THE MILLING INDUSTRY.

NOTWITHSTANDING the evidence taken by the Select Committee on Colonial Industries which sat in the early part of 1904, and which brought to light the various disabilities under which colonial manufacturers are suffering, the new Customs tariff of 1906 offers very little in the way of a favourable adjustment of the duty on wheat and flour to the Cape miller, when compared with the tariff of 1903; and the only benefit he will derive from the new arrangement is in the matter of bran, which is now sufficiently protected to render, in the future, the cost of importation of this commodity considerably less. The complaint against the last Customs Convention was that they had made a large reduction in the duty on flour without a corresponding reduction in the duty on wheat. Bran forms a fair portion of a miller's output, to the extent of 20 per cent. A miller paid 1s. per 100 lbs. duty on bran which comes in in the form of wheat, but bran could be imported at an *ad valorem* rate, which meant a duty of about 3d. per 100 lbs. Under the new tariff a duty of 1s. 2d., less a rebate of 2d., is imposed on bran, while the same amount is imposed on wheat for the making of bran. This gives the miller a distinct advantage in the matter of bran, though he is at the same time subject to local conditions adversely affecting his sale of this commodity, as, for instance, if green food is plentiful bran is not wanted for cattle, and he therefore finds himself with a large stock which he must either sell at a sacrifice or store; but owing to its bulk it would not pay to keep it.

The milling industry is one of the most important in Cape Colony. It gives employment to nearly 2,000 hands, and pays about £150,000 in wages annually exclusive of salaries. The amount of capital employed in the industry is estimated at £3,000,000, nearly all made up of small colonial holders. It has suffered severely owing to the change in the Customs tariff which took place on the 15th August 1903. Previous to that date the duty on imported wheat was 2s. per 100 lbs., and that on imported flour 4s. 6d. per 100 lbs. The duties brought into force in August 1903 under the new tariff were: imported wheat, 1s. per 100 lbs.; imported flour, 2s. per 100 lbs. So that, whereas previous to the last tariff alteration there was a difference of 2s. 6d. per 100 lbs. import duty between wheat and flour, after the alteration in 1903 there was only a difference of 1s. per 100 lbs. By the latest tariff of 1906, this has been improved on to the extent of 4d., the duty on imported wheat now being 1s. 2d. and a rebate of 2d., and of imported flour 2s. 6d. and a rebate of 3d. But it has far from recovered the old advantageous duty as far as the colonial miller is concerned. The protection which was reduced 60 per cent. has recovered something like 5 per cent. An anomaly on the 1903 tariff was the rating of bran under the 10 per cent. *ad valorem* duty. Bran can be purchased in South America for something like 3s. per 100 lbs. and in Australia for about 3s. 4d. per 100 lbs. Taking the duty at 10 per cent. on the former, it works out at 3½d. per 100 lbs., and on the latter at 4d. per 100 lbs. In other words, the miller paid 1s. per 100 lbs. duty on the imported wheat from which he manufactures his bran. He therefore paid 8d. to 8½d. per 100 lbs. more duty on the raw article than is paid on the imported manufactured article. The quantity of flour, pollard and bran produced from 100 lbs. of wheat varies according to the quality of the wheat used and the quality of flour required, but the following may be taken as a fair example:—

Flour	67	per cent.
Sharps	5	„
Pollard	6	„
Bran	19	„
Loss	3	„
	100	„

The duty on imported pollard was 2s. per 100 lbs. and is now 2s. 6d. per 100 lbs.; but as there is only a very limited demand for this article, it is in many cases run along with bran and sold as such. This is the usual practice in Port Elizabeth in respect to coarse pollard. Pollard and bran mixed together, say in South America, are imported as bran, and only pay a duty of 10 per cent., or about 3½d. per 100 lbs. It was commonly imagined that millers had a protection of 1s. per 100 lbs., but that is not the case. They had really only a protection of 6¼d. per 100 lbs. The manufactured products of 100 lbs. of wheat could be imported for a duty of 1s. 6¼d., made up as follows:—

	s.	d.
Duty on 67 lbs. flour and 5 lbs. sharps, or meal, at 2s. per 100 lbs.	1	5¼
Duty on 25 lbs. bran and pollard at 3½d. to 4d. per 100 lbs.	–	1
Total	1	6¼

When the extra cost of buildings, wages, &c., is taken into consideration, as well as the fact that the coal bill of millers alone costs them an extra 1¼d. to 1½d. per 100 lbs. of wheat milled over what it does in America or Australia, it is at once apparent that the protection that was extended to the industry altogether was inadequate. Nor have matters improved, except in the case of bran, through the change in the tariff. The rebate of 3*d.* is practically whittled away by the time imported wheat reaches the miller, what with agents' fees, freight charges, &c.

One effect in the alteration of the Customs tariff was that millers found it necessary to take up other branches of trade, such as produce and general merchandise, to a greater extent than before, so as to minimise the loss caused by the reduction of the flour duties. Another handicap to which the colonial industry is subjected is that the large size of some American mills reduces the cost of manufacture on the other side, and they are consequently in a position to dump down their surplus products in this market, against which the Cape millers cannot compete. The American wheat crop of 1904 was a very limited one, and accordingly American prices ruled much higher than in normal years, but whenever America has a first-class crop we may look for large quantities of American flour being dumped down at

South African ports. Although the duty on wheat and flour was reduced in August 1903, it has made no reduction whatever in the price of bread. While the imports of foreign flour into Cape Town may not show as great an increase as anticipated, that is only because the millers here have had to reduce their prices to a non-paying level in order, as far as possible, to keep foreign flour out, and thus retain their trade. The foreign miller can send his flour to South Africa and sell merely for the return on his wheat, and as long as it just pays him, he will be satisfied with his profit on milling offals and so on He can send flour at very low freights to Cape ports, and relies on getting his money back on it to keep his mill going. This practice, if not checked, is bound to have the effect of crushing out the smaller miller who has not the means to buy in the best market, and some in fact have already closed down owing to want of capital. This would be very undesirable, as what is wanted is a live industry, open and free right through; not a few big places only—in short, we want competition.

Machinery has been introduced which cannot be utilized as things stand at present; one large mill has liquidated and others may follow. The large mills are relying on other sources of revenue to keep the pot boiling, but the profits, nevertheless, suffer a great deal.

The milling company of which Mr. J. M. Stephen is managing director has paid a large sum in wages, between £40,000 and £50,000 per annum, exclusive of salaries, being the former customary expenditure of this firm. They kept the same staff in 1904, as it was only in that year that they began to feel the pinch. Australia was then suffering from drought, but with her ensuing good crops the effect on the local industry in creating unemployed has been a very bad one.

The only solution is either to increase the duty on flour or reduce it on wheat. But as the price of colonial wheat would fall if the duty on wheat is reduced, the former alternative seems to meet the case more satisfactorily.

Then Delagoa Bay is likely to affect the Cape trade, as it has done that of the Orange River Colony. It is impossible to send colonial produce in the shape of wheat and flour into the Transvaal as long as the existing arrangement at Delagoa Bay remains as it is. No colonial farmer can grow wheat at the price necessary to compete against the foreign product coming into Delagoa Bay under the present arrangements. There they pay 5 per cent. duty on wheat, which is again rebated. A man can import wheat into Delagoa Bay, grind it into flour, and send it free of all duty to Johannesburg. Here in Cape Colony millers have to pay full duty. To suit the industry all round the duty on wheat should not be less than 3s. That would ensure a very moderate profit, since the miller has to import coal and pay dearly for it, and has also to pay a high rate for labour. On the other hand, by reducing the duty on wheat, this would again press unjustly on the farmer; and, moreover, the Government wants revenue.

Not only is there freedom from duty at Delagoa Bay, but also preferential rates rule in their favour. On all the railways there is a preferential rate in favour of colonial manufactures, whether from imported material or not, with the exception, strange though it appears, on any product from milling; yet there is more capital invested in the milling industry than probably any other industry in South Africa. This capital has been roughly estimated at £3,000,000; one large company alone accounts for £900,000 of this amount. Unless a remedy is found the money will practically have to be invested in something else, or sacrificed to a certain extent. Part of the capital, however, it would be impossible to re-invest, as it is sunk in machinery and bricks; consequently there would be a loss which would almost amount to a national loss, as the closing of the industry would seriously affect the farmer, who cannot export a handful of his grain, and who therefore relies on the miller to grind his wheat. The wheat available during 1906 has so far been plentiful, and is still unexhausted in the Colony. It is of no use to protect the farmer if the miller is not duly protected as well. If the mills closed down something like £200,000 per year would be lost in earning power. With regard to quality, colonial wheat compares very favourably with imported. All round it is decidedly better; but colonial wheat does not compare well with the wheat produced in Cape Colony, say, ten years ago. Farmers will have to be more careful in the matter of seed, as it is decidedly deteriorating, though some seed has just been introduced from Australia of which great things are expected. Ten years ago Cape wheat was undoubtedly the finest in the world; it had strength and colour combined, and very few wheats have that.

It is found necessary, when importing wheat, to order specially for colour and specially for strength, and then to blend the combination. Cape wheat can be used by itself, and produces grand flour. The crop of 1904 was better than that of the preceding year, while that of 1905 shows a decided improvement on the 1904 crop. Farmers, however, have somewhat neglected it for oat hay, as they find it very remunerative and less liable to failure from various causes. Carelessness in the matter of seed is one complaint brought against Cape farmers; another is the matter of chemical manures. Farmers use chemical manures to a large extent—much larger than the public are aware of, which goes to prove that they are taking a real interest in what is going on to improve the output. But they do not pay sufficient attention to the matter of quality.

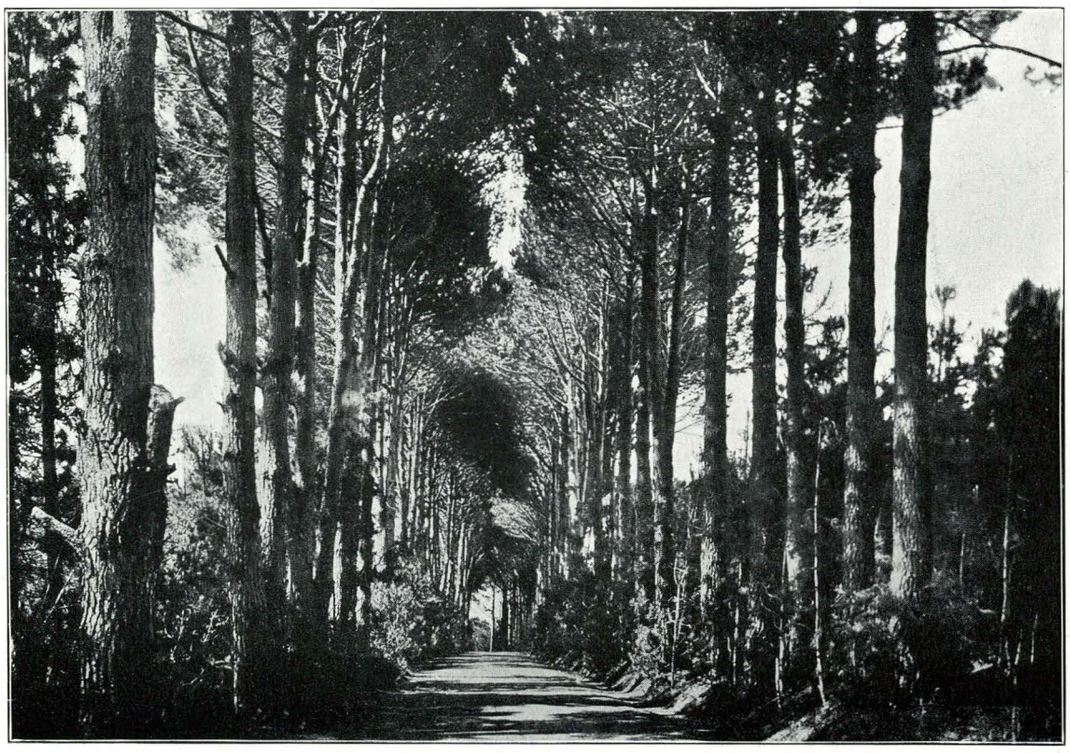
Hitherto the available quantity of wheat from colonial farmers has been, as far as the purchases of one large firm of millers are concerned, from 50,000 to 60,000 bags. As regards the comparison of price, there is little advantage accruing to the miller in buying colonial wheat, from a milling point of view. He takes into account, firstly, the duty, and, secondly, the advantage accruing from differential railway rates, and pays the farmer accordingly. The latter gets the benefit of the duty on the imported article and that of differential railway rates as well, because there is a good deal of competition for his produce.

Most of the labour employed in the milling industry is colonial; but skilled men have still to be imported, as milling has become a science, and a good miller can command a high salary.

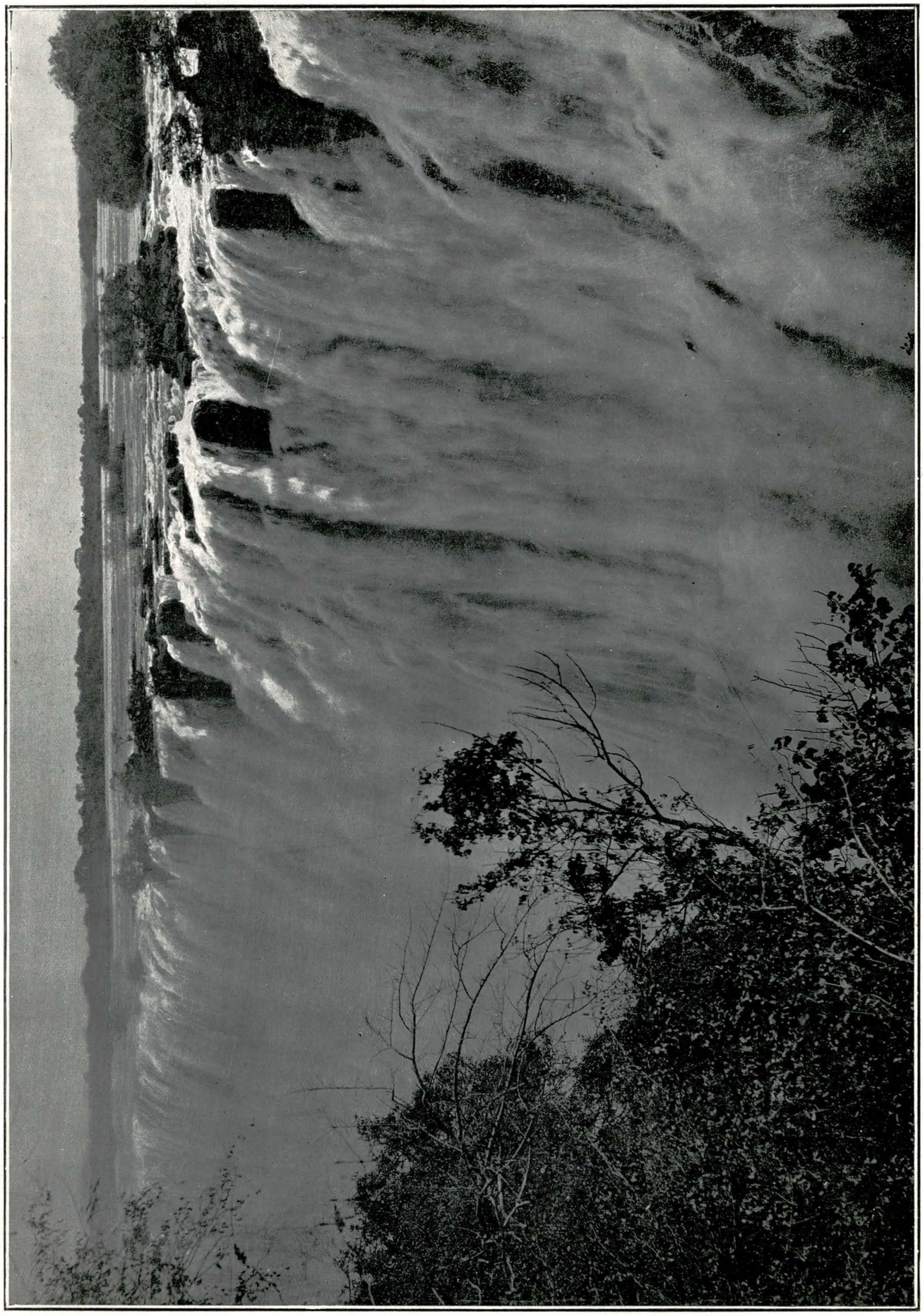
It has been stated that colonial farmers cannot grow wheat at a profit under 20s. per sack of 200 lbs., owing to their expenses in employing fertilisers to a larger extent than formerly, and also in fallowing their lands every third year. Unless, therefore, a distinct advantage is given them, so as to encourage them to grow it more

extensively, the Colony will never be self-supporting in this commodity. The chief argument advanced why an additional duty should not be levied on imported flour is that it reacts on the consumer; but it is a matter of experience that neither reduction nor increase of duty materially affect the price of bread, except that some bakers make a difference for large loaves. There is every reason, taking this into consideration, why the old duty should be reimposed, as the effect of it would be to bring the industry into a flourishing condition again. Although they have paid more for it millers prefer colonial wheat, but have not been able to obtain sufficient for their requirements so far. To encourage the farmer it is therefore essential that every facility should be placed within his reach to stimulate his wheat production.

Milling in the past has been a monopoly, but the capacity of the mills was then much under the consumption required in the Colony. Government, by protection, encouraged the miller to extend his mills to such an extent that internal competition kept down the price. There are four mills in Cape Town to-day. Three years ago they were flourishing concerns; two of these are now practically closed down, and the others are relying on side lines to keep them going. From the year 1875 to 1890 there were twelve mills working in the peninsula; all of these except two, which stood the test, were obliged to liquidate during that period. And this woeful state of affairs is attributable to want of due protection. Biscuit manufacturing is an industry peculiarly adapted to this Colony, because we have all the ingredients here except chemicals. Messrs. Pyott, Ltd., who for the past eighteen years have made biscuits, have done well in this line; but they complain that no sooner did they hit the public taste than the successful article was sent home and copied by English makers, with the consequence that it was imported and sold at a price with which this well-known Port Elizabeth firm could not compete. There is now a danger that unless some remedy is forthcoming this industry is likely to die out. The amount of biscuits and cakes imported into Cape Colony during 1902 and 1903 was 11,532,898 lbs., valued at £306,145, and the duty paid on this quantity, at $7\frac{1}{2}$ per cent., amounted to £22,960. If it had paid an average of $\frac{3}{4}$d. per lb. and $7\frac{1}{2}$ per cent. duty, it would have yielded revenue to this Colony to the extent of £69,000. Or if the ingredients had been imported in the raw state the revenue would have been £54,674, and employment would have been given to upwards of 5,000 people. Something like 8,649,764 lbs. of flour would have been required, giving work to millers, mill hands, &c., all over the country; 1,153,289 lbs. of butter, 4,613,168 eggs, 1,289,471 lbs. of sugar, supplying labour to about 6,000 people, and permitting of ten biscuit and cake factories being run of a size equal to those operating in Cape Colony to-day. But as things are it is all otherwise. Even mills which are holding out are only working twelve hours a day, while there are many small millers throughout the country who, at present, are not turning a wheel. One good effect the Customs Convention has had on the industry. The Transvaal, when properly opened up, will provide a tremendous outlet for the manufactured products of Cape Colony; and this, amongst other things, justifies its existence.



AVENUE, BISHOP'S COURT, NEAR CAPE TOWN.



VICTORIA FALLS, RHODESIA.

THE FRUIT INDUSTRY.

IN 1897 a scheme was inaugurated by the late Cecil John Rhodes with the object of demonstrating what could be done in the way of fruit culture for export purposes at the Cape; and, in pursuance of this object, a number of farms which had formerly been essentially wine-growing farms were acquired for what at that time was considered fairly reasonable prices. The carrying out of the scheme was mainly entrusted to Mr. H. E. V. Pickstone, but, owing to the magnitude to which it developed, Messrs. Wernher, Beit & Co. took up a third interest, together with Mr. Rhodes and the De Beers Consolidated Mining Co., Ltd., for the carrying-out and completion of the scheme. The principal of the farms acquired for the purpose (which number thirteen in all) is situated in the beautiful and fertile Drakenstein Valley, about ten miles from Paarl. In conjunction with the farms a complete and modern jam factory and canning works have been erected, which, being in the midst of the orchards, are turning out jam and preserved fruits of the finest quality. The management of the farms is now under Mr. R. E. Ball, while the technical side has been entrusted to the care of Mr. C. H. Read, who is an able orchard superintendent. Under the latter are thirteen capable managers, imported from California. Since the farms have been producing well, fruit has been shipped to England, and each year shows a larger export. At the show held in the Royal Horticultural Hall, in London, on March 23rd, 1906, the Rhodes fruit farms were awarded a gold medal for their exhibits; while at the recent "Paardeberg Dinner," held in Ottawa, Canada, the fruit which was eaten and highly appreciated by all those attending was grown on these farms. Mr. Ball received a letter from His Excellency Earl Grey, Governor of Canada, acknowledging receipt of the fruit, and praising its excellence and the manner in which it was packed. The jam factory, though still in its infancy, has made great progress, and is likely to materially add to the importance of this industry in the near future. Since its establishment employment has been found for four hundred "hands," who are engaged on the different farms, as well as in the factory and packing-house. All the cans in which the jam is packed are manufactured on the premises in an up-to-date manner by machinery. The timber for the boxes is imported from Norway, but is put together on the premises. The farms comprise a total of 9,680 acres in extent, of which 960 acres are under orchard cultivation, 468 are devoted to vines, and 360 are for miscellaneous purposes. The Rhodes Fruit Farms possess 134,000 fruit trees of various kinds, and 685,000 vines, and are located at Groot Drakenstein, Wellington, French Hoek, and Talbagh. Another farm which is principally devoted to fruit growing is that of "Libertas," which is the property of Mr. J. P. Roux, and is situated in the Stellenbosch district. It is an old farm, dating back to the days of the first Huguenot settlers. The fruit grown here is of the finest quality, and the crops are uniformly good. Mr. Roux's son, it may be added, has gained many prizes for his skill in fruit packing at the various shows held in Stellenbosch and other districts. One of the most successful fruit farms acquired by Mr. Rhodes is the "Vredenburg" farm, which is also in the Stellenbosch district, at Boston's Crossing. Much of its success is due to the energy and intelligence of Mr. Postlethwaite, the manager, who acquired a thorough knowledge of general farming in Australia, and of fruit culture especially in California. He arrived when the dreaded Phylloxera had committed its ravages, and, after removing the old stocks, planted fruit trees in their place. So well has he succeeded that the farm he manages is now the second largest in the country, with an export trade in proportion. "Vredenburg" is essentially self-contained, everything in the way of picking and packing the fruit being done on the premises, while even the boxes are made by the large staff engaged in the industry. The latest machinery has been imported, and no detail is disregarded which might tend to increase the total output of the farm. Apart from the rest of the farm, but in close enough proximity to it, strawberry beds are laid out, which require the bestowal of constant care. These are in charge of labourers, who are housed in forty cottages specially built for them by the Company, and who are allowed a patch of ground to cultivate, for which they pay a small rental, and on which they can grow what they choose.

There is much work to be done before the success of the fruit industry in this country can be realised, both for the fruit growers themselves and also for the Government on their part.

The Government has been making every effort during the past year to push the fruit trade, and they have met with a measure of success; but they cannot be expected to do everything. The growers must recognise their own obligations in the matter.

In 1904 the imports of fruit into this Colony amounted to £34,657, while the exports only reached £8,855. The object of the fruit growers is, perhaps, too set on securing the London market; yet the very best market they could wish for is in South Africa.

If co-operative societies are formed which should have depôts to which their surplus of fruit could be forwarded and kept until the season is over, it would prove one of the most potent means of capturing the home trade. At present we have no means of conserving the fruit and distributing it over a longer period. When it is considered that in the Western Province alone there are some 87,000 persons quite dependent on the fruit and vine-growing industry, and that 350,000 are partially so, it will be understood how important and great the industry is. The need, therefore, of an organisation by which it can bring its requirements to the notice of the Government is a very essential one. This has been supplied in the Board of Horticulture, of which the Hon. C. W. H. Kohler, M.L.C., is President, who have done much to remedy existing evils, and to place the industry on a sounder footing. Some of the useful measures recommended by this Board have been carried out by the Government. To mention a few: they are the inspection of imported fruit; prohibition of the importation of seedling stocks, so as to prevent the introduction of certain dreaded pests; the utilisation of the Porter Reformatory boys for grafting vines; and the increased duty on imported spirits, in order to level up to the difference brought about by the imposition of the Cape Colony Excise. The Board also

issued a spraying calendar, which has proved useful to fruit growers; took in hand the organisation of the annual wine show; drew up a list of fruit trees that had proved to be unsuitable for certain districts of the Western Province; imported netting to protect trees from the fruit-fly and birds; purchased and distributed certain farming publications to the various associations; held an inquiry into the suitability of certain stocks for the grafting of citrus fruits; also an inquiry into the alleged failure of vines grafted on certain American stocks; and appointed a committee to inquire into the wine and brandy industry. Such is some of the good work the Board of Horticulture has accomplished.

As regards the export of fruit, it is gratifying to note that the tonnage of fruit exported this season (1906) is more than double that of last, the figures being 1,013 tons as against 462 tons in 1905. Yet the export trade is not making the headway that was reasonably expected. The whole of the Rhodes Fruit Farms together only shipped as much as a single grower in the person of Mr. H. O. Arton, and this looks as though Mr. Rhodes' policy had been departed from, for he expressly stated that the farms he acquired were not going to engage in local trade, but would ship all their fruit to England. So far this has not been the case, and one naturally asks why? The carriage and transport oversea of fruit, though it was a failure in the early years of the export trade, must now be called a success. It has been proved beyond cavil that South African fruit can be landed in Europe in the best of condition, while it is admitted that our local markets are often glutted to such an extent that the grower suffers heavy loss on his consignments. It may be gathered from this that there is a large surplus of fruit awaiting a market. Enterprise at this end is all that can be desired, in proof of which it may be said that a large number of fruit trees have been planted of late years, many of which are now bearing, and each year the crop of pears will be much increased. The fault, then, is not in the methods of growing the fruit or of packing and shipping it, but it lies rather in the fact that exportation has not proved remunerative on the whole. Reports from England speak highly of the quality and condition of Cape fruit on arrival, yet those who have shipped in bulk complain of heavy losses. If one does not hear of consignments of peaches being sold at 1s. per peach, one does hear of large quantities of fruit being sacrificed at 3s. per case, and even less. It seems impossible, also, that the small amount of fruit shipped from the Cape should be able to flood the market. What is really the case, if there is not a deliberate ring of buyers in London, is that the whole exportation of our fruit is under the control of one large house who buy up the lot at their own prices. Fruit from Cape Colony is timed to reach England when the market is practically bare. Yet, though it arrives in excellent condition and is of the best quality, it does not reach the rich consumer outside London, but is sold to hawkers, &c., who retail it at a profit. Colonial grapes, for instance, though superior in quality to the hothouse grape, are not allowed to realise the price that the forced article does, and are not, therefore, being given fair competition. To combat this disadvantage one expedient would be to appoint an agent on the other side who would supervise the sale of colonial fruit and other produce, and see that it was distributed throughout the country, and not restricted to London. Or, better still, Cape products should be put before the British public by the establishment in London of a receiving and distributing depôt, fitted with warehouses, cellars, and cold storage accommodation for the reception and sale of dried, canned, and fresh fruits, together with jams, wines, and spirits. There should be a competent commercial expert to supervise the reception, distribution, and advertising of such products, as well as experts to handle dried and canned goods and fresh fruit, and superintend the bottling and casing of wines. Then at least £5,000 per annum should be set aside by Government for, say, five years, on the expiry of which time the depôt should be self-supporting —that is, if the goods meet with the success they deserve in European markets. After these steps have been taken, every manufacturer, grower, or exporter in Cape Colony, or, better still, in South Africa, should be invited to take advantage of these arrangements and facilities, and consign to such an organisation their shipments of sound products, all of which must pass a standard before acceptance at this end, to be sold for the best price obtainable for the account of each individual shipper, who would have his own brand and labels. The commission charged would go towards the expenses of the scheme, and in five years should be able to repay them. This scheme should be undertaken by the Government, as no coterie of shippers would ever sufficiently command the confidence of the public, nor could they enforce inspection on this side, which is essential to success.

Turning now to the export of fruits to England, some very instructive figures are to hand. It has already been stated that the exportation during the season of 1906 has been on a larger scale than has ever obtained before; but financial results are not as encouraging as growers would have liked. During the season, from December 3rd to April 25th, 57,320 cases of fruit were sent home by the Union Castle steamers, which included 18,744 cases of pears, 13,646 cases of plums, 15,543 of grapes, 7,221 of peaches, 1,153 of nectarines, 868 of apricots, 108 of apples, 23 of quinces, and 14 cases of melons, making a total of 1,013 tons of fruit. This quantity far from exhausted the cold storage accommodation of the steamers it was shipped by, and the export will have to be doubled before the company think of increasing it to suit additional requirements. No doubt the export trade since 1890 has grown, as the following figures will show; but considering the quantity of fruit now produced in Cape Colony, and the large surplus (in a good season) which is not required for local consumption, the amount sent home is very meagre compared with Canadian and Tasmanian exports of fruit:—

The total sent to England in		1900	was	309	tons.
,,	,,	1901	,,	461	,,
,,	,,	1902	,,	365	,,
,,	,,	1903	,,	537	,,
,,	,,	1904	,,	609	,,
,,	,,	1905	,,	462	,,
,,	,,	1906	,,	1,013	,,

This shows a big leap forward in this last season, which will, no doubt, be improved upon still further, providing the crops mature without suffering from drought and pestilence. Amongst the principal shippers of fruit to England during the season of 1906 were the Cape Orchard Company, with 200 tons; the Rhodes Fruit Farms, 120 tons; H. O. Arton, 117 tons; Wood and

Williams, 92 tons; and H. W. Hawkins, 86 tons. The freight per ton of 40 cubic feet is, for tomatoes, 55s.; for plums and grapes, 60s.; for other fruit, 70s., plus 10 per cent. Hard fruit, which is not so perishable, can be carried either in the hold or on deck at 35s. per ton.

The early difficulties experienced in exportation were those arising from the lack of cold storage accommodation on the steamers, there being no security with respect to the temperature in their cool chambers, with the result that entire shipments were frequently sold in London for a few pence per box; and while there might be a large profit on one shipment, there would be severe loss on others. Indeed, the losses became so monotonous, according to one firm, that they were forced to stop exporting for two years. Now, however, this disability has been removed, in so far as risks of shipment are concerned, while there is little danger in the matter of transport. In 1906 Messrs. Wood, Williams & Co. sent home 4,000 boxes of fruit, and out of that large number only one complaint was made about the condition of the fruit on arrival. Other firms have the same tale to tell of the excellent condition in which their fruit arrived, so that there can be little fault to find with the packing and method of transportation. The fault is really in London, which, notwithstanding its many outlets for consumption, can become so glutted with fruit that it becomes unsaleable. As an instance, Messrs. Wood, Williams & Co. sent home 100 cases of fruit which cost, landed, £46, and which were sold for £21 9s. 2d.; while 400 boxes, which cost, landed in London, £200, realised only £60; and 500 boxes, costing over £260, fetched £52. Yet this fruit arrived in perfect condition. The cause of the low prices was attributed to cold weather and a surfeit in the market. It is almost a certainty that shippers who have been in the habit of making weekly consignments have all lost money.

When one considers that Cape grapes have been selling retail in London for from 1s. 6d. to 2s. per lb., it would appear that either Cape grapes are boycotted at Covent Garden, or else that the wholesale buying is in the hands of a little gang who regulate prices. Originally Cape shippers sent fruit to their agents at Covent Garden, with the result that it stimulated competition. Afterwards, however, an association was formed by colonial shippers, when practically all the Cape exporters sent to one London house, which has an agent at Covent Garden who sells the fruit by auction.

What is really required are the services of a Cape house backed by the Government which could find an outlet for the fruit produce. There is no limit to the quantity of fruit that could profitably be sent home. To make the trade pay, all that is required for our grapes in England is 6d. per pound. The only way to make Cape fruit popular with the masses at home is to have a large London house and push the trade with depôts established all over the country. The markets of the world are in our favour, and if the trade were properly organised we should be able to send fruit all over the world, the only difficulty being that of distribution. It costs, at present, 11s. a case to put down Cape grapes in London, and if exporters got 12s. or 13s. per case they would be well satisfied. If Cape fruit growers do not now make a success of the export trade, it will certainly not be for want of advice. Mr. Hannon, Mr. Charles Chiappini, and Mr. Barn have all studied the question gratuitously and have given the results of their enquiries into the condition of the home market as to its willingness to encourage the exportation of Cape fruit, and as to the present disabilities which are standing in the way of its thorough distribution throughout England from the central depôt at Covent Garden. According to Mr. Chiappini the people were much interested in what he had to say about the Cape trade, although they appeared to know very little about the capabilities of the Colony in regard to its exports and so forth. He was generally present when consignments of fruit arrived, and witnessed the opening of boxes when necessary. He also collected as much information as possible, inquired into the bad condition of some of the boxes, followed the prices in the market, visited the retailers, and attended Covent Garden early in the morning, making extensive notes. He found that the two great matters needing attention were, firstly, the economic one relating to the distribution and disposal of the fruit; and secondly, the question of packing and selecting it on this side. He found on arrival in England that our best grapes reaching their destination in perfect condition were selling at 5s. and 8s. per box of 12 lbs. and 16 lbs. respectively. A few weeks after the same grapes were selling at 10s. and 20s. for similar sized boxes in a market which had not changed to any considerable extent. Feeling sure that the latter prices were fair values for colonial grapes, he sought for the best means of disposal. These grapes were being retailed at 2s. and 2s. 6d. per lb. when they were being sold at 5s. and 8s. a box, and at about 2s. 6d. and 3s. per lb. were selling at 10s. and £1 a box at Covent Garden. It is, therefore, evident that Cape fruit is worth 10s. and £1 a box wholesale. Mr. Chiappini, while dissatisfied with the manner in which Cape fruits are being handled, lays much of the blame on the exporters' agents, who are very competent men and command powerful connections in the fruit market. He was told that a ring had been formed, and discovered that the Agents-General of the other colonies were complaining of the same treatment; yet the only ring he discovered was that inadvertently formed by the Cape Fruit Exporters' Association, who have foolishly combined to send all their products to one firm. They have therefore, with their eyes open, formed a monopoly for these gentlemen, and are making no attempt at distribution themselves, which is a matter of paramount importance. By their ill-advised action they have yielded so much power to this firm that it is now impossible for any other exporter to send his products to any other firm in London, because the consignees of the Exporters' Association, who are handling about 85 per cent. of the Cape fruit, could easily, should they so desire, force any other dealer in Cape fruit out of the market. Mr. Chiappini holds that it is absolutely necessary that there should be more competition among those who handle the Cape fruit in London, and that an organised distribution should be provided for. With this aim in view, he consulted several fruit dealers in London, Birmingham, Dublin and Newcastle-on-Tyne, as well as on the Continent, and his opinion is that better distribution can be carried out. He suggests, also, the appointment of a representative in London, who should be a Government nominee, to supervise closely the fluctuations of the market, to see whether the prices obtained were fair or otherwise, to report on the condition of the

fruit, to make arrangements for better distribution, and generally to operate with the view of improving prices. The services of such a man would not be expensive, as there are several capable men, thoroughly acquainted with the fruit trade, who during the period of the Cape fruit season in London are practically out of employment. The same gentleman thinks, also, that a connection should be opened on the Continent, where a certain amount of trade could be done, although there is a duty on fruit in some countries. He found that consignees and fruit-dealers disagree in their advice and opinions as to the best methods to be adopted for packing; but on one point they all agree, and that is, that it is absolutely necessary for the exporter to pay more attention to the class of fruit sent home. Selection is the principal matter to be impressed on the minds of exporters, because the London market wants only the very best; the second best will not pay either for the fruit or the packing of it. Fruit dealers strongly recommend the thinning out of grapes, which would improve their size, appearance, and quality, and that growers should cultivate more showy varieties of all classes of fruit, as appearance goes further than quality. As long as a grape is large and has a good bloom on it, it will always command the highest price. The English public judge fruit by its appearance. For instance, red and white Hanepoort grapes of exactly the same quality would be put in the shop window marked 1s. 6d. per lb. for the white and 2s. for the red. Grapes which were grown in shady places generally arrived in bad condition, whereas those ripened in sunny spots, although not so large, arrived in a much better condition. Altogether Mr. Chiappini, by his mission, has thrown much light on the state of things in the home market, and much good is likely to accrue from his advice and conclusions. Next season should find all existing evils remedied: fruit for export properly inspected on this side; the Docks cold storage capacity of five chambers holding fifty tons of fruit each largely increased so as to hold double the amount; and facilities placed in the way of exporter and grower whereby Cape fruit may reach a wider public and compete fairly with importations from other countries.

MEIRING'S POORT, WESTERN PROVINCE.

THE MOHAIR INDUSTRY.

THE province of Angora in Turkey, in respect of geographical configuration, pasture, and climate, bears a strong resemblance to those up-country Karoo districts where the Angora goat thrives best. The height above the sea is almost the same, the kloofs and mountains (especially around Somerset East and Cradock) are densely filled with forest growth, and scrub abounds on the sides of the kopjes. In like manner, the similarity is borne out in the characteristics of abundant veldt, made up of dust, stones, and small dry scrub, of vast treeless flats dry as bone, and alluvial deposits descended from the hills. Where the province of Angora differs is in the matter of temperature, being colder than the chief districts of the Colony where the goat is reared, especially in the winter, which is also longer and more subject to rain. Here the up-country air is seldom moist, even in a rainy season, and seeing that dryness is the one great necessity for the production of first-class mohair, the Cape, as a result, excels in this commodity. It is, then, to the above similarity between the natural home of the Angora and its present habitat in South Africa that we must ascribe the rapid growth of the mohair industry in the Colony, since its excellence, thanks also to the care and energy of the breeders, and to the Stud Book, is unrivalled throughout the world. As an example of how the goat has increased since its first introduction in 1838, it may be stated that in 1893 there were 1,230,000 Angora goats and 310,356 common goats in the province of Angora; while the Colony in the same year possessed 2,811,206 Angora goats and 2,819,749 common goats, or about five times as many. The yield of mohair in 1893 in the province was about 31,000 cwts., all told, having a value of upwards of £205,000; while the amount exported from Cape ports was 9,457,278 lbs., valued at £277,619. These figures proved the Turkish hair to be superior, the difference in its favour being 4d. per lb. Then, however, Cape farmers bred for quantity, an oily hair being the result, while the Turks paid more attention to quality, seeking to produce a non-oily, silky hair. But this condition of things has altered since those days and Cape farmers have so rapidly bred out the excess of oil, thereby producing a longer, silkier hair, that the oily goat at the present time may be said to be almost non-existent, while hair from their best clips now rival the best Turkish. In 1903 the amount of mohair exported from Cape Colony was 14,174,315 lbs., valued at £652,515; whilst that for 1904 showed a slight decrease, being 14,038,780 lbs. valued at £613,358. As the quantity exported during the last six months of 1905 amounts to 6,855,433 lbs., valued at £371,668, there has in all probability been a further falling off in the total exports for this year. If this be so, seeing that the Cape mohair is in high favour at home, it is owing, perhaps, to the fluctuation in prices to which the market is subject.

Before the Angora goat was introduced into the Cape, efforts had been made to import and breed the Cashmere. It was common in the middle of last century to confound the Cashmere and the Angora; they were even thought to be one and the same animal, and were often referred to as "Cashmere or Angora goats." The Angora goats imported into the United States in 1848 were for a long time known as Cashmeres, and even those interested in the trade were not sure what part of Asia either the one or the other variety came from. Now the Cashmere is the nearest relative of the Angora, and is found chiefly on the cold dry tableland of Thibet, from 12,000 to 16,000 feet above sea-level. It resists cold well, and cold is essential to bring its fleece to perfection; it has long straight fleece of little value, at the roots of which a very fine soft down of great value grows. As a rule the longer the outer fleece, the more abundant the undergrowth. It varies in colour; in white animals the undergrowth is white, but if another colour the latter is lighter and is not so valuable on that account. To collect this undergrowth, the goats are combed in April before the long hair begins to shed. The quantity of this downy hair obtained from a good goat is about half a pound. It is sent to market generally unprepared, and is then treated. Yarn for cashmere shawls is spun only from the finest hair, and is never dyed for the best shawls, which sometimes take over three years to make. It has the consistency of the finest silk, in that a shawl, say, 16 feet long can be drawn easily through an ordinary finger-ring.

In 1725 the Dutch East India Company made an effort to acclimatise the Cashmere goat to the conditions prevailing in South Africa. Twenty-four were secured and sent to the Cape; of these only eight arrived, the others dying during the voyage, and of these eight only one was an ewe, which also died soon after landing. The seven rams were put to Boer goat ewes, and the resulting female progeny cross-mated with imported sires. Though fairly good hair was obtained from this strain, the imported rams died, and not being replaced, the breed, owing to careless selection, deteriorated, the hair became of little value, and the industry for a time was abandoned. In 1835 a Mr. Riley procured some Cashmere goats from a lot landed in France by Joubert in 1819—this Joubert having with the assistance of the French Government purchased a great many from farmers among the mountains of Persia. Mr. Riley sent three of these to the Cape—one pure ram, one pure ewe, and a cross-bred ewe—which were bought by Mr. Korsten, of Port Elizabeth. They, however, shared the fate of the former consignment, dying of scurvy. This was the last attempt to introduce the Cashmere into Cape Colony. It was in 1838 that Colonel Henderson, of the firm of Dixon & Co., and formerly of Bombay, imported the first flock of Angoras to the Cape. These consisted of twelve rams and one ewe, and were consigned to the Caledon district. All the rams, however, had been rendered impotent before leaving Turkey, so that the first importation for all useful purposes comprised one ewe and her ram kid. These two were the founders of the South African flocks of mohair goats, and the forerunners of that great industry which has proved such a valuable asset to the finances of Cape Colony. The native goat then at the Cape was a short-haired variety, and was indigenous to the country.

The Boer goat of to-day is found extensively on the dry kopjes of the Great Karoo, and is a large animal with strong legs, a grand carriage, and wild, prominent eyes. Its coat is short, smooth, and coarse, and of almost any colour, frequently being dappled. It is hardy, fattens easily, and is very fleshy. Together with the Afrikander sheep, they formed in the early days the only small stock possessed by the colonists. It increases rapidly, and its skin makes superior leather. These Boer goats have, in many parts of the Midlands and the East, been ousted by their attractive rivals, the Angoras. Yet their numbers in 1891 amounted to 3,444,019, or 250,000 in excess of Angoras. They are chiefly found now in Calvinia, Carnarvon, and Murraysburg, but are used all over the Colony, even where the Angora reigns with the Merino. These Cape sheep, or "kapaters," are trained as leaders of flocks of sheep, and as such are invaluable to the farmer, since they are not timid and will lead the way into enclosures or across rivers, which sheep will not venture to do by themselves. They are subject to a kind of scab, and used to die off by the thousand until dipping was introduced. Now these Boer goats have supplied the mothers of nearly all the Cape Angoras. The service they have rendered the Angora industry is incalculable; for had it not been for the presence of several millions of these to furnish innumerable ewes for grading-up purposes, the industry would not now be in the advanced stage it is.

Instead of increasing the Angoras solely by breeding from a few imported animals, it has been possible within a few years to grade up some millions from the old Boer goat mother stock, whose progeny, which largely outnumbers the mohair goats of Turkey and are nearly as well bred, now yield more hair than that country of a quality equal in every respect to the best that Turkey can produce. A flock was raised by means of Henderson's ram and a number of white ewes of this variety, and was farmed in the Caledon district, first by Henderson, then by De Vos, and later, in the Swellendam district, by Van Aardt and Hopley. Bastard rams were at this time sold to farmers in Caledon, Swellendam, and other districts. As a consequence the mohair goat spread rapidly, and numberless bastard Angoras came into being over a wide tract of country. However, owing to the fact that no fresh blood was imported, the hair of the bastard Angora deteriorated and became useless. The second importation of Angoras into the Colony was made by Messrs. Mosenthal in 1856, and was to the number of thirty, though some of the flock he had purchased had died *en route*. Most of these were transferred to Graaf Reinet, where seven rams and one ewe, representing the first pure Angoras ever seen in that part, were sold by public auction. Graaf Reinet, as is well known, is now one of the centres of the Angora industry. The average price of these rams was £82 each, one being bought for £117, and another for £100. Out of the thirty landed by Mosenthal, Graaf Reinet secured fourteen—ten rams and four ewes—at an average cost or £73 15s. 9d.

The third importation of Angoras was effected by Dr. White, who was treasurer to the Swellendam Agricultural Society, and who had heard of Henderson's importation and of the urgent need of fresh blood in the Colony. This he did in conjunction with Mr. Salt, a manufacturer who had imported a number of goats into England where they proved a failure, and so was looking round for the readiest means of disposing of them. The goats on arrival were located in the district of Swellendam, and, together with the remnant of Mosenthal's importation, formed the foundation stock of pure-bred Angoras in the Western Province. A short time after this Mr. Ziervogel, of Graaf Reinet, bought some rams from this pure-bred flock of Dr. White's and took them home with him, thus laying with Mosenthal's fourteen the foundation-stock of pure Angoras in the Midlands. The descent of many of the most noted flocks of the Midlands can be traced back to Mosenthal's and White's goats, and even to Henderson's original flock. The next importation (the fourth) was made by the late firm of W. R. Thompson, of Grahamstown, about 1858, and consisted of from thirty to forty goats. A number of these went to Alice, Cape Colony. In 1868 Messrs. Blaine & Co., of Port Elizabeth, chartered a sailing vessel to load 376 Angora goats at Constantinople, and return direct to Port Elizabeth. Several of these, which were mostly rams, were sent to the Zwaart Ruggens, to form the nucleus of a thoroughbred flock, the remainder, amounting to 54 rams and 44 ewes, were sold by auction at Port Elizabeth. The following year the same firm imported another and the largest shipment that ever reached South Africa, consisting of 720 rams and ewes. In 1869 Messrs. A. C. Stewart & Co., of Port Elizabeth, received a further importation of 100, consisting of 70 rams and 30 ewes. This was an exceptionally good lot. Taking the importations as a whole, a large majority of the goats were sold to farmers in the Midlands, and though they were eagerly bought up, first class animals were scarce and many were worthless. In 1895, to such a high state of excellence had the best Cape stud flocks been brought, that leading Angora farmers were of opinion that considerable risk attached to importing from Turkey; for it was generally held that importation constituted no guarantee of purity, however superior a goat might appear. It was agreed at a meeting of farmers that no more goats should be allowed to come into the country, unless they had first passed through the hands of experts sent out expressly for the purpose of selecting from the Cape. In accordance with this resolution, Messrs. R. Featherstone and C. G. Lee were chosen to represent the Cape. For the purpose of this importation the Government placed £1,000 on the Parliamentary Estimates. Apart from the prejudice on this side of the water, however, the Sultan was active in reinforcing the prohibitory edict of 1880, and it was chiefly due to the influence of Mr. George Gatheral, of Constantinople, that permission to export was obtained, but on the understanding that it should be the last concession granted.

This flock consisted of 115 goats ordered by Mosenthal & Co., and 50 goats to the order of the Right Hon. Cecil Rhodes. The entire shipment was very carefully selected by the best judges, and was chosen out of thousands of the cream of the flocks in the best districts of Asia Minor. On the arrival of the goats they were all put in quarantine to guard against the introduction of pleuro-pneumonia. Taken altogether they were an inferior lot, being without uniformity of widely differing types and degrees of excellence. The very choicest, it is alleged, were inferior to the best goats of the leading Cape breeders. The taint of the kind or common goat was also discernible in blue heads and red legs. Some, however, were good. All were eventually sold, the ninety-five rams averaging £57 1s. 3d.

each, and the nineteen ewes selling for an average price of £42 apiece. The highest price paid for a ram was £330, while another realised £230. The lowest price paid for a ram was £6. The highest price given for a ram since 1879 is £380, but the purchasers were prepared to pay twice the amount in order to secure him; £205 is the highest price paid for a single ewe; this, we believe, is still an unbroken record. Altogether, about 3,000 Angora goats have been imported into the Colony, but it is said that the very best have never left Turkey. The order of things in respect to that country and South Africa is now reversed, since it would pay Turkey to obtain new blood from the Cape for use in its best flocks. Much of the excellence to which Angoras have reached is owing to the superior intelligence and scientific methods of Cape breeders as compared with the primitive methods of breeding obtaining in Turkey, so that no more importations are likely to arrive from that quarter.

The Cape Colony now yields about one-half of the world's supply of mohair, or about the same quantity that Turkey yields. The commodity is remarkably subject to fluctuations in price, which are due to the caprice of fashion.

The competition at the agricultural shows of to-day has become so keen, and animals are so evenly bred, that judging them fairly is a difficult matter. All the goats exhibited are stall-fed and carefully matured, with the result that their fleeces are matchless in their perfection. The Turks are in the habit of shearing once a year, but Cape farmers are obliged to shear twice, owing to the less favourable climatic conditions. Yet, despite this disadvantage, Cape fleece fetches a better price than Turkish. As aforesaid, the unstable nature of the mohair market constitutes the greatest drawback to Angora farming in this Colony, for, being an article of fashion, the demand is dependent on its vagaries, and it is never known what the season's clips will realise. If the demand were regular at 1s. to 1s. 3d. more capital would be put into the industry. The average clip from a full-grown coat ought to yield about five pounds of hair per annum, but the mistake farmers make is that they do not aim sufficiently at obtaining a uniform clip. This is mainly owing to the questionable practice of purchasing rams from different breeders, with a consequent and derogatory inter-mingling of strains.

The goats represented in this country are the Angora, Beibazar, Geredeth, and Castambaal, of which the second named is best adapted for the climatic and geographical conditions prevailing in Cape Colony. This, the Beibazar, is an animal possessing a solid fleece of ringlets and a "stopl" running evenly from the root to the point of the lock. Its fleece is better able to resist the effects of continued droughts than other kinds are. Another mistake which farmers are prone to make is, on seeing a good ram of any of these breeds, to purchase it at all costs and hazards without considering whether he will mate with his ewes, which have, probably, a different class of mohair. The result is that the progeny produce a mongrel description of mohair. An example is afforded of the effects of neglecting this precaution in the breeder who bought a ram for £100 and found too late that it would not suit his ewes, so that it will take him a long time now to neutralise the mischief done in a single season. Yet, as far as the ram was concerned, it was an excellent one, and had thrown splendid stock for its previous owner. This only emphasises the necessity for care in the selection of stud stock, otherwise disappointment and loss will be the inevitable result, while the breeder from whom the stock was purchased will be wrongfully blamed.

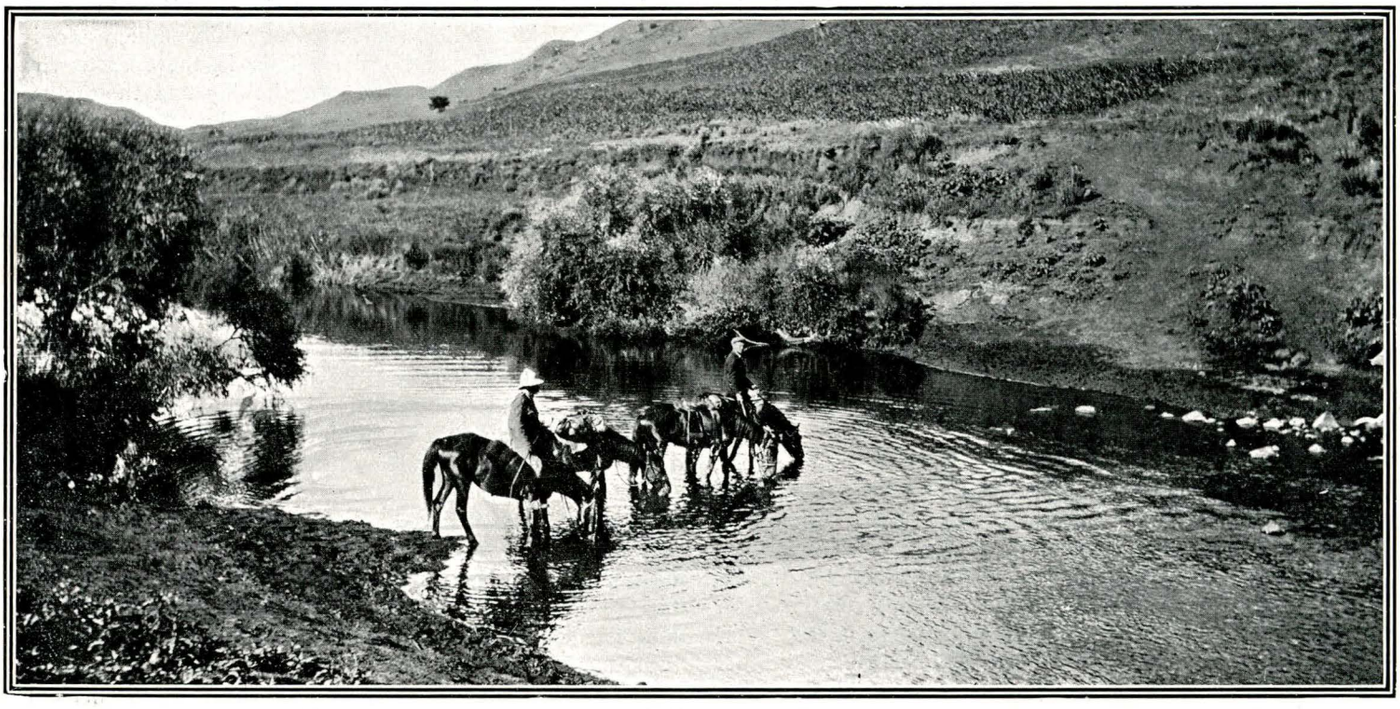
In the production of mohair goods there is no place in the world which can rival Bradford. The only stumbling-block which can stop the expansion of the mohair trade is a recurrence of the unfortunate speculation which has, again and again, set back, and actually killed, a promising trade just when mohairs were beginning to be fashionable. It is one thing to throw up prices 2d. or 3d., but the inevitable result of this gamblers' trifling with the market must be that manufacturers will throw out their patterns at the end of the season, and for the ensuing two or three years no mohair would be sold.

Those who have given the experiment a fair trial are convinced that mohair is the material *par excellence* which is going to revolutionize, for example, the outside appearance of the motorist. The lustrous fabrics which are manufactured out of the hair are specially adapted to meet the requirements of motorists, whether men or women. The mohair fibre is of an entirely different consistency to that of wool, from which the bulk of external wearing apparel is made; for, whereas the fibre of the former has a much smoother surface, and its affinity to attract and retain outside bodies is practically nil, wool fibre, on the other hand, has a surface more scaly, and has the special property of attracting and holding outside bodies, such as dust, which adheres to it freely, and withal stubbornly. This is the reason why motorists who have been out for the day find themselves covered with dust which experience shows no amount of brushing will entirely remove, and which give the garment a permanent dust-colour even when supposed to be clean.

Mohair is undoubtedly a fabric eminently suitable to the needs of man. In America, for both private and public functions it is fast becoming fashionable. All one has to do with a mohair cloak or coat when covered with dust is to shake it, when it will fall off as fast as it came on. The surface of the fibre is so shiny and polished that it prevents all foreign bodies getting inside, and on this account manufacturers experience great difficulties in manipulating this elusive and slippery article.

It will likely be urged that mohairs are too light and thin for outside wear, but it is more the intention of the makers of these goods to provide cloaks and wraps to fit over everything else than to supplant the present outdoor garments. Lustrous fabrics can be obtained in the market at less than 2s. a yard. For the sake of obtaining a well-made mohair fabric, it is much wiser to spend a little more and so secure an article that will stand plenty of wear. Mohair, being a tougher fibre than wool, makes the fabrics into which it enters extremely sound and durable. There are now on the market "mohair tweeds" of the same weight as woollen tweeds, which are made expressly for spring and summer wear, and are quite as impervious to dust as the ladies' cloaks. This new departure should spell an increased consumption for Cape mohair. In America, which country is fast developing its mohair industry, the skins of the Angoras are in great demand, the sale of which is an important and remunera-

tive part of the trade. At the Cape the skins are not made much use of as articles of adornment or for rug-making purposes. They are largely exported, however, roughly dried, though some tanneries now make a business of preparing them. In America they were found to be an excellent substitute for the wild fur-bearing animals which are rapidly becoming extinct. As a fur-bearing animal, the Angora, when one month old, has no equal, for at that age the growth can hardly be distinguished from the astrachan if dyed black, or if taken at an earlier period is a good substitute for the fur of the polar or black bear, according to the dyes used. Nearly all the buggy robes now sold as wild animal fur are nothing more or less than goat skins dyed. One of the most profitable uses that the Angora skin is put to is in the manufacture of lace trimming, whilst it is also used for making floor rugs and as coverings for the backs of sofas and arm-chairs. The price of these rugs is very high, ranging from £2 10s. to £3 for choice skins. America has a considerable manufacturing industry in mohair; her own old yield is far from sufficient to supply the demand for mohair goods, and she imports largely from England. Her record importation was 3,000,000 lbs. in 1896, a year characterised by an abnormal craze for mohair dress goods, which proved to be but temporary. Her average annual importation of this commodity is roughly 1,000,000 lbs. Other articles of commerce made out of mohair are boot and shoe laces, dresses, caps and jackets, as well as braids for military trimmings and for ordinary wear. Reviewing, then, the prospects of this industry, it is safe to assert that in view of the new uses to which it is being put, and its continued popularity as a textile fabric, mohair has a bright future still before it, and there is every incentive to production and the maintenance of the high standard of Angora goat which is a feature of the Colony's agricultural industries.



DRIFT ON MATHELING RIVER IN THE INTERIOR OF BASUTOLAND.

THE DAIRYING INDUSTRY.

NOW that re-organisation has been brought about in three existing dairy companies, which are thoroughly co-operative in character, the whole outlook of the industry is a most promising one. There are about twenty districts in which the organisation of creameries is being proceeded with, and the results in this branch of agriculture are likely to prove entirely satisfactory. Not only will a healthy colonial article of the highest uniform quality be produced, but farmers will be able to exercise considerable influence on the improvement of cattle, which of course is a *sine quâ non* of successful dairying in Cape Colony, or any other country. In many districts where large quantities of feeding stuffs are being produced and where grain and forage are now selling, unfortunately, at low prices, these products will be converted into a much more marketable quantity by being fed to milch cows, and disposed of in the shape of milk, butter, cheese, and cream, so that with increased facilities and reduced prices the colonial market should soon be in a position to compete more successfully with over-sea markets in the commodities of butter and cheese. At present the imports are very large; no less than 1,903,096 lbs. of pure butter, valued at £88,435, and 512,701 lbs. of margarine and other substitutes having been imported into Cape Colony during the last six months of 1905 ; while 1,671,826 lbs. of cheese, with a total value of £43,065, were shipped to Cape ports during the same period. If, however, we put the total amount of butter and its substitutes imported in the year 1905 at roughly 5,000,000 lbs., this shows a large decrease on previous years, the total importation in 1903 amounting to 7,491,490 lbs., valued at £339,400, and that in 1904 to 6,129,304 lbs. with a value of £249,096. This shows a fairly steady decrease in the Colony's consumption of imported butter; and as the population has increased, the reason must be assigned to a great extent to the growing preference for the colonial article, though the general depression has also to be considered. As regards cheese, there was an increase of £6,000 in the importation of 1904 compared with the preceding year; but for the last six months of 1905 the returns show £43,202, which work out on an average poorer than the two preceding years 1903 and 1904.

In the matter of developing the inherent milking capacity of dairy cattle, early breeding has proved most effectual, and in order to obtain the fullest possible development of the milk yielding qualities of heifers which are intended for dairy purposes, it is necessary to breed from them at a very early age. In a young heifer the organs connected with the secretion of milk are in an undeveloped and plastic condition; so that their development is, therefore, greatly promoted by bringing the milk-secreting function into early play by allowing the heifer to become pregnant.

Late breeding is a great mistake in the case of dairy cattle, because the milk-producing organs do not attain their full development in a heifer that is put to bull comparatively late. The fact of carrying a calf, needless to say, entails a big drain on the system of an immature heifer. In order to meet this drain, and at the same time ensure proper growth, heifers that are in calf require plenty of nourishing food. In fact, good feeding must always accompany early breeding if the growth of the heifer is not to be checked. Early breeding is sometimes objected to on the grounds that it stunts the growth and development of immature heifers, but this objection disappears if it is remembered to feed them with plenty of nourishing food during the time that the drain on the system is felt through the exactions of pregnancy. A backward heifer, however, should not be bred from at an early age, as pregnancy in her case is certain to have a stunting effect, and may spoil her for good. Discretion must be used by the breeder in deciding when a heifer is old enough to be put to bull, the development and condition being also taken into consideration.

In order to ensure a good supply of milk from a heifer she must be well fed right up to the time of calving, without allowing her to get fat. It is of the first importance to stimulate the flow of milk as much as possible in young cows during their first lactation period, as the more milk they yield the more does the milk-producing apparatus develop. And even when the flow of milk has practically dried up, and it seems hardly worth while to milk the young cow, the milking operation should be continued, so that the secretion of milk may be stimulated to the utmost. It is a bad plan to allow young cows to dry off too early, not only during the first lactation period, but also during the second and third one, since it adversely affects their future milk supply.

It is well known to every dairy farmer that the milk last drawn from a cow is much richer than the fore milk, but the cause of this has been differently explained. A cow's udder is made up of a collection of glandular nodules, each separated by a thin membrane so as to break them up into divisions. The udder is also divided into two parts by a membrane from front to back, making two separate halves. These halves are not divided, yet the front and back parts are distinct from each other, each quarter being connected with the teat to which it belongs by the lacteal ducts leading from them to the teat. The upper part of the udder is composed of fat, the lower has very little fat in it. So that the popular delusion, that a cow's udder is a simple receptable in which the milk is stored and in which the cream and richest milk ascends to the top, is thus exploded. As a matter of fact the size of the udder is no criterion of the quantity of milk a cow will yield, since the milk is held in a spongy tissue throughout the glands of the udder and also in lacteal vessels internal to it. As a matter of fact, the udder may be regarded as a reservoir which cannot overflow to a great extent, and which fills while the milking operation is in progress, replacing that which is drawn away. A cow which was in the habit of yielding several quarts of milk at one milking was slaughtered and its udder examined by dissection. It was then found that the spaces and ducts it contained were sufficient to hold only half-a-pint of milk. A cow can prevent the flow of milk by repressing the action of the flow or secretion. Necessarily,

the milk from the upper part of the udder can only come down last; and as the glandular substance in this part is chiefly composed of fat, the last milk is in consequence made up of fatty matter, mingled with serum and milky fluid which escapes from the glands by a change of the substance into milk. Thus the richness of the "strippings" end of the milking is accounted for.

The best cow for dairy purposes is one of medium size and small in bone. The head is small and narrow between the horns, and having a good width between the eyes; the ears thin, the eyes large and bright, the neck long and thin, but not beefy. The ribs should be straight and wide, indicating a good digestion and constitution, for much depends on the good working of the digestive apparatus in a good milker. The pelvis should be wide, giving plenty of room for the udder. It is better to have a scraggy cow with a good udder than a well-looking cow with a poor one. The particular breed which has proved itself in Cape Colony to be pre-eminently suited for dairy purposes on farms where the land is limited as to pasture is the hardy "Ayrshire." The main aim of the breeders of Ayrshires has been to develop as far as possible their milky capabilities, and their success in this respect has been so great that the breed now stands unrivalled as regards the quantity of milk produced for the amount of food consumed. They also maintain themselves in excellent condition on the poorest veld, where they have to roam far and wide for their food. As compared with the Cape Friesland, the milk of the Ayrshires is decidedly the richer of the two. If the farm is very large, with extensive vleis of rich veld, no breed answers better than the popular Cape Friesland cattle. They yield a large amount of milk, which is, however, of indifferent quality, while they also require heavier feeding than the smaller, hardier breeds. It is usual to at least once a week record the yield in milk and butter of each cow and to compare this with the food each consumes. This, being quite simple, does not require the services of an expert, as with the testers now on the market every farmer can do it for himself. If such a record is kept, it will be found that three out of every ten cows milked produce their milk at a loss, eating up the profit of an equal number of cows. The weeding out of the poor cows is the first step towards cheapening the production of milk. It has been explained why a cow should be milked dry every time; and the importance of this cannot be too much emphasised. The next rule that must be rigidly observed is to milk clean. Every dairyman is aware that the main cause of impure milk is uncleanliness—dirty cows, dirty yards, dirty milkers, and dirty cans. Dirt and pure milk cannot be reconciled, and the farmer pre-supposes the presence of harmful bacteria, as also of disagreeable smells. Most bacteria find in milk an ideal medium for growth, when the temperature is favourable. On the temperature depends the rate of growth. When milk is cooled to 50 degrees or lower, growth is very slow, and some species do not multiply at all. It is important that the milker should wash his or her hands before and after every milking; otherwise, should a cow happen to be suffering from sore teats, the germs of disease are transmitted by inoculation, probably to the whole herd, causing no end of future trouble and annoyance. There is, besides, a consequent loss of milk, since, in the process of milking, the nerves of the teat are acted upon and stimulated to induce milk secretion; but the pain caused by sore teats suspends the flow almost entirely. The best food for dairy cattle is lucerne, which depends on the availability of irrigated land; it grows well right through the winter and provides green food right up to February. Mealies and mangel-wurzels are also profitable crops, also barley which can be supplied green until replaced by the natural grasses of spring; oat-hay and bran are also necessary dry foods to keep up condition throughout the dry season and early winter. Dairy cows should be well housed, treated kindly, and kept comfortably, and should be milked by the same person as quietly and quickly as possible.

Passing now to the manufacture of milk into cheese and butter, as it is carried on in the Colony, it must be stated at the outset that many farms in the stock-raising districts of Cape Colony are situated far from the market, and have also to face the difficulties of regular and easy transport. In these districts, at present, the profitable sale of fresh milk is altogether impossible, and that of butter more so. Even in the more favoured parts the fresh milk trade is impracticable, and during certain seasons butter-making does not pay owing to the low prices ruling. Where conditions like these prevail there is every argument in favour of turning milk into cheese. If this plan be adopted the disadvantages of immediate transport are lost sight of, because cheese can be kept for several months if necessary, and it does not require the same careful handling as butter and milk do during its transit to market. From this it appears that those farms which are not so favourably situated as to justify their participation in a co-operative dairying movement, are the best adapted for cheese-making on account of the distance which separates such farms from their immediate neighbour. It is a matter for regret that so little is known in Cape Colony about the manufacture of cheese, and it is quite time such knowledge was widely diffused, by means of instructive lectures, &c., delivered systematically by experts in the various districts advantageous to its manufacture. There are several kinds of cheese, but the one that recommends itself for production in Cape Colony is that known as "Scotch Cheddar." The art of cheese-making is much more difficult than butter-making, as so many details have to be reckoned with, which exercise great influence on the nature and quality of the ultimate product. These details must be thoroughly understood, just as the main operations have to be mastered. One must be prepared to devote to its making constant care and attention, on which success depends. As in butter-making, cleanliness is a first requisite, and therein lies the secret of success. If the milk is contaminated, be sure the resulting cheese will suffer. The cow's teats and udder must be washed, and the milkers should be clean in person and dress. Milk should never be used from cows until six or eight days after calving have elapsed, for if it is, and is used for cheese-making, it will affect the product harmfully, according to the quantity used.

The best milk for cheese-making is obtained from the Ayrshire, on account of the small size of the fat globules it contains, and its suitability in other important respects, though good cheese is made from the milk of the Friesland and the Shorthorn. Two rooms are necessary for cheese-making, one for the manufacture and the other for the curing. They must be dry,

clean, and well-ventilated. A system of heating by boiler and conducting pipes should be used to dry the air and obtain the necessary hot water. In this country the great difficulty is to maintain a certain even temperature, and every dairy farmer must, therefore, be guided by the construction of the building as to how he can best utilise the available water. A by-product of cheese-making is "whey," and on this pigs thrive well; so that the keeping of pigs would be profitable and economical if done in conjunction with the production of cheese. A pipe should lead from the dairy to a tank in the "sties," so as to save labour and not allow the whey to sour before consumption. Certain utensils of a special character must be obtained, and large enough to deal with the quantity of milk available. These should be thoroughly washed after use, and scalded with boiling water, being then left in the sun to dry, as this is the best way of destroying germ life. In the summer the milk freshly shed must be cooled down, otherwise if mixed with the evening's milk which has been kept over night it will probably sour. To effect this a shallow pan exposing the milk to a draught may be utilized, or better still a Lawrence cooling-machine may be employed. Early the following morning the cream is taken off the milk before it is added to the warm milk of the same morning. A temperature of 64 degrees is requisite for the evening's milk on the following morning. It is necessary to have a certain sourness in the milk before operations can be started, and this is why the morning and evening supplies of milk are used together. This mixture is then heated in the vat to a temperature of 84 to 86 degrees Fahr., after which the milk is tested for acidity by the rennet test. If the milk is not acid enough, some lactic acid ferment is added to milk which has been kept for some twenty hours, and some of this is placed in the milk to make up the shortfall. By this time it will be sour and thick like cream, and it is then added in more or less quantity, depending on the degree of acidity required. Milk so treated becomes rapidly acid, and when sufficiently so must be watched carefully by means of the rennet test. When ripe, colouring-matter is added if other than a white cheese is desired. The addition of rennet causes the milk to turn into curd and whey; the curd becomes the cheese, and the whey is economically disposed of. The milk at this stage should be about 86 degrees Fahr. Four ounces of rennet to 100 gallons of milk is a fair proportion; the rennet is mixed with cold water added, and the milk stirred for five or ten minutes. This latter precaution ensures the fat being incorporated with the curd. In thirty-five minutes after adding rennet the curd is firm enough to cut. This is done with two special knives, one cutting perpendiculary, the other horizontally. This operation results in the curd being cut into small pieces about the size of a bean. After stirring for ten minutes and keeping the temperature up to 84 degrees, the curd is cooked, which is effected by introducing warm water or steam into the jacket of the vat, and thus expelling the whey and hardening the curd. This heating must be gradual, and should take one hour and ten minutes to accomplish, when the temperature should stand at 100 degrees. If at this stage all has gone well, the amount of acidity will require that the curd be left for another hour for further development. The amount of acidity necessary is discovered by the "hot-iron test," which consists in dipping an iron rod heated to a black heat into the curd, previously pressed by the hand, when it will draw a fine silky thread $\frac{1}{4}$ inch in length, if sufficient acid has been developed. The result of under-acidity is a dry, sharp cheese; of over-acidity, a cheese that will blow and crack in the curing-room, and be soapy in texture and inferior in quality. The whey is then drawn off through a sieve, and the curd scooped out and laid on the drier or cooler, resting on cheese-cloth. After this the curd is cut into square blocks of 10 inches. On again applying the "hot-iron test" the fine threads should be $1\frac{1}{2}$ inches long, which shows it is ready for milling. This process is undergone so as to break up the curd into uniform particles for the reception of salt. After this, the curd is mixed by hand on the drier for fifteen minutes, then further matured. It is now ready for salting. Coarse salt is mixed in, in the proportion of 1 lb. to 50 lbs. of curd, and the whole lies for fifteen minutes, when it is subjected to pressing or moulding, by being placed in a mould lined with cheese cloth, which, again, is put into a press. The pressure is gradually increased every hour, while the cheese drains. After six hours' pressure it is taken out, turned, and the cloth wrung out in hot water and replaced. The press is now put to a steady pressure of 20 to 30 cwts. When next morning the cheese is withdrawn, it is immersed for one minute in water. The pressing takes three days, and fresh dry cloths are constantly used, after which the cheese develops a skin; it is then taken to the curing room, which should have a regular temperature of 60 degrees, and where it should be constantly turned. After from six to twelve weeks it should have matured and be ready for market.

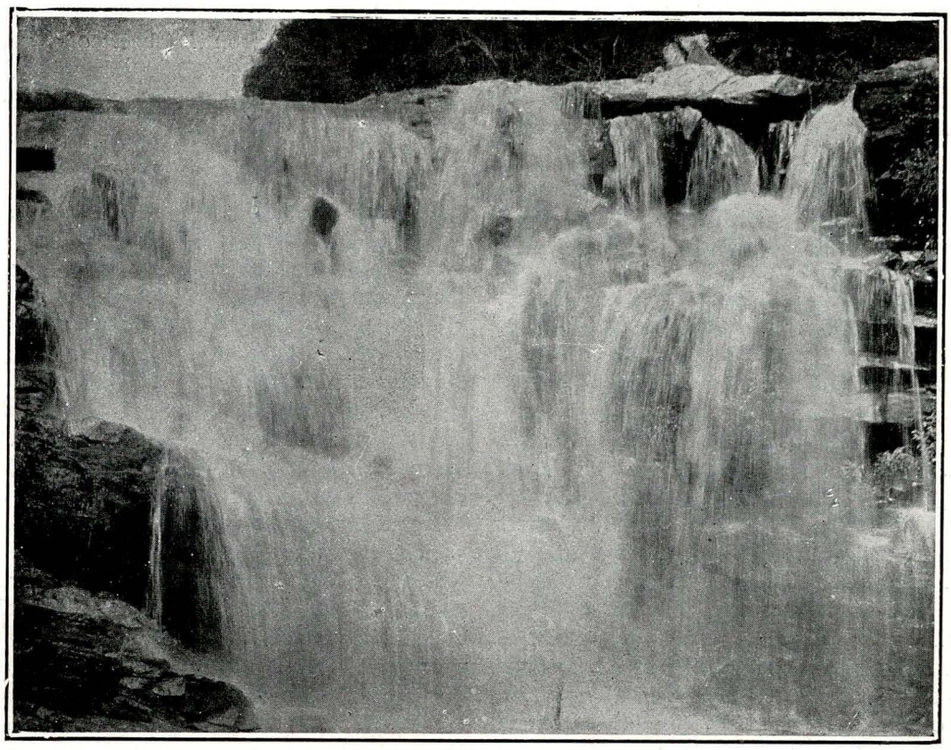
As in other dairy produce, the market is largely held by the foreign commodity; so that unless an article of equal quality and guaranteeing a uniform supply all the year round can be produced, Cape farmers cannot hope to make cheese at a profit. Cheese of a good quality can be made in this Colony, and it only needs, in the absence of individual enterprise, proper co-operative management to stimulate its production. By producing cheese which has at once a mellow freeness, a close texture, and a ripe creamy flavour, the Colony has little to fear from foreign or home competition. As regards butter, its manufacture is conducted in much the same manner as in other parts of the world, and by means of co-operative dairies, factories will shortly be established fitted up with the most modern appliances in the shape of separators, accumulators, &c., so that the best results may be anticipated. Already an excellent butter, which is apparently free of colouring matter, is made in many parts of Cape Colony, but the difficulty of getting it to market at a profit has largely still to be surmounted. Its present price prohibits its general use, as it is not yet in a position to compete successfully with Australian and Hollandish brands, with which the Cape market is consistently supplied, and which are chiefly excellent in quality. However, the right steps are being taken to give Colonial dairy produce a "fair show" by the establishment of co-operative societies, the gospel of which has been so vigorously preached by Mr. Hannon.

At a recent meeting of the Wellington Co-operative Dairy Association, which was formed a short time ago and registered as a limited liability company under Act 25 of 1892, a satisfactory report of its working was submitted by Mr. L. Abrahamson, M.L.A., the chairman.

This Company borrowed the sum of £3,500 from Government in terms of the Co-operative Loans Act, which money is to be used exclusively for the erection of buildings and machinery, while the subscribed capital will be used for working expenses. The buildings are now in course of erection, and rapid progress is being made. The dairy will be completed in June, and operations will commence, probably, in the following month. The aim of the association is to cover as wide a field as possible, and to that end the district included between Mulder's Vlei on one side and Paarl district on the other will come under its influence, as well as those further removed, such as Hermon, Tulbagh and Porterville Road. By this means a large output can be dealt with, thereby cheapening production and incidentally increasing the profit to the shareholders. The manager of this dairy is Mr. Scarr, who has had wide experience of co-operative dairying in Australia. No difficulty is likely to be experienced in the disposal of the products, either milk, butter or cheese, however great the quantity may be; and provided the manufactured produce comes up to the best imported, the preference will be given to the colonial article. Several firms, in fact, anticipating the success of the venture, have come forward with offers to buy up the whole of the butter and cheese output of the Association; so that, other things being equal, there is no fear of a ready market for their commodities. The chief difficulty in the way of co-operation is the difficulty and expense attending the growth of fodder for cows during the dry season in the purely pastoral districts; also the great distance between one farm and another, which makes it impossible to maintain a supply of cream all the year round, or to secure its delivery in first-class condition, constitutes a serious obstacle to success.

In the Wellington and neighbouring districts, however, these disadvantages are not very marked, since there a good rainfall can be relied on, and this, together with a large rural population and small farms, will enable the Company to grow cereals without irrigation; and, given a plentiful supply of water for young summer crops, a splendid local market is assured. It should be said that no better locality could be chosen for proving the advantages of co-operative dairying than the one under notice, including, as it does, the fertile pasture-lands of the Paarl. All milk will be delivered fresh to the factory and will be paid for at the rate of 1s. 1d. per gallon; but milk not guaranteed fresh will be paid for according to its butter test. The profit accruing from the sale of fresh milk will be placed to the credit of the Company. Cream will be paid for according to its butter test.

Now that Wellington has fairly taken "the bull by the horns," it is only fair to suppose that other districts, suffering from similar disadvantages, will do likewise, and that farmers engaged in the dairy industry will either co-operate and supply the market regularly with milk and butter, or failing this, create a flourishing industry in cheese-making. Fresh importations of the best milch cattle are constantly taking place, and we may confidently expect that the depletions in stock caused by the war will soon be recovered and surpassed, so that Cape Colony in this direction may soon be able to call itself self-supporting.



UMBELO FALLS, NATAL.

THE WOOL INDUSTRY.

OF the pastoral industries of Cape Colony the most important is that of the production of wool. Sixty years ago this industry had made very little headway because the existing Cape breed of sheep was a non-producer of wool, and was reared simply for flesh purposes. A man of enterprise and much influence at that time, namely, the Hon. Joseph Barry, saw the urgent need of importing a good breed of wool-producing sheep, and by crossing these with the Cape variety, he hoped to create an interest among farmers in the development of the wool industry. His first move was to purchase Mr. Breda's flock of Spanish Merinos, and to import three Merino rams, with which he crossed the existing breed. The progeny of rams from the resulting flock was offered to farmers at a very low figure, by way of encouragement; yet, strange as it may appear, they refused to take them at any price. Mr. Barry, nothing daunted, then offered them as a gift, but this offer was also rejected. As a final resource he came to an understanding with them, which was, that if they would take these rams and cross them with their Cape sheep, he would buy the first clip of wool, which, as a matter of fact, was neither hair nor wool, at 1s. per lb. This will at once be recognised as an outrageous price, but Mr. Barry in making the sacrifice trusted implicitly in the future of his enterprise to justify this apparently ridiculous expense. To this arrangement some farmers agreed; others, with a rooted prejudice against innovation, still held out. The result was, that the "strain" soon began to improve, and eventually the district became largely productive of good wool, while the strain of the original imported rams spread all over the South-Western district from Caledon to Fort Beaufort. This pioneer, as we might call him—the Hon. Barry—for some time purchased practically the whole of the wool produced, and shipped it from Fort Beaufort (which he was the first to open up for commerce) to England in sailing vessels. The "Barry and Nephews" brand of wool was long sought after by the London buyers, because they could rely on care having been bestowed on the sorting and packing of it. This firm earned a splendid reputation for their wool, as a proof of which the wool brokers of London, in 1860, presented them with a silver cup in recognition of what they had done to improve and foster its production. Since that time and for many years past the industry has suffered from various causes, which when not unavoidable were the result of gross carelessness and neglect. The Government, for instance, gave too much attention to the extension of trade in the far north, and thus neglected the development of its own back country. Then the war did much to decimate the live stock; and the great drought which ensued turned otherwise productive districts into comparative deserts. The consequence of these serious drawbacks was that the export of wool fell off considerably; for, whereas in 1891 the total exported amounted to 322,000 bales, in 1904 it fell to 201,000 bales. A similar falling-off also occurred from the same cause in Australasia, where in 1895 the production totalled 2,001,000 bales, while in 1904 these figures had decreased to 1,371,000 bales. This lamentable diminution in supplies naturally enhanced the values considerably, which for some time past have maintained the high level they then reached. The price for a bale of wool in 1895 was approximately £11; in 1901 this fell to £10 10s., and in 1904 £14 10s. was the prevailing price quoted. This latter year exported 64,372,270 lbs. of wool valued at £1,794,333. Of this quantity, the proportion of "greased" wool to "fleeced and washed" was as seventy to one, and of "greased" to "scoured and cleaned" as about twenty to one; showing that farmers are paying too much attention to the production of the heavy, greased varieties of fleece. As the demand in 1905 has been unusually great an increase on the previous year's output may be safely prognosticated.

Now that the end of the drought cycle has been reached, a succession of good seasons in both Australia and South Africa may be confidently expected. The downward movement in the world's production has ceased, and a considerable increase in the total quantity is likely to be shown for some time to come. The increase which has already been calculated for 1905 amounts in the case of Australasia to about 300,000 bales. With an increased production values will, of course, be adversely affected, and a great deal of lost time will have to be made up before the total quantities reach those of 1895. Consumptive requirements are, however, likely to be large enough to absorb all supplies. Consequently, although the recent extreme prices may not be maintained, we can look forward with confidence to a level of values which will be profitable to the grower, as long as he conducts his business on proper lines and with due regard to the increased competition from producers in other countries. In order to effect this, the farmer must bring himself as closely as possible into touch with the consumer, discover his requirements, and supply them. In this respect he finds his relationship to the consumer somewhat obscured by the intervention of the country storekeeper, whose knowledge of wool as a rule is very limited, and who does not usually discriminate closely as to value. When various lots arrive at the coast markets they are usually sold in a lump at an average price, although the parcel may contain differentiated wools varying in value to a great extent; so that the farmer does not obtain the information he should in regard to the good and bad points of his clip.

The latest report of the Government expert, Mr. P. J. Hannon, who has thoroughly familiarised himself with the conditions, needs, and shortcomings of agriculture in Cape Colony generally, is that the wool industry is in a bad state, not meaning that the material is deficient or wanting, or that production is insufficient for market requirements; but his condemnation is levelled against the careless system in vogue of grading and classifying wools, which two important necessities he claims are entirely absent. It will be easily seen how this tendency to scamp the careful preparation of wool for exportation might in time ruin the industry if persevered in, as far as Cape Colony is concerned. The home buyers look for proper classification. What they want is clean wool. They are prepared to take all qualities and descriptions, whether fine, robust, long, medium, or short, but they must be classified according to their respective value, and their purchases are always made on the understanding that

what they buy is clean washed wool. As things at present obtain, neither grading nor classification is in evidence, dirt is more of a feature than an accident, and the consignments sent to England are generally characterised by the absence of skirting, locking, and piercing fleeces. So no wonder that the reputation of Cape wool has sunk very low on the London markets, or that Cape prices average $4\frac{3}{4}$d. per lb. less than those realised on Australian wools. If the manufacturer wants "clean washed wool," the requirement of the farmer is "the best obtainable return per head for the product of his flock." The aim to be kept in view, therefore, is to bring together these two interests, so that the farmer, whilst satisfying the manufacturer, will do the best possible for himself. For, as a rule, he is quick to recognise that his interest lies in securing the best return per animal, but in most cases he fails to grasp the relation which his wool in the greasy state bears to the clean scoured wool required by the manufacturer. Consequently many South African farmers have lost sight of the fact that the true value of the fleece depends, not on the gross weight, but on the amount of clean wool it contains. We have therefore the long-continued spectacle of wool-growers trying their best to obtain an increased weight of wool by selecting for breeding purposes sheep whose chief characteristics are fatty and heavy fleeces. They have certainly obtained more weight, but not of wool; so that their labours have resulted in a fictitious increase consisting of superfluous matter which is practically valueless. As an instance of the deterioration in weight of a fleece after undergoing a cleansing treatment, that of a heavy, fatty Vermont fleece may be given. This, as it came from the sheep, weighed 29 lbs. $11\frac{1}{2}$ ozs., but subsequent to the process of cleaning and scouring, it was found to weigh only 6 lbs. $5\frac{1}{2}$ ozs., or in other words had lost 23 lbs. of impure matter. There are cases, however, when dry-looking wools would gain in appearance from the retention of a little grease, and this has been recognised in Australia, where there has been some judicious breeding with this object in view. But in South Africa, the Vermont sheep seems to have been used for nothing else but to obtain fictitious weight, and consequently the yield (in pure wool) of the clip is lessened every year. This fact the farmer probably will not realise to the full until heavy grease wools, which have hitherto sold well on account of the high prices ruling for clean, scoured wool owing to the existing scarcity, stand alone on their merits or demerits; for it may be safely predicted that when the normal values are restored by increased production prices for these fatty, wasty wools, they will be reduced to very low figures, and in a depressed market will be saleable only at prices unremunerative to the grower. In many districts the average yield capacity, or proportion of wool, of the clips has decreased generally during the past 15 years by 10 to 15 per cent., and in some cases by a still greater percentage. Wools from the Barkly East, Dordrecht, Burghersdorp, and Steynsburg districts, for example, were wont to return from 42 per cent. to 45 per cent. of clean, scoured wool, whereas now average parcels from the self-same districts yield only 30 per cent. and under. Sales of the latter have realised up to 6d. per lb. when the market was abnormally high. The question naturally arises, therefore, as to what is likely to be paid for such wools in a low market. If the condition of the clips in the above districts had maintained their former values, they would readily fetch 9d. per lb. to-day. As it is, the resulting depreciation must be chiefly laid at the door of the prevailing tendency to grow heavy grease wools in order to obtain increased weight. The farmer must be guided by a standard which will aim at the production of a wool possessing superlative length and density, but without excessive yolk or other waste matter, and which will yield the best nett result per annum.

Now, as to the best means of reorganising the whole system of wool preparation and wool growing in Cape Colony, a step in the right direction has already been taken by the inauguration of a National Association of Wool and Mohair Growers at Port Elizabeth, in January 1906, when a public congress of farmers, produce merchants, and others interested met to discuss these vital questions affecting the welfare of the wool industry. This Association is to have branches in every fiscal district, and the strictest regulations have been drafted for the classification and baling of wools. Members conforming to the obligations of this body will have their wools presented for sale under the protection of a National Board. The effect of this Association, we may say, has already been felt in England, where wool-brokers and produce buyers are warmly applauding the efforts being made to improve the condition of the industry. Then, again, the formation of a South African Sheep Breeders' Stud Book is a great step towards progress in the wool-growing industry; and in this connection it may be observed that the type of sheep most desirable from a wool point of view is one which combines quality, uniformity, length, and density, to the exclusion of fatty and waste matter, yet retaining sufficient grease to keep the wool in a healthy state. It has now been made evident that the clean scoured fleece determines the value of wool. The matter that comes next for consideration is the preparation of the clip for market. It is apparent from the foregoing that if the clean scoured result determines the value, and if, as is the case, the land and ocean freights, together with other incidental expenses, have to be indirectly borne by the farmer, it follows as a logical conclusion that the retention of superfluous matter spells a loss instead of a gain to the producer, since he is actually paying the cost of transport for a large quantity of worthless matter, quite independent of the prejudice which the mixing of such with his wool creates in the mind of the buyer. True, there are a few intelligent farmers who have thoughts beyond their own sheep kraals, who take a pride in their clips and skirt them carefully, but taking South African wools as a whole, the carelessness with which they are prepared for market reflects terribly on the farmer, and constitutes a crying evil which only the influence of persistent adverse criticism, failing the stern lesson of culpable loss, can hope to remedy. The methods now employed, as a glance at the bales quickly proves, are filthy in the extreme, and not only is cleanliness conspicuous by its absence, but to the adhesive dung which is always found clinging to a fleece on farms where sheep are crowded at night in paddocks, is added a considerable quantity of loose and quite unnecessary dirt. In fact, it looks as though the farmer were rather bent on the addition than on the removal of the foreign matter which is mixed up with the wool. It is, therefore, not to be wondered at if the manufacturer raises a protest against such stuff, or that he is forced to patronise the produce of other countries, applying to Cape Colony just for the balance

of actual necessities. If every farmer in South Africa would only make up his mind to export his wool *clean*, though that is the first but not the only necessity, it would still be an important move in the right direction. They would then be more in a position to make their clips uniform, to skirt each fleece carefully and to sort the wools conscientiously. A change is also needed in the method of disposal. The great bulk of the clip which is sold up-country is not dealt with on its own merits. The country storekeeper, in making offers for the farmers' wool, is in reality touting for the privilege of selling him merchandise. Actually, he buys the man's custom, and no note is taken of the quality and condition of his wool. Needless to say this method is directly opposed to progress, and constitutes a narrow-minded self-interest. The trouble is in the present difficulty of dealing with each individual clip on its own merits. In place of supplying the country storekeeper, let the progressive farmer send his clip to the large markets for sale; by so doing he will find himself fully repaid for any improvement he may have made in his wool. The reason that he does not do so may be that he is, in a manner, in the hands of the local storekeeper who supplies him with provisions, &c., in bad, depressed times, when money is scarce, as well as in good seasons, and the farmer, consequently, finds it more convenient to pay in kind, which he may be, perhaps, forced to do before he can realise on his clip. However that may be, the retrogressive farmer who, in defiance of all advice, fails to skirt his clip and persists in breeding heavy, fatty, and withal dirty wool, is bound to be visited by a "Nemesis," when his wool, sold on its own merits, fetches such a low price as to make it unremunerative, which will brand him as the enemy of true progress and a stumbling block which were best removed.

Mention has been made of the word "skirting," and this, to the lay mind, which can readily understand the operations of cleaning and classification of the various qualities of wool, does not convey much meaning. A short description of this important process will, therefore, not be out of place. In the operation of "skirting," the thumb of the left hand is placed under the fleece and the flat of the hand on the top. The fringe of the fleece is then held firmly and pulled off cleanly all round, the desired object being to obtain one unbroken length of fleece. In this way all bits, pieces of grass, &c., are removed. It is then folded over lengthwise one-third, and afterwards doubled over again, so as to bring the centre of back into view. The near side is then turned over, and the small part of neck doubled in, the whole being rolled up from britch to shoulder. In this way no tying of any kind is necessary. After remaining in this condition for half a day to settle, it is ready for baling. Four fleeces are put in a box, and a heavy native treads in the centre of the fleece to press them—not on the edge, because this would undo the whole object of the work of rolling, and would result in the breaking down of the fleece.

We shall now pass to the consideration of some of the various breeds of sheep which have been originally imported and subsequently acclimatized and crossed with resulting "strains" which have proved in one way and another profitable to the farmer. First of all the Persian sheep calls for some description. This animal, which is easily recognisable by its black head and neck and white body, has received during the last eight years a large amount of attention from farmers in Cape Colony; and justly so, since it has proved to be the one sheep suitable for the arid portions of this drought-stricken country, being able, owing to its exceptional hardiness, to thrive on scanty pasturage where other breeds can scarcely exist; and also for the coast and other districts where for years past no other sheep have been grazed on account of the ravages caused by heart-water. Although the Persian is not immune from heart-water, it contracts the disease in such a mild form that it does not seriously affect it. As a consequence of this advantage many farms are to-day carrying flocks of Persians where for many years no sheep have been kept. Merino breeders declare that it is a mistake to encourage the breeding of Persian sheep, as it will tend to destroy the wool industry of this country, and no doubt it can be carried too far. But surely there is room for both—the flesh and the wool sheep.

We farm for profit, and when we have thousands of acres of land unfit for Merinos and other breeds, there is every reason why these unfavourable districts should be stocked with Persians. Their chief characteristics are exceptional hardiness, early maturity, prolificness; their capability of withstanding heart-water and other diseases, and their suitability for crossing with other breeds. Persians and cross-bred Persian ewes lamb when from one year to eighteen months old and rear their progeny without any trouble, while they rarely suffer any ill-effects from grazing on lucerne. In the Colesberg district they are largely replacing Merinos, owing to the heavy growth of what is called "steckgras," which is terribly inimical to the production of wool, and makes the wool industry almost impossible on some of the farms. But a new type of Persian has just been introduced into Cape Colony, which has the advantage of not only being a good butcher's animal, but, in addition, that of carrying a very valuable wool. It is equally hardy, quick-maturing and prolific, thriving on scanty pasturage and in drought-stricken districts, but responds quickly to improved veld conditions. From experiments which have been made on it, there is every reason to suppose that it is entirely immune from the terrible scourge of heart-water. The introduction of this new type has so far been favourably viewed by the farmer. The wool it carries is excellent both in quality and quantity, an eight months' clip being about 5 lbs. in weight. The Spanish Merinos are the pure Merino sheep, although bred to different types. There is the Vermont Spanish Merino, so called from the place they were taken to. These sheep have been bred mostly for quantity of wool and weight of fleece, as well as for other good points, and have proved to be grand sheep for building up flocks. Then there is the Tasmanian sheep. This has had German Spanish Merino rams and Vermont Spanish Merino rams, and has been bred from selection for some years, and no doubt breeds a type which is called pure Tasmanian. The Rambouillet pure Spanish Merino, named after the place they were taken to, and bred to a type of its own, is much wanting on certain points, otherwise it is a good breed, but is not likely to find much favour in South Africa, although its wool fetches a better price "per lb." than that of Merino, whilst as a slaughter-sheep there is very little difference. As regards Merinos, there are some exceptionally fine types in the Colesberg

district, the majority being practically South African and a type by themselves, standing out strongly in their individuality.

Mr. T. T. Hoole, of Atherstone, Cape Colony, has recently returned from Australia with some good Merino rams for himself and others. He purchased for the Colesberg farms of Mr. Abe Bailey one of the noted Gibson rams for £315, which is considered to be one of the best of the Gibson stud ever sent out of Australia. This ram was bred by the Hon. James Gibson, of Tasmania; it is a special stud ram, and is a son of Patron, which came of the world-renowned President strain, and is considered to be the best fine-woolled Merino ram ever bred in Australia. For a Tasmanian he is slightly robust, but the fleece is very dense, while the body is beautifully covered. Seventeen stud ewes from the Gibson stud have also been added to Mr. Abe Bailey's flocks, which are all in excellent condition and almost perfect in symmetry and fleece. Mr. Hoole has also introduced some more Glengallons, and seven rams of the Havila type, which should do well in the dry districts; they have good frames, are fairly bulky, and very symmetrical, while the fleeces, though a little too robust, show plenty of character and quality. The Highland Home flock has been bred mostly from selection with a dash of Vermont and pure Spanish Merino, which has proved of great benefit. Of these, Mr. J. H. King is a large owner, and he has taken many prizes for them. The foundation ewes of this flock formed part of the King's Vale pure Spanish Merino flock formerly owned by Francis and T. W. King, and the flock itself was established in 1852 by F. and G. King. They possess all the best qualities of a wool-producing sheep.

Cape wools to-day occupy a good place on the markets of the world, and their position could be vastly improved if they possessed more intrinsic qualities, and were presented in a more marketable condition. There is no slackness in demand, since slack wool markets are at present (1906) an unknown quantity everywhere. This is all in favour of the Cape article; and if a move is not now made when prices are high and the demand is active, then it will never be made. The Cape wool trade must be lifted out of the ditch in which it has for some time past been struggling; the breeders must remove the stigma which attaches to it on the home market. It must be remembered that the manufacturers' interest in Cape wool has waned purely on account of the uninviting state in which this commodity reaches him, and it needs very little effort on the part of farmers to restore his confidence in it. In looking at Cape wools generally it must be admitted that as regards quality they have few superiors. Buyers do not complain on the score of quality. Manufacturers know that to spin a "long length" they must have a fine fibred wool, as it is impossible to produce a small yarn out of a cross-bred wool. So that this is the first requisite the buyer looks for, and if he does not find it, no matter what other good qualities it may possess, the lots are passed by. Australian wools in general during the last five years have not run so uniformly fine in quality as they did previously, this being due to the rage among ranchers for growing big bulky fleeces, which means a sacrifice of quality to a certain extent.

On this score Cape wools have maintained their level of excellence of years gone by, and Bradford spinners know that when a topmaker guarantees them to be pure Cape "tops," he can rely on them for spinning purposes, whereas other tops will never spin like wool which is entirely "best Cape," because they have been made possibly by mixing together certain proportions of Australian, Cape, and River Plate. Only let the standard be maintained, and, as quality is the first plank in the buyer's platform, the future is very rosy for the wool industry of Cape Colony.

HYDRAULIC MINING, LYDENBURG GOLDFIELDS.

THE POULTRY AND EGG INDUSTRY.

IT may be as well to state at the outset that poultry farming, pure and simple, is not likely to be attended with independent success in South Africa for some years to come, but as a useful adjunct to farming or any other occupation it often pays handsomely. If local markets, or rather a house-to-house delivery of poultry and eggs were available, as in a few instances they are, so as to escape the present prohibitive railway rates which make the despatch of small parcels of produce to distant markets unprofitable, then a prosperous future for poultry rearing as a distinct and self-reliant industry might be assured. How far co-operation may contribute to this desirable state of things, by providing collecting stations favourably situated near the railway line, whose function would be to collect produce, such as poultry and eggs, from the outlying farms in the district, and despatch it in bulk to the nearest market town, time and enterprise (which we may say is everywhere waking up in Cape Colony) will alone determine. As a matter of fact poultry farming is still in the infancy stage in South Africa, but, thanks to the patience and scientific thought which are now being bestowed on the many problems which face the breeder, and to the widespread interest which the industry is creating, it is making rapid strides towards being a paying proposition, and a lucrative branch of agriculture. Beneath the growing enthusiasm, however, there is an under-current of popular belief, that poultry keeping does not pay, that fowls are fatally prone to divers diseases, and that there is no demand for dressed birds, or any great quantity of fresh eggs. We believe these to be fallacies, and facts may be deduced to prove them so. First of all, there is no country in the world where natural conditions are more favourable to this industry. Secondly, the causes of disease are simply the improper housing of birds, want of the requisite knowledge regarding their food, hatching, and habits, and the reluctance to bestow the infinite care, patience, and attention, which are three great factors concerned in successful rearing; all of which causes are easily removable, and now that scientific instruction is being disseminated through the medium of periodicals, such as " Fowls and Eggs," and of lectures and demonstrations, should soon cease to be economic considerations adversely affecting the welfare of this industry. As to the lack of demand the statistics setting forth the imports of eggs and cold storage poultry answer this objection incontrovertibly. In 1904 the number of eggs imported into this Colony amounted to 27,516,794, having a value of £97,567; while for the half year ending 30th June 1905, the number was 17,628,082, valued at £69,601. These figures clearly show that far from the imports being reduced, those for 1905 promise to be several million in excess of the previous year. As regards poultry, however, imports seem to be distinctly decreasing, since whereas 872,255 lbs., valued at £29,339, of fresh frozen poultry were imported in 1904, only 173,997 lbs., representing £5,938, were landed for the first six months of 1905. This is decidedly more hopeful, as, even allowing for a possible falling off in the consumption of poultry, it points to an increase in colonial production, which will be maintained and improved upon in the future.

The usefulness of this industry has been alluded to as an adjunct to farming; but it must be regarded also in the light of a "stand-by" when droughts, locusts and the thousand ills that agriculture is heir to would otherwise spell disaster for the farmer, while it is further advantageous in that eggs and poultry can be turned into ready money by sending them to the various markets, and are the special province of women, who are better suited to manage and rear poultry than man owing to their greater patience and opportunities, therefore allowing their husbands perfect freedom to follow their usual occupations.

The four most important considerations to be observed in poultry-keeping are the rearing, the management, the improvement, and the attention that must be bestowed on the production of eggs and chickens for market.

It will be as well, perhaps, to start with the egg, and to discuss, in turn, the methods of hatching it, the provisions it is necessary to make for the resulting chick, and lastly the utility, maintenance, and various types of the full-grown fowl, with a word regarding the ailments to which it is prone.

Before trusting a hen with a "sitting" of eggs, it is a wise precaution to make sure of her desire to sit by testing her with a few common eggs, for very often hens fancy that they are broody, then suddenly discover that they are not, with the result that probably a valuable hatching is spoilt. Once satisfied in this respect, the next thing to consider is the nest. The shape of this should resemble that of a saucer; it should be lined with soft straw, and be covered with a fair-sized box, with an opening on one side. A good sand bath of ashes, earth, and sulphur should be provided, and the hen should be fed on wheat and small mealies, and have a ready supply of grit and fresh water. During incubation she may be allowed off the nest for half-an-hour at a time according to weather. When the chickens are about to hatch, the hen should be raised from the nest, and the eggs examined, so that where chicks need assistance in getting free of the shell it can be given them. No food is necessary for forty-eight hours after hatching as Nature provides them with an ample supply. Afterwards hard-boiled eggs, followed by coarse oatmeal and soft greenstuff should be given them. Damp or wet foods must be avoided as they give rise to internal troubles. The hen should be fed separately as she is liable to starve herself.

Artificial brooders and foster-mothers are not necessary for chicks in this climate, but a light box is essential, which, after three weeks, may be left outside, according to weather. The heat under a hen on a hot summer's night causes a lot of disease amongst chicks, and it is therefore preferable to rear them without mothers.

But incubation is the best and most generally adopted method of hatching and rearing chicks. Nature's process is too slow for these days of competition, and other objections to it are that hens are not broody when needed, or when broody there may be a scarcity of suitable eggs. The percentage of mortality, also, amongst incubated chicks as compared with those brought out by the hen, inclines in favour of the incubator.

By employing the method of incubation, it is possible to have a supply of pullets all the year round, and, as a result, eggs in all seasons, especially the winter, without it being necessary to keep a certain class of bird for that purpose. Many kinds of incubators are in use, and most are practicable. The hot-water system of heating is undoubtedly to be preferred to the hot-air system owing to the dry climate. To be successful in incubators it is necessary to place the incubator in a quiet, well-ventilated room, on a brick platform or a solid box; to obtain good, clean eggs from reliable sources to ensure healthy stock; to give careful attention to the working of the incubator as regards temperature, which must be "even"; to keep the machine clean, and to wash and disinfect with Condy's fluid each drawer or tray after a batch of chickens has been removed.

When the chickens are hatched they are put into a drying box for about 20 hours without food, and are then transferred to a shallow box about 36 in. by 18 in. in measurement. This will hold some 60 chicks. Here they remain for two days to gain strength, being fed on dry oatmeal sprinkled on a fine sand. After this canary seed may be added, then minced egg and lettuce leaves. On these they are fed every two hours. When a week old, they are placed in a portable "rearer" which accommodates, say, 100 chicks, and consists of a framework with a wooden floor, and a small doorway communicating with a covered run of half inch wire netting. This is placed in a wind-protected spot on gravel soil (for choice) as affording cleanliness and a source of grit. Here they remain for three weeks. On the third or fourth day the chicks get their first drink of water out of a saucer. Their next habitat is a covered run, containing a large open box, which serves for sleeping quarters, covered with a rug. Several of these runs are necessary, so that chicks of an age can be kept together. At this stage they may be allowed out for a run in the yard which strengthens them, and which they enjoy. When nine weeks old they can be treated the same as and allowed to mix with full-grown fowls, soon learning to hold their own. They are now drafted off to a large run—a field for example—enclosed in six inch wire netting, and containing a lot of stock birds, as well as those which are being fattened for market. Each "batch," when drafted off, has its own quarters and shelters for sleeping in, these shelters being composed of a firm wooden frame, tarred and white-washed. The front is left open; the sides and roof are packed with thorn bushes, so that, being inexpensive, they can be destroyed in case of an outbreak of contagious disease. Each shelter has low, removable perches; while in front of each a good strip of gravel mixed with crushed bones, crockery, &c., is laid down to provide grit. The floors of the sheds are constantly dug over, and ashes and sulphur occasionally thrown in. Nests are provided for every shelter and are placed on raised pedestals; they are shut in at the back, the fronts having a narrow board to prevent the eggs from rolling out. The advantage derived from this method of isolating each lot of chickens is that when disease breaks out it can be dealt with more easily and efficaciously. The mature pullet may now have soft food, such as pollard and bran, household scraps, and if obtainable boiled stinging-nettles, in addition to hard grain, such as Kaffir-corn and wheat, which must be given in the evening. These foods largely promote egg-production, whilst mealies and barley have a tendency to diminish it. It is, of course, a necessity from an economical standpoint for the poultry farmer to grow his own poultry food. This may consist of a field sown half with barley or other grain, and half with lucerne as a standing supply of greenstuff. Fancy foods, as advertised, should be avoided, as they are costly; also over-feeding, which makes the fowls reluctant to hunt for food, and thus obtain exercise, which is important for their health. A supply of clear, fresh water, kept in the shade, as sun-burnt water is injurious to fowls, should always be in evidence.

The success of the rearer will, however, depend largely on the fulfilment of two conditions—namely, the necessity of perfect cleanliness and constant personal supervision, so that immediate action may be taken on the least sign of indisposition and the sick bird removed to a "hospital," which is recognised as being indispensable where poultry is reared on a large scale. A good preventive against disease is Epsom's Salts or Condy's fluid, added to the drinking water, and when moulting a pill made of aloe or garlick as the best and simplest aids.

Broadly speaking, there are two classes of poultry; these are the utility and the fancy fowl, the former being bred for profit, either as an egg producer or as suitable for the table, the latter for exhibition purposes. We will, however, confine ourselves to the "ideal utility fowl," which, though not yet an established fact, will in all likelihood be produced soon, and combines the good qualities of both classes.

There are three qualifications necessary to the "ideal utility fowl": in the first place it must be pure-bred, or bred to a recognised standard, so that it is fit to be exhibited; secondly, it must be of large size for the table, must mature quickly, and possess small bones and a meaty breast; and thirdly, it must be a good layer of large eggs—this last qualification being the most essential of all. For example, a variety which will combine the laying of eggs of large size and quantity like the best utility strains of Leghorns, with the meatiness of the Game-fowl, and at the same time be of handsome appearance for show pen, would meet these requirements, but has not yet been evolved. The nearest to this ideal is found in the Orpingtons and White Wyandottes, but in each the weak point is the size of the egg—colour not being so important, though white is preferable for South African markets. No doubt, with the great interest and care that is being shown by those engaged in the industry, this "ideal utility fowl" will, by careful breeding and selection, one day be produced; and if the size of the egg can be increased in some strains of prolific layers now being bred, which also possess good table qualities, we shall then have a most valuable variety from all points of view. To be successful with egg-producing hens it is necessary to hatch them early, then feed for a good strong growth throughout the summer, and bring them into the winter season thoroughly moulted, and with a new coat of mature feathers. If well cared for, these should prove profitable hens for the ensuing winter. Next to these come one-year-old hens that were first-class egg-producers as pullets. Hens older than these, or late-hatched pullets, should be the ones selected, fed and fattened for the poultry market.

In poultry-breeding, the selection of suitable breeds for specific purposes is of vital importance. Should eggs

be desired, an egg-producing breed must be selected; while for table purposes only birds adapted for killing must be taken, though some, as aforesaid, are equally suitable for both uses. It has, however, so far been impossible to obtain the highest perfection in any one breed. The aims of the utility poultry-keeper and of the fancier are not always identical, though they often work so closely together that it is impossible to say where the utility man begins and where the fancier leaves off; The fancier has done much for poultry, since to him belongs the credit of having, with infinite patience and toil, brought a number of new breeds to their present perfection, which fact serves as eloquent testimony of the value of the fancier to the poultry industry. As a rule, however, when a breed loses its value as a utility bird, it is sure to become unpopular and to give place to other and more serviceable varieties.

Probably the best laying fowl we possess is the Black Orpington, which was first introduced into Cape Colony at the dairy show of 1886. The credit of producing this fowl belongs to Mr. Cook, who was engaged in breeding them for five years, and even then it took another six or eight years in the hands of the fanciers before his ideal was in any way reached. He made it by crossing Minorca cocks with Black Plymouth Rock hens, and the pick of the females from this mating were put to Langshan cocks, which possess clean shanks and short legs, and thus the now popular type was slowly evolved. This bird was subsequently improved upon by Mr. Joseph Partington, who made them larger and of better colour, but with big, coarse heads and round cushions, which reminded one of the black Cochin. These birds won prizes wherever shown, and in some cases as much as £100 has been given for a single bird. In the class of Orpingtons—black, buff, and white, and others—entries for show purposes are most numerous, and competition is keenest, except, perhaps, in the case of the Wyandotte, while it has certainly attained a popularity second to none. The demand is good for them, and the prices for standard birds high, and as a utility fowl it has a world-wide reputation, being near the top in all laying competitions held in England. One objection to them is their tendency to sit. They lay a large brown egg, are steady sitters and good mothers; are hardy and excellent for the table, some being ready to kill when five months old. The honour of laying the largest white egg of any breed of fowls belongs to the "Andalusian," which comes from the Mediterranean, and has several points in common with the "Minorca," but instead of being black or white it is blue or slate colour. It is to be recommended where plenty of eggs is a desideratum, but is not suitable for breeding purposes. Another breed is the "Brahma," from Asia, which was once very popular, and has given way to new varieties. The great objection to it has been the large quantity of feathers they possess, which unfits them for utility purposes in a hot climate like South Africa. They are good sitters, cover a large sitting of eggs, but are liable to break them. The "Ancona," also a Mediterranean type, has not found much favour in the Colony, as it is not amenable to proper domestication, its nature being to roam about, though it lays well, and is kept solely for this quality. It is like a Leghorn, mottled black and white in coarse patches, and is very wild. Of the Asiatic "Cochins" there are two leading varieties—the buff and the partridge. They are extremely handsome and dignified, lay small eggs, amounting to from 75 to 100 per annum, but, being strictly a fancier's breed, are worth very little for utility purposes. The British breed of Dorkings is the oldest known of any breed, and some think the most serviceable that can be kept. They are good layers, and excellent as table birds, being fleshy and of good quality. There are three varieties in general use, namely, the "silver grey," the "dark," and the "white." The British game fowl are plentifully represented in South Africa, being used chiefly for crossing purposes, and giving in this respect excellent results. They are a table fowl, and are not noted as layers. An Indian game cock crossed with a Buff Orpington makes an ideal cross. The "Leghorn" breed, of which there are several varieties, is best known through the "white." This bird lays practically all the year round, and though as chicks they are susceptible to disease, when full grown they are very hardy. Their eggs are large, and always command a ready market and a good price. They are, however, non-sitters. Other breeds, such as the "Houdans" (British), the "Langshans" (Asiatic), the "Minorcas" (Mediterranean), the "Plymouth Rocks" (American), and the "Spanish," we can but mention, and hasten to one of the latest breeds of fowl brought out by the Americans to this country. This is the Wyandotte, of which there are several varieties, the "Silvers" being the most popular. It is an excellent bird to keep, being tame, hardy, and docile, standing confinement well, and laying plentifully a fair-sized brown egg. The difficulty is to breed it with the correct markings on the plumage. Other varieties of this bird are the Golden, Buff, and White Wyandottes. To sum up, the Orpingtons, Leghorns, and Minorcas are the best layers of large eggs, while for table use the palm must be given to the Game and Wyandotte varieties.

When preparing birds for market a different system of feeding must be introduced, as the production of fat is the all-important point. Mealies and mealie meal should form the chief food, sufficient greenstuff being provided to keep them healthy. All cockerels when two months old should be separated from the opposite sex, and kept out of sight, as otherwise they fret, and as a consequence do not develop as they might. By separation they become fit for market when, say, five months old, and they should not be kept longer than six months unless required for breeding purposes. The many complaints of sickness amongst poultry comes mainly from those who are careless in the treatment of fowls. South Africa, let us say, possesses no monopoly in poultry disease, although diseased fowls are often exposed for sale on our morning markets. This cannot happen in Europe, and legislation is already provided in this country to check this evil, and the law should certainly be enforced. When sending to market only a few birds should be placed in a box, so as to present the best appearance, and the same precaution applies to eggs, which should bear date of production, and be placed in suitable boxes. As a result, the better prices realised compensate for any increase in the outlay. It is best to send "live" birds to market in preference to "trussed" birds, as the difference in the prices given for either is very little, and in the former case there is less doubt as to their freedom from disease, while the freshness of the living bird, which has, perhaps, travelled some distance, cannot of course be disputed. We may now pass to the consideration of "ducks," which form another branch of poultry farming. Compared with fowls, they are easier

to rear, being comparatively immune from disease, can shift for themselves sooner, and, most important of all advantages, can be turned into ready money at an age when fowls are still in their infancy, and, if reared opportunely for the market, realise big prices. The percentage of eggs hatched, however, whether by incubator, foster-hen, or the duck itself, does not compare favourably with that of fowls' eggs, though the profits accruing from duck "hatchings" are more favourable. The chief ailment to which a duck is subject is lameness, but this can be provided against by allowing ducklings to sleep on boarded floors. Cleanliness, as with fowls, is of course a *sine quâ non* of success. The best food for ducks is, at first, moistened bran, and after the first month an evening meal of wheat or oats soaked in water, accessory foods being, liver occasionally, greens and boiled vegetables, and grit. As it is the habit of ducks to lay before nine in the morning, it is necessary to shut them up overnight, as this provides against the eggs getting lost or falling a prey to rats. According to an expert in these matters, water is not essential to the well being of the duck, since they have been reared in times of severe drought, when all available ponds were dry. Indeed, they put on flesh more quickly when reared away from water, as exercise prevents them from fattening. They should be allowed a swim now and again for the sake of cleanliness, and on this latter ground should be kept apart from fowls.

We have thus said all that is possible concerning the poultry industry within the limits of this short article, though the subject is such an increasingly large one to deal with, that only a book devoted to a full treatise on this growing industry by a qualified expert, who could add the experience of other breeders to his own, could hope to do adequate justice to it.

It has been found that, by patience, perseverance, observation, and cleanliness, much has been accomplished by way of producing a good all-round class of bird, as well as excellent types for exhibition purposes. Much yet remains to be done in the way of co-operation and the successful combating of the various ailments—sometimes so fatal—to which fowls are subject; but there is every ground for believing that in the near future the produce of Cape Colony in poultry and eggs will materially reduce to proper proportions the present huge importation of these commodities into South Africa.

ZWARTKOPS RIVER, NEAR PORT ELIZABETH.

THE PROGRESS OF IRRIGATION.

ONE of the most important questions now prominently before the people of Cape Colony and on which the future of agriculture rests is that of irrigation. It is a matter for surprise that no attention was given to this subject until 1877, or 225 years after the first settlement of Europeans in South Africa, when the first Irrigation Act was passed: it had taken all this time for the light of intelligence to break through the hard wall of convention before the people began to realise the expediency of making provision for promoting the irrigation of lands, and for the preservation and storage of water. This earliest Act of Parliament, which provides for the formation of Irrigation Boards whereby farmers can combine and carry out organised schemes with the assistance of loans advanced by the Government, is composed of a tangle of statutes from which it requires considerable patience and skill to extract the law on any given point, and for this reason is detrimental, as it stands, to the interests of Water Courts and farmers alike. It was with the primary object of codifying and consolidating this Act that a Bill was introduced during the last session of Parliament. It provided for the correct definition of perennial and intermittent streams, a point which in the past has been the cause of much litigation and controversy; for the creation of River Boards, to be composed of riparian proprietors, whose function should be to conserve and regulate the water, and to see to it that the rights of irrigators were not transgressed; to offer protection to the user of flood waters on intermittent streams, so that the farmers whose lands these intersected could form themselves into a Board and grant permits for the use of the water, thus giving the holders protection and enabling them to carry out expensive works with the assurance that their labours would not be wasted; and it also provides for important modifications being effected in the powers of Government to lend money, and to borrow for this purpose the sum of half a million, which would be distributed in loans to farmers for irrigation purposes. Now the law already provides for the creation of Boards to carry out irrigation prospects, and of Water Courts; but these Boards have the character of being purely voluntary, so that if the farmers do not need them they are under no obligation to create them, and they can only be created if the majority of the farmers in the district concerned express their willingness to have them. The Government cannot force a Board upon a river, and where no difficulty concerning the distribution and conservation of water is experienced there would naturally be no Board. One objection to it is that in the case of some rivers a Board would be unwieldy, but this might be overcome by fixing the area of the river district at a manageable size; whilst, on the other hand, a district is faced with the alternative that unless one is formed, its streams may be proclaimed, and the control placed in the hands of the Director of Irrigation; in which case it would appear as if districts were forced to form Boards under the penalty of seeing their rivers taken out of their own hands. But it is authoritatively stated that no such menace has been thrown out by the Government. Rather is it their intention, on the contrary, to use this special power of proclamation only in exceptional cases, as, for instance, when rivers flow only partly within the boundaries of the Colony, such as the Orange and the Vaal, in which case, where the formation of a local Board would be difficult or impossible, the intervention of the State might be necessary. State control is held to be a risky and generally unwarrantable experiment, and as applied to the rivers of this country might do more harm than good; so that it is quite feasible to suppose that the Government, whose ultimate objective is the all-round prosperity of the Colony, would in case interference were found at any time necessary use their utmost discretion in deciding questions affecting the water rights of a district, and would be chary of running counter to the express wishes of the particular farming community concerned. The *raison d'être* of a River Board is to administer the river, and to see that the rights are not overstepped. They are the water-bailiffs, not the judges. To those districts which desire it they can give the power of organising themselves into a body for the administration of the river waters. The immediate effects of this common control may not be evident, but as a provision against future contingencies, the precedent of other countries where irrigation has developed to a great extent show it to be necessary. The objection raised by the Oudtshoorn farmers, who owing to the advanced state of irrigation works in the district are most likely to be effected by any legislation, detrimental or otherwise, to their interests, is that the proposed control by River Boards will make interested parties judges in their own cases, but in lodging it they seem to have forgotten that these Boards have no judicial standing, such authority resting with the Water Courts, and that riparian owners can appeal from the decisions of the former to these Courts, and if this did not meet the case, to the Supreme Court. Protection is certainly necessary in the interests of those irrigators who use the water of an intermittent stream to flood their lands withal, since farmers above them, as things at present rule, can make their dams useless by intercepting their rightful supply of water, thus putting them to great expense with barren results.

The formation of Water Courts is a vexed question, the opinion being held by some that they should replace the Boards, which they think are intricate, expensive, and unpractical; and by others, that the latter justify their existence on the grounds that if the former is to be given the right of using the flood waters of intermittent streams, it is only fair that the self-same right should be determined by a Board consisting of riparian owners, contending at the same time that its working is neither expensive nor intricate, but is likely to curtail expense, since the apportionment of flood water may be decided without litigation, unless a riparian owner objects to the ruling of the Board. This alternative, which seems to be commendable, would enable farmers to be trustees for their own river, and to combine with the object of exercising general supervision over the river in which they have a common interest.

The Irrigation Act of 1877 provides that owners of one-tenth of the land of any locality may petition the Governor to form an irrigation district. The Government engineer is then called upon to examine the scheme submitted, and if his report happens to be favourable, the irrigation district is duly constituted, always supposing the majority of owners of the land are in favour of it.

Each Board consists of from three to seven members elected by the landowners, thus forming a "body corporate," that can sue and be sued, hold property, and do everything which "bodies corporate" are permitted to do in the Colony. The law also gives extensive powers to the Board to enable it to carry out the necessary works, and to deal with recalcitrant owners, and invests it with full control of all rivers and streams in the district, while its officers and servants may, as occasion requires, enter upon and take possession of such lands and premises as are necessary to enable them to carry out the purposes of the Act. Without these powers, Robertson, for example, could not have completed its canal; the amicable adjustment of all claims being largely dependent on the powers of expropriation vested in the Board and their right to appeal to arbitration, which is a good object-lesson and proof of what co-operation can effect. The amended Bill, which is to come on in the forthcoming session of 1906, and which is now placed before the public so that its projected improvements and amplifications may be thoroughly digested, has been much simplified in the re-drafting, and its financial proposals have been made even more generous than hitherto. On the principle of granting subsidies, this measure will provide facilities for farmers whereby they can obtain large loans, repayable, principal and interest, at 6 per cent. on the security of their holdings; the expected outcome of this being to encourage more extensive irrigation schemes, for the erection of dams and weirs, where large quantities of river or surface water can be made available for irrigation purposes. Another provision is, that where five farmers and upwards combine to carry out schemes for water boring on their farms, loans will be advanced by Government on certain conditions, repayable by instalments, for the purchase of boring machinery, and a subsidy for each boring of 8s. per foot will be allowed, as well as the necessary technical advice in the purchase of drills.

Up to 1903 only two River Boards had been formed; one established seventeen years ago at Warrenton, on the Vaal River, which is still existing, the other at Robertson, on the Breede River. It is in connection with the latter example that we now propose to say a few words. The farmers of Robertson, recognising at last the value of the water which was running past their farms unutilised, formed an irrigation board, and thanks to their enterprise and the indomitable perseverance of Mr. T. E. Scaife, A.M.I.C.E., the Government Irrigation Engineer, they have now in full operation a canal twenty-one miles long, irrigating some 5,248 acres. It should be added that the Government certainly provided £33,000 to enable the farmers to construct it, but the "kudos" belongs to the energy of the latter, and to Mr. Scaife, who had charge of the work, and who, in the face of great difficulties, carried the canal across railway lines, roads and dongas, constructing it in a plain but serviceable manner. The effect of this achievement and the consequence of supplying tracts of land with water through its agency, is that the gain in prosperity to the farms which directly benefited by it is very marked. It is estimated that the increase in wealth due to the creation of this canal amounts to at least 33 per cent. during the last few years. The first meeting of the Board took place in 1898, and the valuation of the lands in Robertson, taken by the Divisional Council two years later, was £602,194, while a subsequent valuation taken in 1903 gave £795,095 as the true figures representing the opulence of the district, or an increase of capital in three years of £192,901. As more and more land since then has been brought under the influence of irrigation, Robertson must now be recognised as the second richest district in Cape Colony. With such a fine precedent to give them the necessary courage and enterprise, it will be surprising indeed if other districts do not follow this example, and in a few years time be enabled to challenge the distinction which Robertson, in company with Oudtshoorn, at present enjoys. To give some idea of the "growing capacity" of this district, it should be mentioned that, while last year the Transvaal imported £50,445 worth of potatoes, the Robertson district alone yielded this commodity to the value of £33,611. So, also, in comparing the importation of fresh vegetables into the Transvaal with those produced in the same district, we find that the former Colony imported £20,959 worth of vegetables, and Robertson £4,659 worth of onions alone. The advantage to farmers which has accrued owing to irrigation in this part of the Colony may, perhaps, be better realised by reference to the increase in land value. Ground which formerly was worth anything from £1 to £2 per morgen (something over two acres) is now valued at from £50 to £60 per morgen; and at Warrenton irrigated land returns up to £100 per acre per annum in value of produce, and is let at about £25 per morgen. At Douglas, Cape Colony, irrigable lots were sold in 1896 for £11 an acre, in 1897 the highest price paid was £94 an acre: while an official valuation of land at Swellendam placed it at £150 per acre. In short, it may be taken as a general rule that the effect of irrigation is to increase the purchase price of land by 100 per cent. in many cases, and by 75 per cent. as a safe average.

It is now necessary that we turn to the district of Oudtshoorn, which is so far *facile princeps* in the matter of irrigation. Hence has come the chief opposition to the Irrigation Bill of last session; and here it would appear as though what are termed the "wealthy upper proprietors" were running counter to the best interests of the district as a whole. It has been contended by a local critic that these gentlemen prefer water rights to go undefined and unregarded in case their own free use of the water should be questioned and fear lest the majority of the Oudtshoorn farmers might oppose them and curtail their accustomed use of the upper waters.

Though this article pretends neither to be controversial nor critical, but unbiassed in every respect, it would not be just to our readers were we not to set forth the case of Oudtshoorn and lay bare, as far as possible, its internal arrangements as affecting irrigation. To begin with, the view of the wealthy farmers as opposed to the farming community in this quarter (in some respects) is this: namely, that what the law purposes to establish has already been established there, and that Oudtshoorn has managed its water rights so nicely and with such a minimum of friction so far that the proposed Boards are not needed; nor is it held that further control is necessary, seeing that no complaints of infringements by landed proprietors of each others private water rights are heard. In other words, they fear "constant interference with private liberty," and the formation of River Boards; they fear taxation, though this is groundless; and they fear lest such a change should take place that would

give the lower proprietors a voice in the administration of the river. This, in short, is the case for or against the farming capitalists of that district. To decide these differences on their merits, as existing between the "upper proprietors" and the Government, and again, between the Government and the farmers as a whole, it will be necessary to review, shortly, the development of Oudtshoorn on irrigation lines.

It may be said, at the outset, that the ostrich has undoubtedly been the making of Oudtshoorn, and has enabled it to carry out the most elaborate and comprehensive system of irrigation farming which is to be met with anywhere in the world. And this is owing to the value of the bird itself as a producer of feathers for a brisk and constant market, and to its predilection for lucerne fodder, on which it thrives splendidly. This lucerne fostered and encouraged irrigation, not only as an easily-grown food for the ostrich, but quite as much on its own account as fetching good prices in distant markets. The people of the district have developed their own legislation on this complicated subject, and do not expect much benefit to accrue from Government interference; and one really very seldom hears of any dispute which cannot be and is not settled by local judgment. The system in vogue is one of division by arbitration. Formerly the riparian proprietors on the upper reaches of the stream were apt to appropriate as large a share as they could of the river water; now, however, the continuous action of arbitrators has removed this greedy tendency. The water is now divided between the riparian proprietors according to the amount of irrigable land on each property, the nature of the soil (some soils requiring more moisture than others) being always taken into consideration. This is managed by allowing each proprietor the use of the river waters for so many days, after which it passes to the next farmer, and so on to all who have a claim to them. When the river fails, the proprietor whose next turn it is to receive the waters takes the first flood that comes down. Thus a very fair division of the waters is secured, and this system is now so popular that nearly every stream in the district has been arbitrated on in like manner, and those which have not are bound to come under the system very shortly. In some cases the bulk of the arable land is held by one or a group of proprietors. The whole matter is then simplified; but in case of future sub-division, which is inevitable considering the growing values, the water question will be again on the *tapis*, and the division arranged as explained above. Some of the holdings are so large now as to prevent their efficient working under one head, and it looks as if the system of tenant-farming would again come into being. And if the depopulation of the district, owing to the economy of labour which the predominance of the ostrich industry over others enables the farmer to practise, can thereby be averted, and the people restored to the land, then it is "a consummation devoutly to be wished." True the system of tenant-farming is partly in use now, but on the "bywoner" principle, which makes a tenant work on shares, and is not so independent as a tenant paying a fixed rent, with a lease that gives him rights for a fixed period. When the tenant-farmer proper makes his appearance as a permanent feature of the Oudtshoorn district, it will be with certain defined rights as to the quantity of irrigation water he can consume, and these rights must be dependent on the flow of the streams, so that the present system, which is working well and is popular, may not be interfered with. From the foregoing it is obvious that the solution to this intricate problem of irrigation lies in allowing the proprietors to apportion the waters on each stream themselves; and if, by securing the services of skilled advisers, and cheap loans on business lines from the Government, who should appoint scientific agriculturists in charge of irrigation farms—if, by these means, and by the establishment of an experimental irrigation farm on each large main stream, where farmers could see for themselves the results of experiments, their opposition to things scientific and their suspicion of outside intervention can be overcome, then the problem is a problem no longer, and smooth working is assured for the future.

A big scheme, necessarily, takes a long time to carry out, and there is no reason why small undertakings should be kept back while it matures, but every reason why smaller ones should be rapidly pushed forward; and given the right men (experienced irrigation engineers and scientific agriculturists), well paid and having a free hand yet standing on their merits, immediate returns would begin to come in as the result of such enterprise. A farmer starting on an undeveloped farm with very little capital would, if he were wise, and were obliged to choose the most utilitarian of several desirable improvements, select and carry out those which would give the quickest return on the outlay, leaving for the future such developments as would only yield a profit after long investment. And, since money is scarce, not only with the farmer but the Government to boot, both would do well to consider the advocacy of investment on these lines in the matter of irrigation. These are the sensible views of Mr. C. E. Lawford, of Cradock, who has perhaps the finest grip on the requirements of irrigators. So that we can say with him in reviewing the situation at Oudtshoorn, is a comprehensive Irrigation Act a necessity? Given the requisite amount of self-help and self-reliance, and providing the example of Oudtshoorn farmers, who have done well under existing circumstances and would have doubtless done better had cheap money and skilled advisers been available in the past, is closely followed, there is no reason in the world why other farming communities possessing similar facilities should not carry on plenty of irrigation without being embarrassed by any further provisions in the shape of "law." However, it is for the future to decide whether the want of further legislation accounts for the disabilities under which agriculture is labouring, and the backwardness which characterises it, or the want of advantageous loans, and sound scientific advice.

The simple methods adopted by irrigators in the construction of their weirs and dams in the Oudtshoorn district might not appeal to the trained mathematical ingenuity of an engineer, yet are as effective as more pretentious works costing much more money claim to be. The commonest form of dam or weir met with as employed for turning the water out of the streams on to the lands is a very primitive and somewhat unsubstantial structure. It consists, for the most part, of a layer of bushes trailed into the stream, and weighted down with stones and rubble, so as to form a rough barrier. This in time becomes compact and, if not washed away, forms a fairly substantial weir, sufficient to turn the water aside without interfering with the flow of the main stream. The longer it stands, the more

durable in becomes, owing to the constant accretions of silt which comes down with every flood, and serves to fill up the crevices with a cement-like material. Should it happen to be washed away by a freshet, the cost of renovation is very little, as a couple of boys with a few bushes and stones can replace the whole structure in a few hours, and the material for this being handy, the cost of transport is negligeable.

The bush weir, however, is not satisfactory when a river having an unstable bottom has to be dealt with. In a river like the Grobbelaars it answers well, but in the Oliphants other treatment is necessary. The bed of the latter river is friable, loose, and not very stoney, so that it is more difficult to get a firm foundation. The chief difficulty experienced is to get any material to resist the action of the water, short of solid masonry sunk to a great depth in the bed of the river. It was the invention of the ingenious contrivance known as the "Wire Dam" which saved the situation. This consists of a large tough net made of fencing wire, and anchored in the bed of the stream. Into this net stones and rubbish are thrown until it contains sufficient to form a barrier of a required height. The end of the net is then turned over and made fast, thus securing the whole body, which relies chiefly on its weight to hold it in position. These weirs seldom give way, and have proved highly satisfactory where loose sands have to be contended with. Though science may replace them by other contrivances at some future time, at present they answer the purpose, and hold their own with the best. We pass now to what in some parts of Cape Colony constitutes a serious hindrance to the irrigation of land. This is "brak," or the brine resulting from evaporation. It is specially prevalent in the Karoo, existing either in the soil or in the permanent water; and in the case of the Government weir at Van Wyk's Vlei has foiled all attempts at irrigation. We have, again, the opinion of Mr. Lawford as to the best way of coping with this disadvantage. He is of opinion that the permanent success or failure of irrigation in the presence of "brak" depends entirely upon the kinds of crops grown, on the methods of irrigating employed, on the amount of cultivation given to the crops, and on the nature of the drainage—whether artificially or naturally underground. It is easy to prevent the accumulation of "brak," but once accumulated, difficult, expensive, and tedious to eliminate it. As it is the result of evaporation, the first step is to stop evaporation as much as possible. There are three known ways of effecting this. The first is by only growing such crops as will afford the greatest amount of shade for the longest time in the year; the second is to apply water as seldom as possible to the surface; and thirdly, when applied, to cultivate the top three or four inches of soil after each watering, and thus stop capillary attraction and prevent the moisture rising from below. The best plant for the first requirement is lucerne, as it gives a shade all the year round when not cut excessively. It also answers the second requirement admirably, as, being one of the most deep rooted of fodder plants, it requires heavy waterings which sink down deep, and are thus out of the reach of the two great evaporating agents—sun and wind. Provided good watering is given, the roots will strike through almost any soil and will draw sufficient water for a crop to last long after the final flooding. The third requirement is, so far, not forthcoming, but is in the nature of a cultivator suitable for loosening the surface of the lucerne beds after each watering. The spring tooth harrow at present employed to effect this is not quite satisfactory, and though the American tooth disc has given good results, it falls short of the exact requirements of the district, and thus leaves a field open for the inventive powers of an agricultural society.

Some valuable statistics have been collected showing the revolution that irrigation works in the producing capacity of a farm. In these, compiled by Mr. Braine, A.M.I.C.E., of the Irrigation Department, it is discovered that one acre of lucerne will fatten 70 sheep a year, and good lucerne fields will carry five ostriches to an acre per annum. As each bird yields an average of £4 10s. worth of feathers a year, the return per acre per annnm is £22 10s. Lucerne will yield 1 to 1¾ tons of hay per cutting, and gives five to nine cuttings a year; so that, including the cost of labour assessed at £1 10s., the total return per acre per annum amounts to £18 10s. The value of lucerne for winter grazing has also to be considered. At the end of 1904 lucerne hay was selling at £9 a ton in Johannesburg, and last March at £8 per ton, while it often realises £7 a ton in Cape Colony. Lucerne seems to possess every advantage necessary to make it lucrative to the grower. It is seldom touched by locusts or eaten by mice and rats; hail does not destroy it, and its nutritive value is higher than that of oat hay. The instance of a Graaf Reinet farmer is cited as showing what a boon it can prove, for, during a severe drought, he made £1,300 in six months by fattening wethers on 150 acres of lucerne, and £700 from butter. Deducting £120 for expenses, a net profit remained to him of £1,880 in six months, all made while his neighbours were losing heavily. It is estimated that good arable land laid down in lucerne and irrigated with flood water is worth from £60 to £80 per acre, while if under permanent water it would be worth double. Another farmer, who has a storage reservoir of some 25,000,000 gallons, states that his farm has doubled in value, and that he is making twice the profit that he did formerly, although his works are in their infancy. These two examples must suffice to show the marvellous capabilities of a farm if properly watered. Tobacco will produce 2,000 lbs. per acre in suitable soil if irrigation can be relied on; wheat will yield from 130- to 150-fold in favourable localities, and potatoes at New Bethesda have run from 90 to 150 bags of 150 lbs. each to the acre. Now, as to the future of irrigation, the amount per acre that can be legitimately expended for the construction of irrigation works is still a moot question. Each project must be considered on its own merits, and the question should be decided on a purely commercial basis. Small schemes, it is held, can stand a much higher cost per acre for construction than would be justified on larger works commanding extensive areas. If a farmer owns dry land worth 10s. an acre, and knows that he can sell it at £25 an acre when irrigated, he could spend £20 an acre on works, and still realise a higher profit than was possible originally. It may be a safe estimate to assume that the cost of construction on the most promising schemes may be taken as the future value of the irrigated land, less an allowance for a sinking fund, insurance, and profit. This would not hold good, however, for large works.

In conclusion, it should be emphasised that there is no country in the world in which an irrigable acre is such a valuable asset as in Cape Colony, or where such a large expenditure is justified in order to bring an irrigable acre under cultivation.

THE COACH AND WAGON INDUSTRY.

ONE of the important industries carried on at the Cape is that of vehicle making. The centre of this industry may be regarded as located in the Paarl district, where all kinds of wheeled vehicles, such as carriages, carts, coaches, and wagons are extensively manufactured. One firm alone, of which Mr. J. P. Retief is the principal, employs nearly 200 hands, while their wages bill totals something like £20,000 a year. This firm owns the largest factory in South Africa. Like other industries, this has suffered owing to a large reduction in the duty on the imported vehicle. Before the Customs Convention of 1903 it was 20 per cent., and this was found too little; after that date the duty was still further taken off till it stood at 12½ per cent., which made it impossible for the colonial manufacturer to compete successfully. The result of this ill-advised reduction was to lessen the output by half. The new tariff which has just come into force, however, has more than restored the old protection, a duty of 25 per cent. having been imposed on all first-class work entering the Colony, while second-hand carriages, &c., are unfortunately rated at 10 per cent., which is not sufficient, as a large quantity of these are imported renovated and polished up to look like new, and sold at a low price. This has provided the needful protection to all local makers to compete favourably with the imported article, and will permit of the employment of a great deal more labour engaged in the industry. America has heretofore been the principal and most dangerous competitor, because this country is in a position to supply the Cape market at a very cheap rate, and it imports vehicles in three distinct grades, the first of which is good, but has not the durability of the same class of vehicle produced in the Paarl.

Nearly half of the wood used here is imported, which is true also of much of the leather. The colonial leather is used principally for cushions. As much wood as can be procured in the Colony enters into the manufacture of vehicles, but the supply is not sufficient, while it is very difficult sometimes to get the right sort of timber required. Stinkwood, for instance, though excellent and comparing very favourably with foreign timber of the same character, has faults which prejudice its general use by the wagon builder. The planks into which it is cut are three inches thick and liable to get warped or bent, it has to be stored for three years before it is fit for use, and the price is about one shilling dearer than the American ash. Soft woods, however, are largely used in the structure of wagons, and are procured from the vast Knysna forests. But the supply of these is restricted owing to the Government reserve, which allows for a certain quantity being cut per season and no more, so that the manufacturer is obliged to fall back on foreign timber in order to fulfil his requirements. For the upholstering of carriages, &c., the best leather (American split-hides) is used. Colonial hides, if those tanned by Mossop and Garland be excepted, do not come up to the necessary standard for the best class of work, while even the best colonial hides cannot compete with American skins in price. No enamelled leather is made here as it comes in free of duty.

There are, in all, about twenty-five cart builders between Cape Town and Wynberg, employing a very large number of men, while in addition to Paarl, there are carriage works at Wellington and Oudtshoorn. Much of the labour is imported; for this a big price has to be paid. In Great Britain the average wage is 35s. per week, whilst at the Cape it is £3 12s., or more than double as much. Then employers can never rely on sufficiency of labour, for as soon as the industry receives a stimulus up country, they are left absolutely without men for the simple reason that they cannot afford to pay the standard wage ruling in Johannesburg. Regarding the trade, there is an increase in the matter of repairs, but a decrease in the building of new vehicles, owing to the large number of "second-hand" which flood the market.

There is no doubt that the colonial-made vehicle is better adapted to this country than the imported article, because the climate in England being moist, when it arrives in a dry country like South Africa it is liable to shrinkage, and this difficulty is experienced even by Cape manufacturers when sending vehicles up to drier parts of the Continent. This forms a distinct argument in favour of protecting and encouraging the local trade. In the matter of excellence, the Cape article compares equally with that made in America or England, being if anything more durable, and evincing workmanship of a highly-finished character.

Besides the districts before mentioned, the industry is well represented also at Knysna, where most of the timber available for manufacture is at present grown, between forty and fifty distinct kinds passing through the mills. Many of these, such as the stinkwood, the white and the red wood, yellow-wood and boxwood, the latter being exported in large quantities to England and the Continent for the manufacture of weavers' shuttles and such-like uses. The stinkwood, which is chiefly used for wagon and cart building, is also shipped in enormous quantities.

Amongst the saw-mills which are established at Knysna must be mentioned those belonging to Messrs. Thesen & Co., who own the first large stores one sees when approaching the town. Their mills give employment to hundreds of men, while they possess numberless wagons loaded with huge piles of timber. The Bracken Hill Mills which they own are situated about eight miles from Knysna, and are surrounded by high hills, covering an area of some twenty acres. Here may be seen piles of sawn timber and gigantic tree trunks, while inside the large sheds great circular, cross-cut, and horizontal saws cut their way through the logs, causing a din that makes speech unintelligible. The most up-to-date labour-saving appliances are employed, including an ingenious contrivance for sharpening saws, and planing machines which plane, tongue and groove in one operation. An overhead crane with a carrying capacity of five tons conveys timber from one machine to another. In an adjoining building are a number of wheelwright machines and turning lathes, all of the latest American pattern, for cart and wagon building forms one of the most

important branches of the firm, and upwards of 1,500 spokes a day are turned out with ease in a finished condition. In the mills situated in the main forest some ten miles from Knysna the raw timber is dealt with. Several well-built wooden cottages occupied by the timber-cutters and their families help to form a picturesque little village in the heart of the lonely forest.

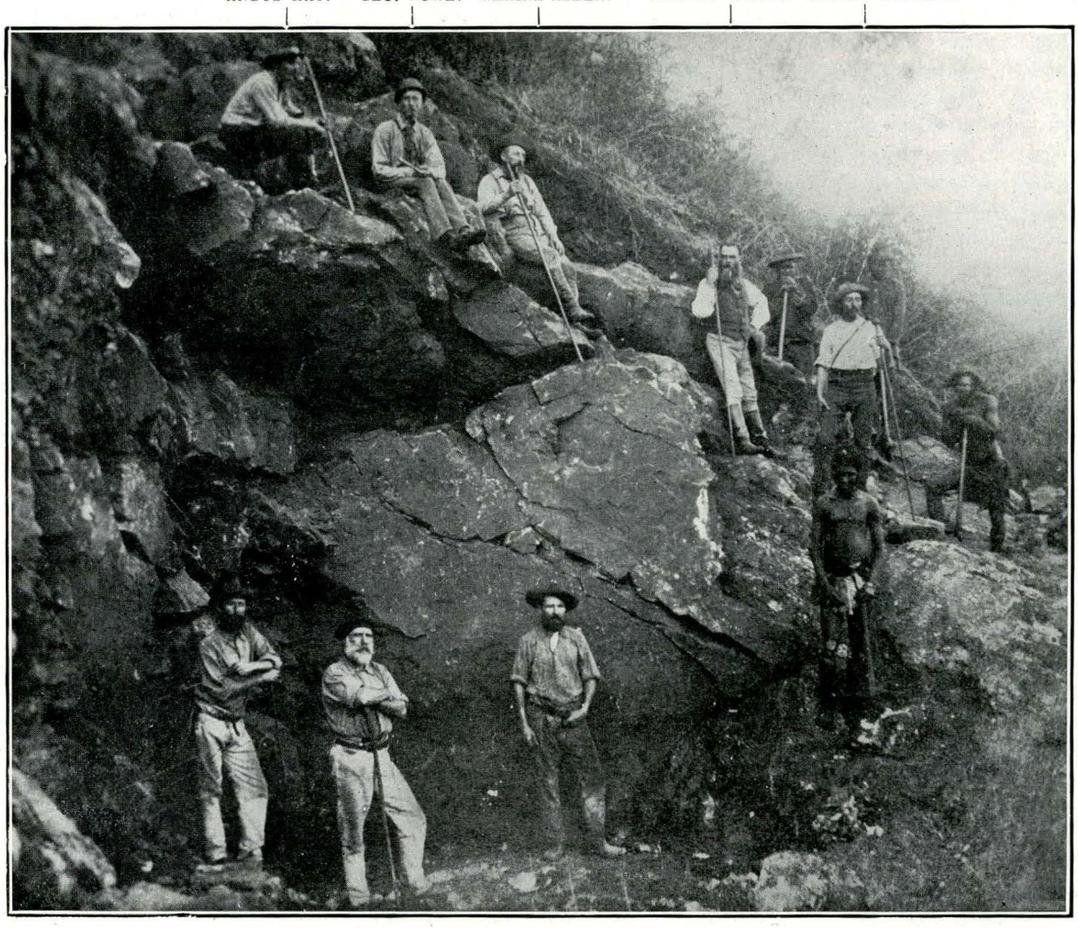
The above mills belong to Mr. Templeman, who also owns town mills which are a model of efficiency and compactness.

The well-known firm of Mr. George Parkes owns 8,000 acres of forest in the vicinity of Knysna. In his mills he manufactures pick-handles, dressed wagon-wood, hoes, rakes, and spades in large quantities, as well as all kinds of furniture. The principal articles manufactured are rough and finished spokes, of which this firm stocks 60,000 at a time. Amongst other ingenious contrivances employed in Mr. Parkes' works is the "Defiance" Spoke Lathe, which by the fixing of different dies to the driving spindle can turn out spokes, pick, hammer and shovel handles with bewildering rapidity. In the main forest is the Rudebrandt Mill, which also belongs to the firm. The more valuable varieties of timber are conserved in preference to sacrificing them to present day demands, for though the timber area is a large one, the constant removal of any particular kind would mean its ultimate extinction.

With commendable forethought, therefore, the output is restricted and fresh trees are planted, thus building up a valuable asset for future generations.

THE SHEBA MINE, 1886.

ANGUS HAY. GEO. ROWE. THAINE ALLEN. ANDREW OCHSE. LIONEL PHILLIPS.



EDWIN BRAY (discoverer).

THE DIAMOND INDUSTRY.

IN the early spring of 1867, a son of a Boer named Daniel Jacobs, who had a small farm on the banks of the Orange River near Hopetown, came home one day with a pocketful of pebbles, which, with other children, he had picked up while playing near the edge of the river, and dropped them on the farmhouse floor. These many coloured stones included garnets, carnelians, jasper, agates, chalcedony, and lastly, though up to this time its existence was not suspected—a diamond. They were a common sight in the yard and floor of the farmhouse, and so this particular lot received little attention from the plodding Boers. But when the children tossed the stones about, the little white pebble so sparkled in the sunlight that it caught the eye of the farmer's wife. She was not sufficiently curious to pick it up, but spoke of it as a singular stone to a neighbour named Schalk van Niekerk. When the latter requested to see it it could not at once be found as the children had rolled it away somewhere in the yard. It was searched for and discovered however, and when van Niekerk wiped off the dust the stone scintillated so attractively that, on the possible chance of its turning out to be valuable, he offered to buy it. The good vrouw laughed at the idea of selling a pebble, and allowed him to keep it. He put the stone into the hands of a travelling trader, called John O'Reilly, who undertook to find what kind of crystal it was, and whether it had any value. After showing the stone to several Jews in Hopetown and Colesberg who refused to have anything to do with it, he was thinking of throwing it away when it came under the eye of Mr. Lorenzo Boyes, Civil Commissioner at Colesberg, who found that it would scratch glass, and observed that he thought it was a real diamond. This surmise was turned into a certainty, subsequently, by Dr. W. G. Atherstone, the foremost mineralogist of the Colony, who after applying the usual tests, wrote congratulating Mr. Boyes on his possession, assuring him that it was a veritable diamond weighing twenty-one and a quarter carats, and worth £500. The determination was so positive, and the expertness of the examiner so incontrovertible, that Sir Philip Wodehouse, the Governor at the Cape, bought the rough diamond at once at the value fixed by Dr. Atherstone. The stone was sent to the Paris Exhibition, but though it was viewed with much interest it caused no sensation, owing to the fact that diamonds had prior to this been found in a bed of pebbles, yet had not proved the precursor of any considerable diamond deposits. Though Mr. Boyes searched diligently for more stones his efforts were unrewarded, and though the farmers were now sharply observant of every heap of pebbles in the hope of finding one of the precious "blink klippe," or bright stones, it was ten months before a second diamond was dicovered, and this in a spot more than 30 miles away on the river bank below the junction of the Vaal and Orange Rivers. From the Orange River the search then proceeded up the Vaal, where the beds of pebbles were more common and beautiful. The eyes of the natives were much keener in such a quest than those of the phlegmatic Boer, who scarcely troubled to stoop for the faint chance of finding a diamond. It was not until the year 1868 that a few more diamonds were picked up on the banks of the Vaal by some quick-sighted Koranas. The advance of discovery, however, was so slow and disappointing that people began to grow sceptical of the cheering prediction of Dr. Atherstone, who was convinced of the presence of large diamondiferous beds from the outset. Some gravely asserted that any diamonds in that field must have been carried there from some distant part in the gizzards of ostriches, and that any further search was unjustified. Dr. Atherstone, however, clung manfully to his prediction and warmly advocated extensive geological research, and a thorough scientific examination of the country, which he hoped the Home Government would authorise, as the Colonial Exchequer was "too poor to admit of it."

No official response came to this excellent suggestion, neither was Government exploration needed; for in March 1869 a superb white diamond, weighing 83½ carats, was picked up by a Griqua shepherd boy on the farm Zendfontein, near the Orange River. Schalk van Niekerk bought this stone for a huge price in the eyes of the poor shepherd—500 sheep, 10 oxen, and a horse; but the lucky purchaser was soon able to sell it easily for £11,200 to Lilienfeld Brothers, of Hopetown, and it was subsequently purchased by Earl Dudley for £25,000. This wonderful gem, which soon became famous as "the Star of South Africa," naturally drew all eyes to a field which could yield such products, and the existence and positions of diamond beds was soon further assured and defined by the finding of many smaller stones in the alluvial gravel on the banks of the Vaal. For a stretch of a hundred miles above the Mission Station, at Pniel, the river flows through a series of rocky ridges, rolling back from either bank to a tract of grassy, undulating plains. It was along this stretch that the first considerable deposit of diamonds in South Africa was uncovered. The first systematic digging and sifting of the ground was begun by a party of prospectors from Natal at the Mission Station of Hebron. This was the forerunner of the second Great Trek to the Vaal from the Cape, consisting of a flock of adventurers "that spread down the stream like a locust swarm, amazing the natives, worrying the missionaries, and agitating the pioneer republics on the north and east." Nearly every race, profession, and trade were represented in this crowd of diamond-seekers, and the dress they wore ranged from oilskins to woollen shirts and corduroys.

At the time of the discovery of diamonds on the banks of the Vaal River there was no better method known for the extraction of diamonds than the shovel of the Indian, the batea of the Brazilian, or the cradle of the gold miner.

The early comers picked out irregular patches of ground at will, and prospected on any unoccupied spot along the river bank. There was no fixed limit to the size of a claim. One party would pounce on a whole hillock, like the prolific "Natal Kopje," and another would occupy a hundred feet or more of shore line.

The enticing yield of the Natal Kopje drew preference to claims around it, and the product of other neighbouring places was so enticing that the larger mass of the diggers concentrated at Klip Drift. This massing made

it necessary to define the limits of ground which a digger could reserve for his own working, to decide which a "Diggers' Committee" was chosen by the prospectors, which made simple regulations to control the working of the river diggings. The method in force for treating the diamond-bearing soil was the following: the mixed gravel and sand was shovelled into wheelbarrows and carts and taken to the river's edge. Here it was dumped into heaps on the ground, or in troughs sunk in the bank. The gravel was then washed in cradles with two or three screens of perforated metal, so set as to form partitions, with discharge holes graduated so that the larger stones were retained above the upper and coarse screen, while the lighter stuff flowed out through the lower and finer screen holes. When the worthless stones had been picked out, the remaining concentrate was carried to the sorting table and spread out for examination.

The miners were so orderly and tenacious of their rights that there was little "claim jumping" or wrangling. To neglect a claim for three days meant its forfeiture by the owner, and the ground was open for the issue of a new certificate to the first claimant. It was soon understood that such diamond placer digging was inevitably a gambling speculation, and therefore few complained of their hard luck or grudged success to others more fortunate. When the Boer farmers came to the fields they often brought their families with them, and it was a common sight to see father and sons digging and washing together, while the mother and daughters sat on the ground industriously picking over a layer of pebbles.

When the choice locations on the Klip Drift bank were taken, the influx, which was continual, spread up and down the river and little camps sprang up at Gong-Gong, Blue Jacket, Larkin's Flat, Union Kopji, and other placer diggings, extending from Hebron 20 miles north-east of Klip Drift to Sefonell's, 60 miles west. About ten thousand diggers, both white and black, were thus stretched along the river in this string of camps, as well as in roving parties of prospectors. The digging went on quietly at Klip Drift and the miners were well content with their own simple regulations, until news reached the various camps which set them in an uproar. This was in the nature of a grant made by President Pretorius and the Executive Council of the Transvaal Republic to a firm of three privileged persons for the exclusive right to search for diamonds in the territory of the Republic for a term of twenty years from June 22nd, 1870, subject to a royalty of 6 per cent. on the value of all diamonds discovered. The instant effect of this grant was a universal rising and mass meeting of the Klip Drift camp, and the declaration of the foundation of another free and independent Republic in the Vaal, of which Theodore Parker, one of the leading adventurers, was chosen President. This menace was not without its effect on the Transvaal Republic, which eventually refrained from any attempt to contest its rights either by parley or force of arms. The crowd of diamond-seekers soon after this migrated to the Pniel bank which was opposite Klip Drift. The land thus entered upon belonged to the Pniel Mission, who protested against the intrusion, but appeared to be satisfied when the Berlin Society obtained the licence fee from the diggers on the Pniel field. Diamonds were found so plentifully here that the camp in a few months rivalled Klip Drift in size. Small stone, brick, and iron buildings for stores and other uses were erected in rows along the main street in the heart of Klip Drift camp, which was called Campbell Street. Butchers, bakers, and grocers opened shops, and restaurants offered cheap meals at 2s. 6d. per day, a tavern and lodging house accommodated travellers and regular boarders, diamond brokers sat ready to judge and buy rough diamonds for export, a music hall had a show every week-day night, and a small church welcomed all comers to its Sunday services. Following these discoveries came others, notably at Jagersfontein and Dutoitspan. An overseer on the farm of Johannes Visser noticed small garnets and pebbles of agate sprinkled about in a spruit which was dry for the greater part of the year. Having heard that these were an indication of the presence of diamonds, he set to work and sifted some gravel. At a depth of six feet he discovered a diamond of fifty carats. The news of this being soon noised abroad brought hundreds to the new diamond field. It did not justify all expectations, however, as the diamonds were few and far between. In September 1870 a still more remarkable discovery took place at Dutoitspan on the farm of Dorstfontein, about 20 miles south-east of Pniel and Klip Drift on the Vaal. The farm belonged to van Wyk, who when the rush to his property took place, issued licences at a charge of 7s. 6d. monthly for every allotted claim of 30 feet square.

Now it was the turn of the Free State to step in and assert its sovereignty, by making the holding of any claim illegal except by a Free State burgher or farmer. This requirement was easily evaded, however, by the transfer of licences granted to Free State citizens. In addition to this, the spread of the news brought such a rush of people to the Diamond Fields that the little Republic soon became powerless to enforce any such restriction. Van Wyk was prevailed upon without much difficulty to sell his farm to the predecessors of the London and South African Exploration Company for £2,600, which was a fortune to the simple farmer more tangible than the chance glitter of diamonds. The prospectors soon spread to the neighbouring farm of Bultfontein, owned by Cornelius du Plovy, who sold it to Thomas Lynch, a Free State speculator, for £2,000. The purchase of this property on Sunday was the cause of a law suit, in which Lynch claimed £10,000 damages from du Plovy, who had resold his farm to Leopold Lilienfeld and others on the pretence that a sale on the Sabbath was illegal. Lynch won his case, and obtained a judgment for £500 and costs on August 19th, 1872. Du Plovy then sued Lilienfeld, who had prevailed on him to resell, and obtained judgment for £760 19s. 1d. and costs on February 12th, 1893. Both Bultfontein and Dorstfontein eventually became the property of the South African Exploration Company.

The first prospectors on the new ground supposed that the diamonds of Dutoitspan were simply a sprinkling strewn through a sand wash like the river-shore deposit. When they struck an underlying stratum of limestone with streaks of greenish shale, at a depth of two feet or so, they thought that this corresponded with the known bed-rock of the placers along the Vaal; but they were mistaken. After many claims had been ransacked and abandoned, one of the workers in an elevated ridge was curious to see what might possibly lie hidden underneath the stratum of limestone, so he cut a few feet through the rock and found that the limestone grew rotten and soft, and split easily when struck. This

rotten rock fused soon with a decomposed breccia of a yellowish colour, and the sifting of this ground revealed to his atonished eyes the presence of diamonds sparkling on his sieve and on the sorting table. The diggers then all rushed back, and covered every patch of unoccupied ground. Subsequent discoveries were then made on De Beer's farm, "Vooruitzigt," near Dutoitspan; and at New Rush or Colesberg Kopje, which was afterwards known as Kimberley Mine, in honour of the British Secretary for the Colonies. "Only a few months from the day when the first diamond was found near du Toit's pan," wrote Mr. Gardner Williams, "the camp at Dorstfontein was proudly claiming the title of 'the City of the Pan.' A spacious market square was laid out on the ground between the pan and the ridge covered with diamond diggers, and around this square were ranged the white walls of the camp. Streets radiating from the central square gave open access to the market-place, and the white tent blocks were soon dotted near the square with shops of brick, iron, and wood, rivalling the pioneer diamond digging town of Klip Drift on the Vaal."

Klip Drift, in fact, soon began to wane in popularity, and the dry-diggings in 1871 has gained an undoubted pre-eminence. The rise of the camps at Kimberley and De Beers was even more rapid than the growth of Dorstfontein and Bultfontein farms. No regular working took place in the De Beers diggings before May 1871. Three months after the rush to Kimberley began, Colesberg Kopje was the centre of a vast encampment made up of streets, and stores built of iron and brick. By the determination of the limits of Griqualand West the diggings of Bultfontein and Alexandersfontein, as well as the chief camps, became part of the British Colonial domain. So far the "yellow ground" only had been explored, the deposit being enclosed in a oval-shaped funnel of shale, which the miners called "reef." This reef contained no diamonds, and marked the limits of profitable prospecting. When, however, the bottom of the "yellow ground" was reached at a depth of about sixty feet, it was found that the underlying rock commonly known as "blue ground" was also diamond bearing. By exposure to the elements this blue rock quickly decomposed, and permitted of its precious contents being extracted by sifting. The workings now developed into open quarries from which the "blue ground" was excavated. The output of diamonds increased enormously, so much so that in 1871 some forty to fifty thousand pounds worth of diamonds were being extracted weekly from the Colesberg Kopje alone; while the best claims rose in value from £100 or less to £4,000. One poor Dutchman who bought half a claim for £50 found diamonds after two months working to the value of £15,000 or more, and innumerable instances could be quoted showing the great increase in output and the rise in value of diamond claims. The surface area covered by claims was much larger than the diamond-yielding ground, whose total extent was about 70 acres. When the claims were afterwards consolidated by purchase, the Kimberley open mine surface was reckoned to be 33 acres; De Beers, 22 acres; Dutoitspan, 45 acres; and Bultfontein, 36 acres. Only a few diamonds were found outside of the rim of "reef" enclosing the diamond bearing craters. The Kimberley Mine in 1872 had become an open oval quarry about 1,000 feet in length and 600 feet in extreme width. From this date onward the introduction of suitable and more modern machinery took place to cope with the increasing scope and depth of the workings. Hauling ropes of hemp, and later of steel, to which were attached buckets of raw-hide were employed. These were worked by windlasses set on platforms, the ropes passing over guide-wheels and running back to the workings by force of gravity. So thickly together were these lines set that the face of the vast pit looked like nothing so much as a monstrous cobweb, and it shone in the moonlight as though every filament were a silver strand. When the mine was deepened "horse-whims," introduced in 1874, were gradually substituted for hand-tackle in hoisting and lowering the buckets, which were large tubs holding six cubic feet of blue ground.

In 1875 the first steam winding engine was employed at the mines. This represented the first application of modern mining methods to the South African Diamond Fields. Then followed steam washing gear. The mining camps changed year by year, more completely to the appearance of thriving mining towns. De Beers fused with De Beers New Rush in the town of Kimberley, while the town of Dutoitspan rose on its camp site two miles away. Diamond stealing and illicit diamond buying were, beyond all doubt, the worst plague of the camps and towns at this time. The strictest oversight could not prevent it, and as the natives were allowed to roam freely after their day's work was done, they could easily transfer diamonds to the hands of the sharpers. It was impossible to trace a stolen diamond even when the theft was known, and great quantities of diamonds were clandestinely bought and carried to the coast towns for sale, or forwarded to foreign markets.

Now, it was years before the acquisition of more than two claims by one person was tolerated. The spirit of democracy ruled supreme in that "No Man's Land," and the authority of the imperial sovereignty was hardly felt. The representative "Diggers' Committee" was merely the executive hand of the body of prospectors. But there came a time when imperious necessity forced the further consolidation of claims when the mines had reached a depth that made patch-working impracticable. In this mass movement and equalising of opportunity the rise and display of strong individuality were necessarily subdued and slow to appear. But now the brains capable of great conceptions and performances found pressing occasion for all their foresight and energy; since the way was at length clear for individual assertion, influence, and distinction. One of the men who could lay claim afterwards to all these qualities was Barnett Isaacs, otherwise "Barney Barnato," who came to South Africa in 1873; another was Cecil John Rhodes, and still another, Mr. Alfred Beit. The two former started abreast in the race for fortune on the same track. In the same year, 1873, Rhodes, then a stripling, united his claims in De Beers Mine with those of C. D. Rudd, and together they slowly increased their holdings. Robert Graham joined them in 1874, and later on Runchman, Hoskins and Puzey took part with them in the purchase of Baxters' Buildings. This combination, in addition to mining their own ground, took pumping contracts to drain the mine. There were also other competitors for the purchase of claims, such as Dunsmore and Alderson, and Stow and English. These three firms gradually acquired all the best ground in De Beers Mines, except the Elma Company, the Victoria Company, and the Union Diamond

Mining Company. The De Beers Mining Company was formed on the 1st of April 1880, with a capital of £200,000, by the union of the three firms first mentioned. It progressed rapidly and successfully, extending its range of ownership, absorbing step by step its neighbours, and finally standing out pre-eminent in March 1885 with a capital of £841,550, on which dividends of 7½ per cent. had been paid during the last fiscal year, despite the heavy charges of development work, and the inevitable obstructions to mining operations. Mr. Rhodes and Mr. Rudd, at one time, had the offer of the whole De Beers Mine for £6,000, but after a day's careful consideration they decided not to finance it.

For nearly six years Rhodes concentrated his efforts in the Diamond Fields towards obtaining the complete control of De Beers Mine by himself and his chosen friends, and he brought about the consolidation of all the holdings in May 1887. His master mind was bent steadfastly on the attainment of the control, development and output of the four great diamond producing mines of South Africa, and his work of first uniting all the interests in De Beers Mine was only the initial phase of his great dream of amalgamation.

The range for amalgamation of the four mines was so great that no single man, however ambitious, could hope to cover it by any single-handed effort. The consolidation of all the companies in the De Beers Mine was on the lines conceived by Rhodes, and carried out with the help given him by the leading men interested in the various companies.

Then commenced the great rivalry between Rhodes and Barney Barnato, for, up to this time, the former had not attempted to get a footing in the Kimberley Mine. Rhodes wanted money for purposes of Imperial expansion in Central Africa; Barnato had no higher ambition than that of being the foremost operator in these marvellous Diamond Fields. That was the difference between them. Both were astute financiers, and a hard fight for predominance ensued. Rhodes negotiated with Lord Rothschild for the supply of funds to purchase the French Company in the Kimberley Mine; this he did to prevent the amalgamation of all the interests in that mine, which might then set up as an independent company in conflict with the interest of De Beers. The negotiations with Lord Rothschild proved successful. The loan was advanced, and the French Company bought in for £1,400,000, including all assets. As soon as this was accomplished, and when Rhodes had amalgamated his interests, after a hard but indomitable struggle, with the Kimberley Central Company so as to prevent the flooding of the market with diamonds, and the consequent depreciation in their value, he found that the management of this company was headstrong in its determination to run the Kimberley Mine in rivalry with De Beers. This was opposed to his conviction that monopoly was the essence of success in diamond-mining, for Kimberley and De Beers mines together could produce far more diamonds than the world would take. At length he decided that the only feasible plan was to buy a controlling interest in the Central Company, this required £2,000,000 sterling, and it was due to the hearty co-operation of Mr. Beit, who possessed an unequalled command of capital for such undertakings, that Rhodes was enabled to fight Barney Barnato to a standstill, in the bidding which ensued between them for the control of the Company. At last Barnato capitulated, and accepted an offer of an equivalent number of De Beers shares at the current rates of shares on the day of the sale in lieu of his interest in the Kimberley Central Company. This bargain with Barnato gave De Beers the control. Rhodes then turned his attention to the poorer mines, such as Bultfontein and Dutoitspan, in which he also purchased controlling interest, not that they were paying concerns, but because their yield in diamonds, even if mined at a loss, would seriously affect the price which could be obtained for the product of the richer mines. Thus the conflicting interests on the Diamond Fields were fused in one dominant organisation, and the De Beers Consolidated Mines, Limited, which as a Joint Stock Company has been so large a factor in the development of the resources of South Africa, and, under the guidance of Cecil Rhodes, of the push of civilization through the Dark Continent, came into being. The actual cost of the properties thus acquired by the Consolidated Mines was approximately £14,500,000.

During the financial year following amalgamation, 90 per cent. of the total production was furnished by the Consolidated Mines. To the shareholders in the mines, after this reorganisation was effected, the returns were unprecedented, the profits being largely due to the complete control of production, systematic operation and regulation of the output, but the comparative showing was also greatly enhanced by the shrewdness of the financiers responsible for the organisation, and by the withdrawal of inflation from the stocks of the various mining properties included in the new corporation and its leased holdings. Before consolidation the capital of De Beers Mines was £2,009,000; of the Central Company, £1,779,650; of Dutoitspan, £3,500,000 approximately; and of Bultfontein, £2,000,000, making a gross valuation for the four mines of £23,434,250. By consolidation the capital stock was compressed to £3,950,000, and almost absolute control of these four great properties was secured at an annual charge of about £320,000. The business of the Company grew so rapidly that it was found necessary to establish transfer and general offices in London.

All the latest machinery and appliances are employed at De Beers, both in exploiting the blue ground and in raising it to the surface, while the processes in use for the extraction of the diamonds are in a high state of perfection. As may be imagined, the handling of the great mass of breccia, through which the tiny crystals are sprinkled in a proportion so infinitesimal, called for machinery which could effect thorough extraction combined with rapidity in working; and it was only through years of experimenting and progressing from imperfect to improved designs, that the present great diamond-winning plant of the mines was solved.

When the blue ground is dumped automatically from the skips into the ore bins, it is carried away in trucks by an endless wire rope haulage, driven by steam, to the depositing floors. These floors are made by removing the bush and grass from level stretches of ground which are cleared and then rolled. Each mine has its own receiving grounds, which cover an area of several thousand acres. The most extensive are those floors which belong to De Beers. After the blue ground has been spread out, it is necessary to wait patiently until sun and rain have done their work in disintegrating the breccia.

To hasten the disintegrating process, the bed of blue is harrowed several times so as to turn up the larger

lumps and expose fresh faces of the ground to the sun. Steam traction engines are employed at the present time for this purpose, having replaced the old light harrows drawn by mules. The great spread of the floors, therefore, looks like nothing so much as a vast ploughed field where the labourers are preparing the soil for seed. As a rule a period of from four to six months is required for the softening of the blue ground, though the time taken depends in a great measure on climatic conditions—water to moisten the ground, and heat to break it up. What is called hard blue, which is not affected by exposure, and constitutes about 5 per cent. of the total product of De Beers Mine, is sent to be crushed by rock breakers and rolls. When sufficiently softened, the blue ground is taken from the floors by endless rope haulages to the washing machines and is there put through the first stage of concentration. The ground is dumped from the trucks into hoppers, at the foot of which are small revolving tables on which the ground is divided, and fed automatically into two revolving cylinders. This automatic feeder, devised by Mr. Robeson, late mechanical engineer to De Beers Company, divides the ground equally between two rotating washing machines, and delivers it regularly, so that the machines cannot become overcharged, which would result in loss of diamonds. After leaving the automatic feeders the ground is mixed with thick muddy water, and a quantity of clean water is added. This brings the blue ground to the correct consistency for washing. From the chutes the mixture passes into a revolving cylinder covered with perforated steel plates having holes $1\frac{1}{4}$ inches in diameter. Lumps larger than the holes pass out at the end of the cylinder and are then crushed for further treatment. Worthless stones are picked out by hand. The pulp which passes through the screen holes is fed into shallow circular pans wherein revolving arms attached to a vertical shaft sweep the contents round. These arms have wedge-shaped teeth so arranged that diamonds and other heavy minerals are forced by it to the outer side of the pan, while the latter flows out of the discharge situated upon the inner rim. An idea of the amount of ground treated in a year may be gained from the statement that it would form a cube of more than 430 feet, overtopping the spire of St. Paul's, while a box measuring two feet nine inches would hold all the gems extracted from this mass. When the day's work is completed, the pans, through each of which 300 loads have passed, are emptied and cleaned up, and the concentrated deposits of diamonds and other heavy but valueless minerals are then sent to the Pulsator in trucks with locked covers, where they are sized by passing through a cylinder covered with steel sieving having holes from $\frac{1}{16}$th to $\frac{5}{8}$ths of an inch in diameter. The five sizes thus passed through the cylinders flow into a combination of jigs, the term Pulsator applying to the large concentrating plant and machinery where the final concentration is done, and the diamonds sorted from the worthless minerals with which they are associated. One of the employés of De Beers, Mr. Fred Kirsten, hit on an excellent plan for the retention of diamonds which flowed away from the percussion table with the tailings. When it seemed that every resource to do away with hand sorting had been exhausted, Kirsten asked to be allowed to try to catch diamonds by placing a coat of thick grease on the surface of the percussion table.

He had noticed that only substances such as axle grease and white or red lead adhered to diamonds when they chanced to come into contact, and he argued that if these substances adhered to diamonds and not to the other minerals in the concentrates, why should not diamonds adhere to grease on the table and the other minerals flow away. In this way the remarkable discovery was made that the diamond alone of all minerals contained in the blue ground will adhere to grease, and that all others will flow away as tailings over the end of the percussion table with the water. This invention has been improved upon, until now all the sorting, except for the very coarse size, is done by the "greaser," whose power of distinction is far superior to the keenest eye of the native. During the time the shaking table is worked it is rapidly shaken from side to side by an eccentric placed on a shaft under the table. Strange to relate, the descending diamonds stick on the face of the grease while all other minerals pass over it.

In the treatment of diamonds by the lapidary three distinct processes are involved—namely, cleaving, cutting, and polishing. To split the diamond successfully an expert knowledge of its character, crystallization, and lines of cleavage is necessary. A rough diamond is coated with a hard dull crust which has to be removed. It may have defects, such as cracks, unequal colouring or black deposits in its interior. The distortion of the crystal must be corrected, its defects concealed or removed, and it must be decided how the largest gem can be cut from the rough stone. The rejected portions may be split off or ground away, the latter process being slower and more expensive, but much the safer. An attempt at splitting should the cleavage of the diamond not be favourable thereto may result in the ruin of a gem of great price, so that much knowledge and nerve are required by the lapidary if he would be successful as a diamond cutter and polisher. Much patience and strength are necessary in order to reduce the stone to the required size by grinding or cutting, as the diamond is the hardest of all known substances, and its own dust is now used in polishing and grinding this precious stone.

The lapidary sits at a table above which a flat steel wheel revolves horizontally. On the upper surface of this wheel are fine grooves cut angling from its centre to its perimeter. By means of belting beneath the table the grinding wheel is made to turn at a rate of from three to four thousand revolutions a minute. Diamond dust mixed with olive oil is applied to the upper surface of the wheel, and against this face the diamond to be ground or cut is held.

For this purpose the stone is set in a fusible solder on the end of a copper cupel which is held firmly against the wheel by a projecting clamp. The exposed face of the stone is then set against the revolving wheel until it has been ground sufficiently and the proper angles turned.

Work calling for the highest intelligence, patience, and nerve is concerned in this operation. When the facet is finished the workman wipes the dust off and tests its smoothness, after which he passes to the next uncut facet. Polishing, being the finishing process, all irregularities in faceting must be corrected, each line and angle must be geometrically correct, and each facet and lozenge must be shaped to perfection. The colourless stone must glisten like a dewdrop sparkling in the sun, producing at every movement the colours of the prismatic spectrum. The patience of weeks, and even months, must be expended

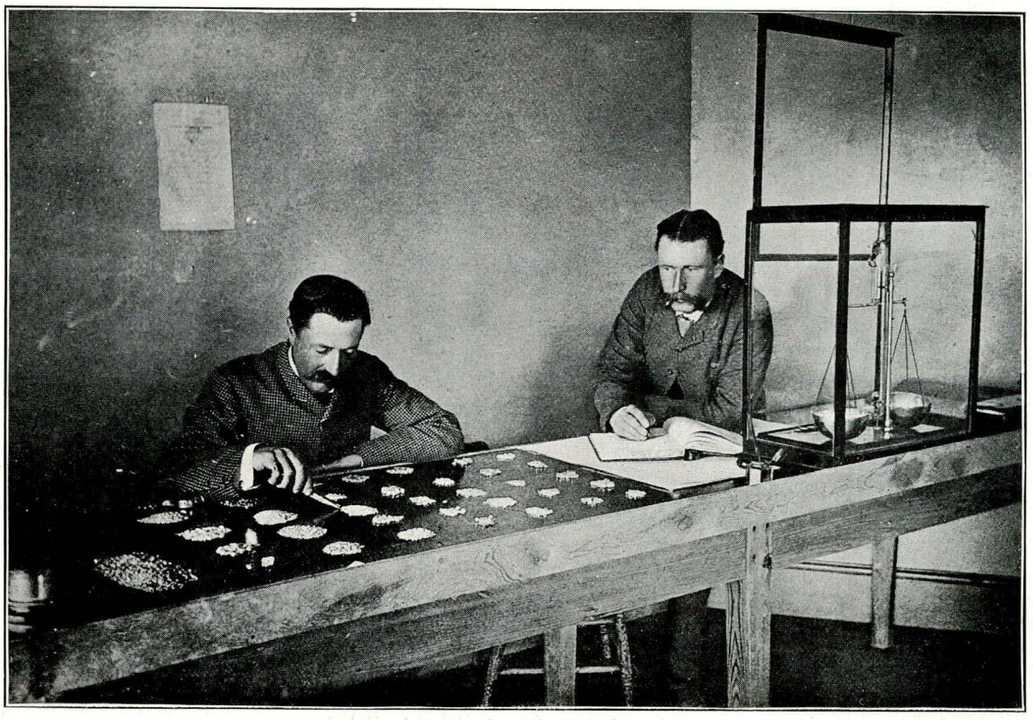
in perfecting these crystals. The celebrated Pitt diamond, now among the French jewels, took two years to complete, and the lapidary engaged received £3,500 for his work.

The average loss of South African diamonds by cutting is estimated at one-half to three-fifths of their gross weight. The diamond weighing 428½ carats found in De Beers lost 200 carats in cutting. The waste depends on the character of the stone, that is to say, its purity, form, and crystallization, and the style of the cut adopted. The Koh-i-nûr which originally weighed 793 carats lost in subsequent cutting no less than 690½ carats. The explosion of diamonds is another source of loss, and is attributed to the heat of the solder or the frictional heat of the revolving disk. Though many Europeans have become skilful workers at this trade, the most successful lapidaries have been of Hebrew stock, and since religious bigotry drove the Jews from Portugal, Amsterdam has been the central mart for the diamond merchant and the diamond cutter.

Now a word in conclusion as to the annual output of diamonds by the De Beers Consolidated Mines, Limited, which represents by far the major portion of the industry at Kimberley. Prior to consolidation on March 31st, 1889, the number of carats recovered amounted to 914,121, which realised £901,818, while a dividend, equal to 5 per cent., of £188,329 10s. was declared. A year after, in 1890, the number of carats found had increased to 1,450,605, valued at £2,330,179 16s. 3d., and a dividend of 20 per cent. was declared. This record was easily broken in 1891, when 2,020,515 carats, representing the respectable amount of £2,974,670 9s., were produced. In 1892 the returns showed an increase of nearly £1,000,000 on the previous year's statistics, then for two years there was a decline, and subsequently a steady rise in the output, until the war largely suspended operations. Not until 1899 and 1901, however, were the figures obtained eight years previously again reached and surpassed, the amount realised by the sale of diamonds up to June 30th of the latter year having been £4,570,214.

Comparing the diamonds exported from Kimberley during 1904 with the year 1905, the increase amounts to 108,640 carats, valued at £336,135, since 3,353,274 carats, representing £6,422,488, were exported in 1904, while the exportation during 1905 totalled 3,461,914 carats, valued at £6,758,623. These figures show an enormous advance on any previous year.

The diamond-mining industry constitutes the premier industry of the Colony, and right well it deserves to be, for through it other industries were started, and those existing were enabled to push ahead. To the Kimberley mines it may also be said we owe largely that vast tract of territory Rhodesia, to the acquirement of which Cecil Rhodes devoted a large part of that fortune which he worked so hard, and considering the aim of Imperial expansion which he always kept in view—so nobly to build up.



DIAMOND SORTING, KIMBERLEY.

THE OSTRICH FEATHER INDUSTRY.

PREVIOUS to the domestication of the wild ostrich in 1867, this bird had never been regarded seriously by farmers as holding in its feathers one of the most valuable assets that Cape Colony now possesses. It was considered incapable of being tamed, and the method employed to secure its plumes was to hunt it down and shoot it on horseback. Over forty years after the landing of British settlers in the Colony, this source of wealth, which lay practically at their very doors and almost in daily sight, was scarcely exploited. Ostriches ran wild in abundance throughout Albany, and occupied wide tracts of land right up to the Zambesi. Those settlers of a more adventurous turn made it their work to hunt the bird and export its feathers, and during their peregrinations in search of it, were constantly stumbling across broods of young.

We have the curious anomaly therefore of the inhabitants, with, presumably, open eyes and a certain amount of enterprise, looking on while feathers were sold for nearly their weight in gold, and yet lacking the imagination to perceive that by domesticating the bird they could reap a half-yearly crop of feathers in place of shooting it for a single crop. It then came about that, owing to the methods then employed to obtain feathers, a serious depletion took place in the droves of ostriches which had made Cape Colony their grazing ground; for many which escaped being shot, were frightened by the hunter into more inland parts. Before domestication took place, there were only a few tame birds, and these were mostly confined in zoological gardens and parks, like that of Sir Walter Currie's, at Oatlands Park, Grahamstown. The first farmer to give his whole attention to ostrich farming was the Hon. Arthur Douglas, and it was mainly due to his example that the industry was developed, until now it is one of the most lucrative the Colony possesses; the value of the feathers exported yearly being considerably over one million pounds sterling. From the time of its initiation, over £8,000,000 of capital has been employed in the industry; and whereas in 1865 17,522 lbs. of feathers were shipped, valued at £65,736, in 1905, or after a period of forty years of domestication and improvement of the bird, no less than 471,024 lbs. were exported, having a value of £1,081,187. These figures represent an increase on those first quoted of 453,502 lbs., valued at something like £900,000, while the improvement shown on 1905 exports compared with those of 1904, is to the extent of 643 lbs., valued at £22,199. This is, we may say, a highly satisfactory rate of increase, and points at once to the flourishing condition of ostrich farming. Almost the entire pluckings were derived from tame birds. It would be as well, here, to revert in the face of what has been recorded with regard to the progress of the industry to the time when farmers to a man were sceptical of any good result accruing from domestication. Chief amongst the scornful objections brought against it were that the birds were too timid and would not breed in confinement; or, if they did build nests, would break the eggs on the approach of a stranger; and that, even in the event of these difficulties being overcome, the feather grown in the tame state would not curl, and would thus be of little marketable value. All these surmises (for they were little more), however, proved incorrect, and although for a long time a strong prejudice was rife against tame feathers, it has now been entirely removed, and, indeed, improvement in them is going on from year to year.

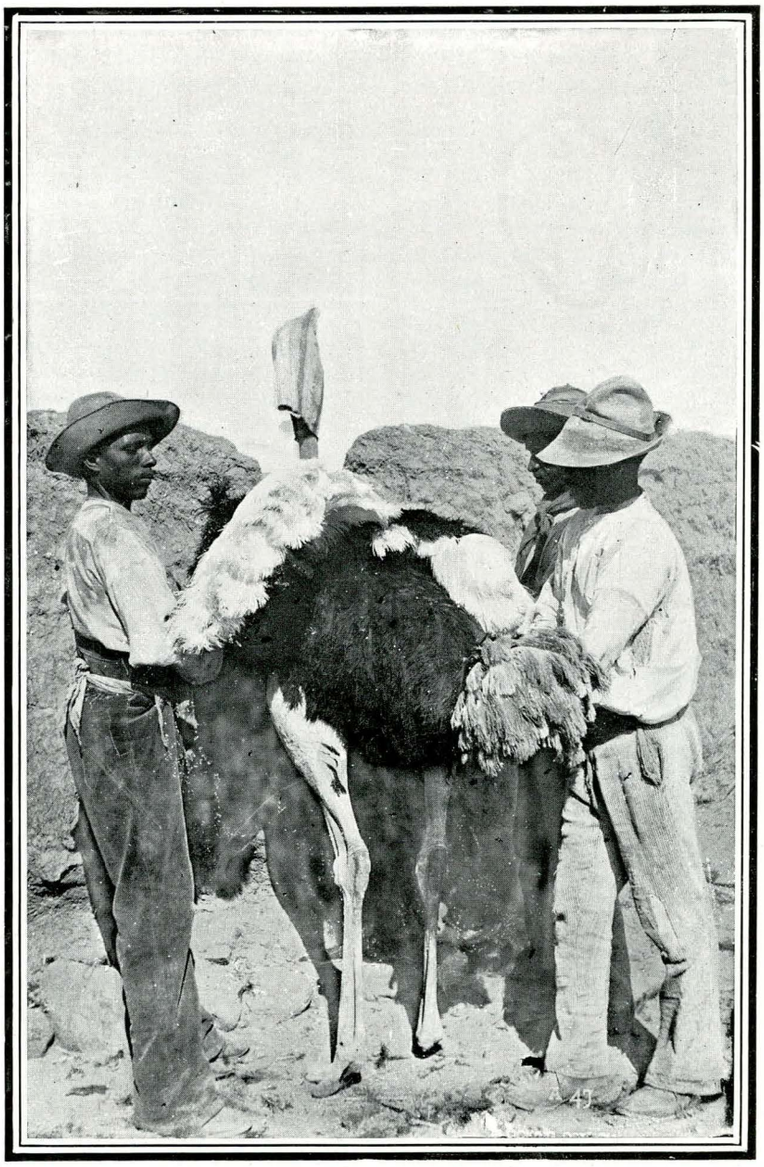
In the early part of 1870, the incubator was brought into being, and efforts were made by this means to increase the number of tame birds in the Colony. General success, however, did not attend this innovation, but it can safely be stated that through this agency and by ordinary incubation rapid strides were made and the number of birds increased to a considerable extent; so that, whereas in the returns for 1875 the total number of domesticated birds was put at 21,800, the last census for the Colony gives the number of birds farmed as 358,370, or an increase in thirty years of 336,570, representing a proportional addition *per annum* of 11,219. These figures scarcely require comment; they speak for themselves. It is a fact worth mentioning as being remarkable that the breeding and rearing of birds has met with but a small measure of success in other parts of the world. The efforts made by the French in Algiers, in Egypt, and the sister colony of Natal have not brought important results in their wake. Buenos Ayres, Australia, and California, to all of which one would think the ostrich would take kindly, considering the excellent grazing and wide stretches of unpopulous land which they offer and which this shy bird prefers, have made tentative efforts to acclimatize it; and these countries during 1903 obtained some ostriches, but the Colonial Government, fully alive to the necessity of protecting its interests, stepped in, and by prompt action prevented further extensive shipments being made, and thus to-day Cape Colony possesses an industry peculiarly her own. The market for ostrich feathers is always likely to prove good, and prices, though they show a big decline since 1884, have, nevertheless, been consistent since that year. The reason why the market is and will continue to be firm in this commodity, is that it forms part of the Court dress and is extensively used for ladies' hats; and though fashions change every year, as a graceful and striking adornment it will probably long hold its own; while the industry at the same time is quite safe from the good offices of the Prevention Society, so active some years ago, seeing that no cruelty is practised in the plucking of the bird, the operation being similar to the shearing of sheep and causing no pain.

The age to which an ostrich lives is variously estimated at from twenty-five to thirty years. In its wild state it was originally found over every part of South Africa, and though it is not known whether it preferred the desert to the grass veldt, thriving equally well in both, it is possible that it fled from the dry regions when exceptional drought occurred; and that, on the other hand, though fond of the soft succulent grasses obtainable in the moister parts, its native shyness prevented it from staying near the haunts of its enemies, such as lions, tigers, jackals, and last, and perhaps principally, man himself.

Under protection the ostrich has thriven in every part of Cape Colony, the high grass lands which are subject to great cold having so far proved least adapted for the carrying on of the industry. Much study and knowledge of the habits of this terrestrial biped, whose feathers are no less remarkable than its capacity for speed, its strength of leg, its bare neck, and large egg, weighing from 2 lbs. to 3 lbs., is necessary before the farmer can hope to rear, improve and treat it in case of disease or injury. The ostrich is represented by four species, namely, the ostrich proper, the Emu and Cassowary of North Australia and South Pacific, and the Rhea of South America. As is generally known, it cannot fly, having rudimentary wings yielding the most valuable of its feathers; its breast is rounded like a barrel; it is the only bird with two toes, on which it walks; what is erroneously called its leg is actually its foot, the leg proper being fleshy and mostly concealed by the wing feathers. It has a small brain, yet is anything but stupid, despite its proverbial habit of burying its head in the ground to escape injury and being seen. The neck is remarkable for its length and formation, the disposition of the cervical joints allowing

it to turn its head completely round without moving. The ostrich is subject to several ailments, such as dropsy of the heart, lung disease, affections of the eye, dislocation of wing, breakage of leg and sprains; which makes readiness and ability to treat them as they occur a paramount necessity in the farmer who would be prosperous. Another danger he has to provide against is the over-stocking of his farm. If he stocks it to its full capacity, the herbs on which the ostriches feed will be destroyed, whilst, on the other hand, if the farm be only partially stocked, in good seasons these herbs will have a chance to seed and reproduce themselves. And, again, greater care has to be exercised with the ostrich than the sheep, seeing that the bird has a habit of selecting one particular plant to feed on, neglecting others as long as this holds out. To prevent this the usual course is to allow half the farm to lie idle for six months, and to treat the other half in the same way during the following six months.

Before ostrich farming began, fencing in South Africa in the safe-guarding of stock was an unknown quantity. Horses and cattle roamed at will, often strayed and were lost. Now, no enterprising farmer, since the introduction of wire fencing, would think of farming without an enclosure for his stock, even if he had no birds. Various fencing has from time to time been in vogue, such as bush, wattle, post and wire, and stone walls; but wire fencing, on account of its cheapness, portability and endurance is now in almost universal use; and when laid down for ostriches is never lower than 4 feet 9 inches, this height effectually preventing them from escaping.



PLUCKING OSTRICH FEATHERS.

As an example of the evil attendant on over-stocking and the desire to breed ostriches on a large scale, which is characteristic of many farmers, we would now draw attention to a comparison between the increase of weight in feathers produced in 1882 and the weight for 1904. This increase amounts to 216,426 lbs., which at first sight appears satisfactory; but, on considering the value, it is found that there has been a falling off of £35,634. This depreciation is chiefly the result of the large quantity of inferior feathers produced, and should serve as an object-lesson, since it plainly demonstrates the fact that it would pay better to keep, say, "200 good, well-bred birds than 400 inferior and poor-class birds." Besides, "the feeding bill," to quote Mr. Louis Penny in an article dealing with the subject, "would be less in times of drought, and the damage to the veldt more easily recoverable; and instead of having to face a depreciation in values, which must come about if some effort is not made to improve the quality of the feather, we would see undoubtedly a corresponding increase in the average price; quantity is all very well in its way, but quality is of far greater value." This is a common-sense dictum, and conveys a warning which must not be overlooked. It is a matter for lament that the pluckings of to-day do not compare favourably with those of several years ago, the feathers in many cases being of poor grade, narrow, and much damaged. Whether the drought experienced is entirely responsible for this, as some claim, or whether, as Mr. Penny believes, the falling-off is due to continuous inter-breeding, we are not prepared to say; but, without a doubt, a freer crossing of the best breeding birds, thus introducing new blood, would be advantageous, and might be the means of restoring the feather to its pristine beauty of form and colour. The Stud Book, however, which has just been started, will prove of great benefit to the ostrich farmer in the way of classifying the various types of birds; since by this means "standard birds," which have passed the tests of record, will, like stallions, rams and bulls, be sought after for breeding purposes, and none but the faultless will be encouraged. Probably, the best feather now produced in Cape Colony comes from the Middelburg and Bedford types. These possess all the richness of flue, all the compactness, and the correct length and breadth of the ideal feather, as the expert and buyer knows it. Though the Oudtshoorn feather has wonderfully improved, it is still far from the ideal attainable. Remarkable for its length, which reaches 29½ inches, there is still much lacking in the quality of the flue and general appearance. To be perfect, a feather must have the qualities of compactness, shapeliness, and richness of flue, and the quill should be thin. Any flaw naturally depreciates its value. The causes of the damage so prevalent now in the season's pluckings are said by the farmers themselves to be due

to flies and parasitic insects which attack the socket in which the feathers grow; also to imperfect feeding owing to drought and consequent impoverishment of the blood. In view of these defects, it surely behoves the ostrich breeder to pay more attention to the quality of his crop than to the quantity, and to study the requirements of his birds with this view in end. Nothing can equal the plumage of the wild bird, since he has perfect freedom of selection in the matter of food and intercourse; and it should not be forgotten that either beauty of plumage or the gift of song is vouchsafed to most birds, and is the means employed by nature to keep alive sexual affinities. Therefore, it would seem essential to the welfare of the industry that the conditions which they enjoyed in the savage state should, as far as possible, be adhered to, and that "standard birds" should never be plucked. In 1875 the value of the ostrich feather reached its maximum, and the pluckings, amounting to 49,569 lbs., were sold at £6 3s. per lb. In 1888 the value had dropped to £1 6s. per lb., and in 1905 it stood at £2 4s. per lb., though nearly ten times the quantity (compared with 1875) was produced. It may not always be the case that Cape Colony controls this industry, and should a foreign competitor come into the market, having profited by the experience and mistakes of the breeders in this Colony, there is a real danger that we may lose to a great extent one of our most important assets.

No better move in the direction of preventing the deterioration of feathers owing to indiscriminate breeding could have been made than the formation of a Stud Book, on similar lines to that which has for some years obtained in respect of cattle, horses and sheep. Of course, much new ground has had to be traversed in preparing it for this valuable stock, seeing that there was no precedent of experience in any other part of the world to draw upon, and from which breeders could obtain assistance in the registering birds in an Association's books. This, the main difficulty, has, however, been overcome, excepting as regards the class of breeding-birds, which is now receiving consideration. The aim of the chief supporters of this section is to limit the numbers of the foundation stock to be registered, taking in only the very best of super-quality birds. The necessity for this measure will be obvious when it is remembered how quickly the birds increase. Another difficulty in the way is the great expense attending registration, since not only have the fees of "plucking witnesses" to be paid, but also the fees of an expert who reports on each bird's plucking, after examining each feather plucked. As this amounts to about 230 feathers in each plucking, it will be patent to all that this examination is a big undertaking, as only the best qualified experts in South Africa are engaged for the purpose. So that it depends largely on how far breeders are willing to disburse for the ultimate benefit of the industry. We have the assurance, however, that members of the Association are determined to have nothing but the most reliable judgment as the best means to secure a high standard feather production, arguing rightly that, say, 50 superior birds are preferable to start with than 500 of medium and mixed quality.

Had it not been for the ostrich, the present position of the Oudtshoorn district, to take a typical part of the Colony devoted to ostrich breeding, would not be what it now is; and for this reason, namely, that the incentive to cultivate lucerne would have remained largely in abeyance, owing to the fact that any other stock fed on it would become so bulky as to considerably lessen its commercial value. True, it might have been possible to fatten live stock for butchering purposes: but this would not have compensated for the enormous outlay involved in the establishment of lucerne. But, as the ostrich was found to thrive on it, and as the quality of its feathers improved on this food, it may be said to have given the first real stimulus to the irrigation movement, and to the lucerne industry which grew out of it. In fact, the ostrich *made* Oudtshoorn, and has provided the wherewithal to furnish the district with one of the most comprehensive and elaborate systems of irrigation farming to be found anywhere in the world.

The advantage of the ostrich industry over any other is discovered in the facility with which the whole crop of feathers from a large farm can be carried out in a single Cape cart, thereby clearing away the difficulty and cost of transport which still tends to cripple other industries, like dairy and poultry farming. No better industry, therefore, could have been selected than the one at present paramount in Oudtshoorn, where such a rich pasturage as lucerne can be cultivated with comparative ease, and on which the birds not only thrive but show a marked improvement in their feathers. The only regret is that Oudtshoorn was not sooner able to get into close communication with the great markets of the North, in which case its output would have been considerably increased, especially in the direction of food-stuffs. It should be mentioned here, that as an indirect effect of the ostrich industry it is now found that lucerne, beyond supplying the birds and other stock with splendid and suitable grazing, can be sold for its own sake just as profitably as by retaining its production for local requirements; the railway having carried away large quantities of this commodity to Johannesburg and other centres of consumption.

Now a word as to the future of the feather industry. It has one great disadvantage; and that is the almost disastrous economy of labour which it permits of. In such a rich section as Oudtshoorn, the opulence of which has of late years been increased by artificial means, one would hardly expect to find the "poor white" a growing factor in local affairs. Yet he is becoming a problem which the present system of farming only aggravates without solving; and this is mainly the result of the preponderance of the feather over other local interests. As a matter of fact, the ostrich industry requires very few hands to work it; and we thus have the anomaly of the ubiquitous ostrich spread over large farms in the district which were accustomed to carry from twelve to twenty families, all doing well in their own way. It is, therefore, rapidly assuming the dimensions and character of "ranching," and, as such, requires far more space than it did formerly for its due development. It is advantageous to the big farm holder, but is an industry the least calculated to build up a thriving community. So that there is a very real need for the introduction of something in the shape of agricultural industry which would neutralise these pernicious effects; otherwise, should fickle fashion some time take it into her head to grow tired of the graceful plume, serious mischief may accrue from the monopoly. Should change of opinion occur, and the confidence of the public be shaken in ostriches, it would mean a revolutionising of existing methods at Oudtshoorn. In place of droves of these birds grazing on the rich pasturage, we should see herds of dairy stock and flocks of sheep, pigs with their litters, and flocks of poultry. For the whole gist of the matter is, that Cape Colony cannot go on interminably sending away its millions yearly for food-stuffs, when districts such as this are lying fallow, only awaiting development. The ostrich industry does not bring us one iota nearer to being a self-supporting colony.

Another danger, already alluded to, is that the success of this industry in South Africa has attracted the attention of other countries, where probably more advantageous conditions prevail for its development. Both Australia and America are making attempts to rob this colony of its present exclusive monopoly in feathers, and large schemes are going forward in these countries with the

object of introducing and developing this source of wealth. Should they prove successful, then the feather market must suffer from the influx of larger supplies. In this case, the ostrich farmers of Oudtshoorn would not be materially affected, because they have always their lucerne to fall back upon as a valuable asset which would tide them over any losses in the direction of feathers. Be that as it may, it is incumbent on these farmers to turn their rich pastures to account by way of fostering the stock of the country, which is at present in such a bad way, owing to depletion from disease and the losses sustained during the war, that we are obliged to import our meat as well as our dairy supplies. In the event of this wise precaution, there would be no need of sacrifice in respect of birds; they could still be grown, in conjunction with dairy and cattle farming. But the greatest advantage derivable from the change would be reaped by the opportunity it would present of recalling the people to the land, and by providing them with a sound, staple, and enduring industry, whilst at the same time reacting on the whole colony by relieving its present necessities.

About 1875, as before mentioned, the demand for ostrich feathers was most active, as they were much in vogue and were largely used as the adornment of ladies' hats. But with the introduction of other trimmings, and the feathers of other birds, there was a falling off in later years; and while at that time a pair of ostriches would fetch anything from £200 upwards, and small farmers had invested their all to acquire some of these valuable birds, when the slump came about 1888 the price dropped to about £80 a pair, and many small owners were ruined in consequence. As showing what prices prevailed at the end of 1905, we herewith give a few quotations which ruled in December on the Cape Market. Super Primes were £10 10s., with a special price of £35; Firsts, Seconds, and Thirds fetched £8, £6, and £3 10s. respectively; Feminas from £4 to £7; Long Blacks, £4 10s.; Medium Blacks, £3; and Shorts, 10s.; these being minimum prices, which since July, 1905, have been consistently maintained on this market.

The habits of the ostrich are, in some respects, very singular. It has a strange manner of "waltzing," for instance, in which the chicks also participate. When let out of the kraal in the early morning, they often start off at a great pace, then stop, and, with raised wings, spin round rapidly for some time, often until quite giddy, when a broken leg sometimes occurs. The adult bird, when running in large camps will do the same, especially if startled in the early morning. A troop of birds waltzing, in full plumage, is a very pretty sight. Vicious cocks when challenging to fight, or when wooing the hen, "roll," that is to say, they go down suddenly on their "knees" (the ankle-joint), open their wings, and swing them alternately backwards and forwards, as if on a pivot. Their necks are lowered till their heads are level with their backs, and they then swing their heads and necks from side to side with their wings, the back of the head striking with a loud click against the ribs. While rolling, the cock does not rest his body on the ground, but sits straight up; every feather is on end, and the plumes outspread like a large white fan. The cry of the ostrich is described as a "boom"; it is a muffled sound and is thrice repeated—two short cries and then one long one. It is confined to the cock and is uttered especially at night; but generally it is a challenge to fight, or a note of courting to the hen. It can only be uttered while the bird is standing still, and as no air escapes in the process, the neck becomes inflated during each boom like a puff-adder's. At night it sounds weird and wild, breaking the silence of the farm. Other sounds common to both sexes are an angry hiss or gurgle, uttered when frightened, and a short, sharp note, which constitutes an alarm-signal. The ostrich feeds in a peculiar manner by tossing the food into a sack in the upper part of the neck and then swallowing it. It is capable of tossing a quart of mealies into this sack before swallowing, and two such "swallows" are often seen travelling down the neck at the same time with an interval between them; or one "swallow" may return to the sack after being swallowed when the bird lowers its head to continue feeding. They are indiscriminate feeders, and will swallow oranges, bones, small tortoises, fowls, young turkeys, and even kittens; while a cock has been known to swallow short lengths of fencing wires and brass cartridges, which killed him. The crop of an ostrich always contains a large number of smooth stones, some of them brightly coloured. When running, this bird spreads out its wings, and, thus aided, skims lightly over the ground. The head is held lower than usual and a little forward. The neck vibrates sinuously, but the head remains steady, so that the bird, even at top speed, can turn round and quietly contemplate its pursuer. The position of the wings is that which offers least resistance to the wind as it cuts past. As the breeding season approaches, a cock and hen will pair, and after selecting a suitable site will proceed to make a nest. They like to have their nests far apart, and, if possible, escape observation from other birds. A stony or sandy rise sheltered by a small bush is often selected for the nest. This consists of a simple, hollow depression, and is made by both birds; the cock scraping and kicking the sand out backwards with his feet, while the hen stands by, fluttering her wings, and helps by picking up the sand with her beak and dropping it near the edge of the growing depression. The hen then begins to lay an egg every other day. A nest in which only one hen is laying contains on an average fifteen eggs; but she often begins to sit before she has laid her full complement. Both parent birds sit turn about, but the hen will often occupy the nest for two days and nights before the cock relieves her. The eggs have to be covered as a protection against hot weather, storms, and small carnivora. The direct rays of the sun striking the eggs would kill the chicks, if such a precaution were not taken. The ostrich is a peculiar feeder. He walks rapidly on and on as he feeds, picking a few leaves here and there in his stride, and seldom halting unless he strikes a tasty plant, and then only for a brief time. Thus he travels long distances while feeding, and it takes him several hours to obtain a satisfactory meal. The hen has about four or five hours to feed in the early morning before taking her turn on the nest; while the cock has eight consecutive hours throughout the day. It is scarcely possible to conceive a more effective disguise than the sober brownish-grey colour of the hen for day sitting, and the black hue of the cock for night. When on the nest, the ostrich lays its head, neck and tail flat along the ground, the plumes lying close together on the earth, almost hidden against the bird's body. If an egg gets broken, the old birds eat it, shell and all, and in this way they sometimes treat their "first-born." When a cock is ready to breed, he pairs with one hen, and with her makes the nest. If they escape the intrusion of other hens, this state of monogamy continues, and chicks result; if, on the other hand, they do not escape, polygamy will usually take place, with disastrous consequences to the nest. Very often two or more hens will lay in the same nest, which creates confusion as to their allotted times for sitting, and results often in the breaking of several eggs and in the substitution of older eggs for new ones. They become addled through disturbance and exposure, and the nest is eventually abandoned.

Such then are a few of the most remarkable characteristics and habits of this no less remarkable bird, whose feathers are so highly prized and are a source of much wealth to Cape Colony.