with an intention of conducting his professional duties on precisely the same principles, without reference to the difference of climate and soil." If, then, he failed to carry out his preconceived notions, was it not a fact that he was too apt to attribute his defeat to the natural defects of the country than to his want of judgment and consequently to conclude "Since good farming (by which he means the British system) will not answer, I may as well be a sloven like my neighbours?"

Under such circumstances, continued the Magazine, and with an uninterrupted succession of crops, it was not to be wondered at that the land was seldom or never refreshed with manure, especially since it most commonly received only one ploughing, indifferently performed, followed by a careless harrowing. The objections to manuring which were put forward, were the difficulty of making it and the expense and trouble of applying it. These were not so, for with a little pains such obstacles might be easily overcome and the superiority of the crops would amply repay the additional outlay of money and labour.

This was all the more surprising since the utility of manure had been so fully established both by practice and on chemical principles. The facts were that all organic matter was capable of being converted into plant food since it contained "in a greater or less degree, portions of the chemical properties which in the process of decomposition in the ground (were) disengaged, and being soluble in water, enter(ed) into the constitution of the plant." For this reason it appeared that the "application of any

substance as a manure possessing the greatest portion of the primary constituents of the plant to which it (was) applied, (would) be the most effectually beneficial in affording nutrition." Hence "decayed wheaten straw might be the best manure for a crop of wheat." Preparing manure, generally, did not receive all the attention that it should. Without a great deal of inconvenience it might be convenient to have a stockyard near the barn into which the straw could be thrown. Here it would be mixed with "excrementitious manure to aid its decomposition."

To prevent too speedy a fermentation, the best method was to drive the manure out on the field where it was intended to be used, and have it put in a large heap, which should be covered over with earth to keep it dry and safe from the action of the air and sun. It was necessary to issue a warning that stable manure ought to be applied with great caution to land intended for wheat, since "the soil in this country is so congenial to the growth of oats that the grains in the hay, and even the grains voided by horses, would vegetate and spring up unless obviated by considerable and uniform fermentation."

If lime, moreover, as unfortunately was not the case, were readily available, it would be found "extremely beneficial to land intended for wheat, for both lime and azote exist in the composition of wheaten straw, and experienced farmers inform us that wheat never thrives so well as on soils containing alkaline matter." The facts were, however, that "Limestone . . . is not so abundant as to allow any hope of lime ever becoming a manure of general use in the Colony." There were many other manures which, when agriculture improved, would be found useful in increasing production. On the coast, seaweed might be valuable, and elsewhere, composts of "earthy and decomposed substances."

It was a "gross mistake and contrary to every principle of nature" to "select seed, when making a choice of wheat for seed, with a small shrivelled grain, in order that a bushel of it might sow more ground." The seed to be selected should be round, full, and, as far as possible, free from smut. "Great pains (had) to be taken to prevent smut in wheat, by immersing the seed, before sowing, in saline and nitriolic solutions, and although these might doubtless have considerable efficacy in preventing it, yet well prepared land, good seed, and seasonable sowings (would) be found most necessary to get rid of this evil." It was carelessly improved farms which engendered smut most plentifully. Rust often arose, too, from similar neglect, and was "merely a species of minute fungi generated on the stem which interfer(ed) with the introsusception and motion of the nutritious fluids."

Another advantage would arise from a well conducted system of rotation. Where the land was regularly and carefully worked, one man and two horses would perform as much labour as two men and eight bullocks. A team of bullocks might be necessary for rough and heavy work, but horses would be found most economical to till the land under rotation. It was true there were few men in the Colony "who understood how to work horses properly, or whose dispositions were mild enough for this purpose." Perhaps in due time the Colony would acquire a class of

labourers more experienced in this department, but in the meantime it was advisable to point out that "shouting and swearing (were) not necessary qualifications of a horseman, however much they (might) be regarded by some in a bullock driver."

From its observations, the final conclusions of the Magazine were these:

"We have for some years past found that agricultural pursuits have not been profitable, inasmuch as the foreign growers have been able to compete with us in the disposal of their grain here at a very low rate. We feel convinced, however, that industry, economy and a proper system will do more to render our fields fertile, and to throw such competition out of our market, than peculiar legislative protection . . . We have often contrasted the farmer of this country with an honest yeoman of equal circumstances in the Mother Country. Here, he keeps his carriage, sports his racers, drinks his wine, and seldom condescends to look at the employment of his humble menials who are probably under an overseer having considerable sympathy with men destined to the drudgery of farm labour, and who, therefore, in the master's absence exact little more work than they are willing to perform. The gentleman farmer, from these causes, grumbles because he cannot get remunerating returns, but seldom takes the trouble to trace the deficiencies to their proper source. . . . How different in the old country! There, the plodding farmer is the first on his establishment to get out of bed in the morning, and to arouse, with the dawn of the day, his drowsy servants. His arrangements have all been well matured, and every man either knows or is put to his proper occupation. With a well experienced eye constantly upon his men, he will soon detect badly performed labour, or an insufficient quantity of it. Wherever his presence is most wanted, there will he surely be found—not always a listless looker-on, but often an active operator. When this is the case in Australia, we shall see a more contented and prosperous class of farmers"

CONCLUSIONS.

The inevitable conclusions of this sketch of farming and its technical difficulties, 1788-1842, are that of all things in the early Colony, agriculture was possibly beset with the most considerable problems, which as late as 1842 were not yet in sight of being solved. It was backward and primitive throughout the whole period of early settlement. Probably the major factor involved in its failure rested in an unfavourable soil and climate, rendering it impossible to apply the newer and better farming methods

developing in the England of the times. The farmers themselves, the large majority, were the depressed minority in a sprawling population, obsessed with the easier fortunes to be gained from pastoral occupations and trade. The gentlemen farmers were occupied with theories, but were careless, indifferent and "listless." Their farms were amateur part-time preoccupations, their real interests sheep and wool. There was no balance—no skilled yeomanry or prosperous peasantry. Exploitation was the philosophy of the times and this applied to the land as to everything else. If exhaustion of the soil and failure to restore and maintain its fertility was a major problem in Macquarie times, it would appear that it was equally a problem of the years which followed. Much of the later history of land settlement in Australia is concerned with strangely similar issues—timber destruction, erosion, rabbits, flood control, exploitation and exhaustion of the borderline agricultural soils of the interior. It is a heritage which it is now the occupation of Governments to remedy.

To these factors must be traced much of the debasement of early agricultural colonisation in New South Wales. There were, however, numberless other problems as well, some of which have been noted and others which will be traced in later chapters of this survey. Here, in conclusion, it is necessary only to mention one further salient factor, and that is *"capital."* It is a mirage and complete fallacy to conceive of farming as a simple occupation, requiring only for success the basic qualities of perseverance and industry. It is surprising how often such ideas are entertained, even in the highest quarters. It is rather a composite of encyclopaedic knowledge, skill and industry, of building and renovation, requiring, moreover, a sufficiency of capital for immediate profit and final investment. Without capital, neither machines, fertilisers nor labour can be procured.

The facts are that in the first fifty years of settlement, capital investment in agriculture was comparatively slight, for it was the poorest field for investment and profit, not necessarily because of the poor returns which the land produced—badly treated as most often it was—but from the depressed and uncertain prices returned to the grower. In Macquarie times and later, there are to be seen the first troublesome signs of farm tenancy on short terms; of men attempting to earn a living on small acreages and with uncertain prospects, possessing no capital and thus forced to exhaust and destroy the very farms from which their livelihood was to be obtained. Later generations, too, have been destined to see this same problem occur.

APPENDIX.

From the Bigge Transcripts of Evidence (Mitchell Library) is here abstracted Surveyor-General John Oxley's calculations of the expenses involved in clearing and bringing under cultivation, a 50-acre block of forest land, such as was the customary grant made by Governor Macquarie to emancipist settlers.

The reference is found in Box 5 of the Transcripts, pp. 1926 *et. seq.*

Expense of a Property of 50 acres.

Take a period of 3 years—suppose the settler to take possession of his land in March, he will probably begin by felling the first year—

	£	s.	d.
16 acres of forest land at 10s. per acre	8	0	0
Burning off 10 acres at 25s.	12	10	0
Ploughing once, supposing the team to be hired at 20s. per acre	10	0	0
Planting 10 acres with maize at 8s. per acre	4	0	0
To be well cultivated, the maize should be hilled and cleaned at least twice, at 8s. per acre	8	0	0
Total	42	10	0
c.f.	42	10	0
Pulling, husking and bringing in the crop averaging it at 30 bushels per acre	8	0	0
Removing stalks	2	0	0
Bringing the same to market at 1s. 3d. per bushel, supposing the distance from Sydney not to exceed 30 miles	18	15	0
Grand Total	£71	5	0

Produce.

300 bushels in Sydney store at 4s. per bushel	60	0	0
3 rations from the store for 6 weeks	17	4	0
	£77	4	0

Carried to the Second Year's Account.

Brought Forward	5	19	0
Burning off 6 acres, felled the preceding year, at 25s. per acre	7	10	0
Ploughing 10 acres Corn ground once for Wheat, at 20s.	10	0	0
Twice ploughing 6 acres of new ground for Wheat	12	0	0
32 bushels of Seed Wheat	16	0	0
	£45	10	0
Chipping in Seed Wheat	5	0	0
Reaping at 10s. per acre	8	0	0
Drawing in, stacking, etc.	3	0	0
Threshing 256 bushels of wheat at 8d.	8	10	8
Bringing to market at 1s. per bushel	12	16	0
Felling and burning off 9 acres of new forest land at 35s. per acre	15	15	0
Ploughing do., £9—Hilling and Weeding twice at 8s. per acre	16	4	0
Pulling, husking, etc., 270 bushels of Maize	6	15	0
Bringing do. to market, at 1s. 3d.	16	17	6
	£138	8	2

Produce.

256 bushels of wheat, Sydney Store, at 10s.	128	0	0
270 bushels of maize, Sydney Store, at 4s.	54	0	0
Plus £5 19s.	187	19	0
Profit ..	£49	10	10

3rd Year.

	£	s.	d.
8 acres of old ground, first cleared prepared for wheat; second time once ploughed	8	0	0
Removing stalks, etc., from 9 acres of corn land	2	0	0
Ploughing the same for wheat at 20s.	9	0	0
34 bushels of seed wheat for 17 acres at 10s. per bushel	17	0	0
Chipping in do.	5	10	0
Reaping in do. at 10s. per acre	8	10	0
Drawing in and stacking	3	10	0
Threshing, supposing it to yield 12 bushels per acre (204 bushels)	6	16	0
Bringing to market at 1s. per bushel	10	4	0
Ploughing 8 acres for corn at 20s.	8	0	0
Planting do. and twice hoeing	9	12	0
Pulling and husking do. 25 b. p.a.	5	0	0
Bringing to market at 1s. 3d. per bushel	12	10	0
	£105	12	0

Produce.

204 bushels of wheat Sydney at 10s.	102	0	0
200 bushels of maize Sydney at 4s.	40	0	0
	£142	0	0

Profit £36 8s. 0d.

"From the end of the third year, supposing the settler to continue 25 acres in alternate cultivation in the best manner he is able, without the assistance of manure, which it is probably out of his power to procure, his lands will continue decreasing in produce, so that at the end of six years, the soil will be entirely exhausted, and if none of the remaining portion of his 50 acres is fit for cultivation, he must seek elsewhere for a settlement and subsistence for his family; but if he is enabled to manure his farm, either by possessing a little stock himself, or by the flocks of others being folded over it, his land will not be considerably deteriorated. As such, dressing will last not less than three years, still presuming the land to be constantly cropped with wheat and maize, on alternate and different portions annually. This course of proceeding, bad as it is, supposes the settler to understand something of farming, and desirous to make the most of his land, but the greater number of the settlers, having been originally mechanics, or not used to agricultural labour, such attention to their own interests, is rarely found among that class.

"On looking to the result of the preceding calculation it will be seen that no estimate is made of the value of the poultry which may, and, in fact, is reared in considerable numbers on such a farm; neither is the labour of the settler himself allowed for, for which supposing that a portion of his attention is occupied by the general superintendence of his property, marketing, etc., £15 per annum may fairly be added to the income derived from the land cleared; there will, therefore, remain for the net value of his own

labour and profits of the 25 acres of land cleared to £79 10s. 10d. for the first and second years, in the third year the value of his labour and land in cultivation will be £51 8s. 0d. or £2 1s. 1¼d per acre. In the succeeding years, supposing him to have obtained the aid of manure occasionally the net receipt from his farm on the articles of wheat and maize alone may be safely estimated at £60 per annum.

"All the preceding calculations as to profit of the settler are founded upon the certainty of a market for his produce at 10s. and 4s. per bushel, respectively; but it must be held in view, those values are considered relatively to the high prices allowed for originally bringing and keeping in cultivation the 25 acres upon which the calculation is made; for if the value of produce was considerably lower, and the markets were uncertain, it cannot be doubted that the attendant expenses must be lowered in proportion. It is further to be recollected that with the present case the settler has been presumed to commence his labours, without any other property than a sufficiency, to maintain his family for the first year, with assistance from Government for a part of it. If, on the contrary, he possessed a horse and cart, with the necessary harrowing implements, the profits of his land would be very considerably more, not less indeed than £20 per annum, for instead of paying for the carriage of his produce to market, harrowing his land, etc., it could be done by himself without any additional charge for extra labour, as in the sum of £15 allowed for by own personal exertions, by attendance on the markets is calculated upon.

"The products of each year are such as may reasonably be expected in fair seasons, from forest lands of the second quality. If the ground brought into cultivation was either of the first quality of forest land, or the alluvial soil found on the banks of rivers, the net proceeds would, of course, be much greater, as the produce would be at least one-fifth more. All the prices charged for labour, ploughing, etc., are such as are usually demanded by Freemen, and in the most cases exceed those established by general orders by 20 per cent.

"The lands under the circumstances before stated are as yet without either fences or buildings, except a bark hut originally erected, but a careful, industrious man might appropriate at least £10 per annum towards enclosing his farm and rendering his habitation more decent and comfortable without feeling the means of subsisting his family in plenty, much diminished. I believe, however, that few of this class of settlers look upon their farms as likely to remain permanently in their possession, they are consequently in general, unimproved and open."

References.

(1) Cf N.S.W. Dept. of Agriculture: Farmers' Handbook—Description of Soils, County of Cumberland.

(2) Bigge: Transcripts of Evidence. Mitchell Library. [This is unpublished manuscript copy material. The transcripts are boxed and partly indexed.]

(3) N.S.W. Magazine, October, 1843 (cf. *infra*).

(4) Sydney Herald, 16th May, 1831.

(5) This is a composite calculation. Macarthur's opinion was that at least one acre was required per sheep on his much superior property at the Cow Pastures.

(6) N.S.W. Magazine, October, 1843, pp. 513 *et seq.*

(7) James Atkinson, Esq., London, 1826: An Account of the State of Agriculture and Grazing in New South Wales; p. 13 *et seq.*

(8) Bland, Brown and Towney Selected Documents, pp. 503-4, cit. Fitzpatrick op. cit. p. 162.

(9) Ibid, p. 502; cit. Fitzpatrick, p. 162.

(10) Committee on Factory Children's Labour, 1831-32—Minutes of Evidence: Bland, Brown and Towney, op. cit. pp. 510-511; cit. Fitzpatrick, p. 162.

(11) MS. (Mitchell Library—Sydney)—Rev. W. Lawry to his parents, May 21, 1818—Bonwick Transcripts—Missionary Vol. 2, pp. 355-6.

(12) Bigge Transcripts of Evidence—Examination of Archibald Bell.

(13) Atkinson, op. cit. Miscellaneous references.

FOOD AND AGRICULTURE ORGANISATION.

At the end of 1947, a series of articles dealing with the Food and Agriculture Organisation of the United Nations was published in this Review. It is now desirable to bring this information up to date in the light of more recent developments in order that it may be possible to re-assess the work of F.A.O. in relation to the solution of world food problems.

World Food Situation.

(*a*) 1947.

In 1947, some improvement was indicated over the situation which had existed in 1946. However, recovery was not as great as was sometimes expected. The greater part of Europe was visited by the twin plagues of an unusually severe winter, which damaged and destroyed millions of acres of crops, and a very dry summer, which cut the yields of all important crops. The following tables give comparisons of areas and productions of specified crops in Europe for 1946 and 1947, compared with the 1934-38 average:—