

Government of Madras.

HOME DEPARTMENT.

(EDUCATION)

23
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NOTES
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Anderson oil-exPELLERS

Issuing orders on the proposals submitted by the Director of Industries in regard to the purchase of the — purchased by the Department of Industries

CONFIDENTIAL.

OIL PRESSING PLANT.

In accordance with instructions from Government a practical oil presser was deputed to visit the Bombay Presidency and report upon the possibilities of the Anderson Oil Expeller, after consulting persons qualified by actual experience of the Expeller or knowledge of the Oil industry generally or both to express an independent opinion as to the merits or demerits of the Expeller as an efficient machine for oil extraction compared with the Hydraulic Press and country ghani.

The following opinions were expressed :—

No. 1
A comparison was made with a small unit mill of the Hydraulic type capable of crushing 15/16 tons of seed in 22 hours. Such a mill could be equipped in normal times, it was estimated, for about Rs. 45,000 excluding buildings and land. To crush one ton of seed then would involve an outlay of Rs. 3,000 in machinery. The approximate engine power needed would be 45 H.P. or 3 H.P. per ton. The cost of crushing including cost of press cloths was placed at Rs. 13/- per ton of seeds. The total cost of an Expeller plant including provision of steam for heating is placed at approximately Rs. 30,000 and it is capable of crushing 5 tons of seed per day of 22 hours so that the outlay in machinery comes to Rs. 6,000 per ton. The total power needed is 30 H.P. or 6 H.P. per ton. The cost of crushing by the Expeller was estimated by No. 1 to be Rs. 23 per ton. (This is not confirmed: we find the cost to be slightly under Rs. 19 per ton.) The yield of oil is smaller by the Expeller plant than by the Hydraulic Plant. The interior of the Expeller is subject to a rotary pressure of about 5 tons per sq. inch which must involve heavy wear and tear.

A partner of an Oil Factory now closed said that they had one Expeller Plant with subsidiary machinery. They closed down after 8 months working. They had not made systematic analyses of yield and stopped working after having experienced rather heavy losses. The capacity of the Expeller they found to be $2\frac{1}{2}$ tons of seed per day of 11 hours. They found it necessary to mix some fibrous material with seeds containing a large percentage of oil. For instance with ground-nut kernels it was found necessary to mix 20% of shells. The coal consumption in 11 hours was 15 cwts. The cost of repairs and renewals was estimated at about Rs. 150 per month owing to the heavy wear of the barrel. Their plant is now for sale.

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No. 3 An engineer in-charge of the above plant confirmed the foregoing.

No. 4 A member of a firm of engineers dealing with this class of machinery places the efficiency of the Expeller at about the same as that of the ordinary ghani, while the latter is more economical in working. He is convinced that nothing can equal the efficiency of the modern Hydraulic cage press.

No. 5 The Manager of an Oil Mills is of opinion that the modern rotary ghani is more efficient and economical than the Expeller.

No. 6 The Proprietor of an Oil Mill working with both ghanis and an Expeller says he uses the Expeller only for the second pressing of the seed. Repairs are heavy.

No. 7 A Technical Chemist found the percentage of Oil left in the cake by the Expeller unduly high. He considers the rotary ghani more suitable for district working.

No. 8 The Manager of an Oil Mills using both Hydraulic Presses and an Expeller, finds the Hydraulic Press more economical. The efficiency of the Expeller decreases with its life owing to the wear of the working parts.

The accounts of a Mill running two expellers were examined and indicated that the average cost of crushing was Rs. 18/11/- per ton. This was under favourable circumstances, the usual cost would possibly be more. The advantages and disadvantages of the Expeller Plant may be stated as follows:

Advantages.

1. The work is automatic and clean, and although skilled workmen are required to run the plant it does not require constant attention.
2. No press cloths or mats are required.
3. Handling and labour are less than with the Hydraulic Press.

Disadvantages.

1. High initial outlay for machinery as it is more than three times that of either a Hydraulic Plant or Bengal Ghani installation of equal capacity.
2. The pressure on the seed cannot be regulated or ascertained, and is apt to vary at all times giving unequal results in extraction.
3. Is not quite suitable for crushing all oil seeds.
4. Under equal conditions both in cold and hot pressing the yield of oil is much lower and in quality not better than the Hydraulic Press.

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5. The great risk of damage to the machine if a small bit of iron or hard metal gets into it with the seed under average Oil Factory conditions.

6. Would not suit village conditions as skilled workmen are required to run it, and the repairs and renewals are expensive and difficult.

7. Higher cost of crushing in spite of poorer yield.

The following may be taken as the average expenditure for crushing a ton of seed:—

Hydraulic Press	... Rs. 15
Expeller	 19 or more.
Ordinary Ghani	 16-8 to 17.

Samples of the cake turned out by the Expeller were taken and analysed. Til-seed cake showed over 21% of Oil, while Hydraulic press cake showed 11% to 12% and ghani cake 12% to 14%. Samples of Expeller cake from Rape seed showed from 11% to 14% of Oil. Hydraulic cake showed 9% to 10% and ghani cake 11% to 13%.

A. H. SILVER,

Director of Industries, U. P.

Cawnpore, 25th January 1916.

seed, and the Government must do more in this direction either on their own responsibility or by encouraging co-operative or even private enterprise. But the question of the seed supply must also be tackled from the other end, that of the ginners. There is no use in supplying pure seed if the resulting cotton is to be mixed at the ginners with inferior cotton, which not only degrades the quality of the lint as a whole, but also mixes the seed supply for next year, and renders the maintenance of the improved quality impossible. This is, perhaps, the greatest defect in the Indian system; the ginners in most parts of India are run by small men, and are very unsatisfactory in almost every respect.

A notable instance of the importance of this mixing of cotton is at present causing considerable local interest in the Tinnevely and Ramnad districts, where considerable efforts have been made for some years to improve the local staple and to eliminate inferior varieties, and where also the famous Cambodia cotton was first cultivated successfully in India. A few years ago, however, someone introduced to the district an inferior short staple cotton from the north, which has the unfortunate merit of a high ginning out-turn to compensate, to some extent, its inferior quality. This intruder rapidly gained ground and the authorities found it necessary to take very stringent measures to deal with it. Fortunately, the chief purchasers of cotton in the district are comparatively few in number, and it was possible to secure unanimous agreement among them to adopt drastic measures, for they fully realised that the reputation of the local cotton, which is very high, would be completely lost if this inferior cotton became generally established. It must be kept in mind that the profit of growing the inferior staple lay only in being able to sell it, by mixing it with the superior variety, at something like the price of the latter. If the high reputation of the local variety were lost, as it certainly would be if the mixing continued, not only would the cultivators of the superior variety lose their special market, but even the growers of the inferior variety would find it no longer paid them, when they could not get the high price for it. It was, therefore, generally recognised as essential that the inferior cotton should be wiped out of the district, and after considerable negotiation agreement was secured among the buyers to refuse absolutely to buy any of the inferior cotton this season or any cotton containing it. That no injustice might be done to the growers, the fullest possible notice was given of the new agreement at and before sowing time, through the Indian dealers with the firms and through Government officers, but in spite of everything, it now appears that a good deal of the inferior cotton was grown, and apparently it has managed to find its way by admixture into a large part of the pure cotton of the district, with the result that the consumers, standing by their agreement, refuse absolutely to buy the mixed cotton at any price, and the cotton market was temporarily at a standstill. It is a unique situation and one in which the whole of India should be interested, for if the authorities allow themselves to be beaten this time, it will be difficult again to attempt any measures of the kind; and that would mean a most lamentable confession of failure and considerable ultimate loss to the ryots of the Tinnevely District. On the other hand, however, it may not be necessary to push the lesson home too hard. What is wanted is to impress upon the growers that the cotton buyers really mean what they say, and that they will not buy the inferior cotton or anything in which it has been mixed. If that purpose be served, the cultivators who have tried to cheat the combine will have good reason to regret their attempt. But the whole thing is an illustration of what can be done on a purely business footing to improve or maintain the quality of the cotton grown in one district, when all the parties concerned are prepared really to co-operate towards that end. There is room for a great deal of that kind of thing in India, for India is bound to take ever a more and more important place among the cotton-producing countries, but it will not pay her if she always produces the worst in the world. Combined and honest efforts to maintain quality are essential, and the joint effort now being made in Tinnevely and Ramnad should be widely noted throughout India. What it means to these districts can readily be inferred from the fact that when fully good fair Tinnevelles were standing at Rs. 180 a candy of 500 lbs. Bengals, to which type Pulichai belongs, was about Rs. 110 for 500 lbs. in Bombay. The difference in price is large, and cannot be compensated by a much smaller increase in total yield.

OILS AND SOAPS.

BY ALFRED CHATTERTON, F.C.I., C.I.E.

IN INDIAN AGRICULTURE, OIL SEEDS ARE a very important crop. Besides supplying the needs of the people, there is a surplus which is exported amounting in normal years to nearly 1,600,000 tons. The internal consumption of oil is very large, and the greater part of the oil is extracted by very primitive processes, which leave an unnecessarily large percentage of oil in the cake. Compared with the exports of oil seeds, the foreign trade in oil and oil cake is comparatively small. The reason for this is that nearly all foreign countries accept the seeds free of duty, but impose a heavy tax on oil or oil cake, and thus preserve to themselves the oil crushing industry. Moreover, Indian agriculture is unfortunately so backward that it still pays to export oil cake to the United Kingdom, Ceylon and Japan, where for cattle food or manure it fetches much higher prices than in India. There is no difficulty about the transport of oil cake; but the carriage of oils involves the provision of barrels or drums in which to carry the oil, and it is certainly easier and cheaper to send the seeds to Europe than it is to extract the oil in this country and send both the oil and the cake to Europe. The business is complicated by the fact that the oil and cake are really two separate commodities, and if the crushing of the seeds was done in India, it would be difficult to regulate the supply of each so as to meet the current demand. The production of a certain quantity of oil implies the production of an equivalent quantity of cake, and an immediate market must be found for both, or a large amount of capital will have to be employed to enable the oil miller to hold back his surplus stock. This can be done more cheaply in Europe than in India, and, moreover, the European oil miller is necessarily in closer touch with his markets, so that the prospects of developing an export trade in oil are not very good.

Before the introduction of kerosene oil very large quantities of vegetable oils were used for lighting purposes, and in those days, of the oil seeds grown in India, a much larger percentage than is now the case was retained in the country. There can scarcely be any doubt that proportionately to the population, more oil cake was then used as manure than now. Consequent upon the dislocation of the oil seed export trade by the outbreak of war, proposals have been made to develop the oil industry by installing modern oil presses on a large scale; but the scheme has been nipped in the bud owing to the manufacturers of the machinery failing to fulfill their contracts, due to their works being taken over by the Minister for Munitions. After the war, it is hardly likely that the conditions in India will be more favourable than hitherto for the employment of such machinery, and it is quite certain that there will be no change in the fiscal policy of European nations which will encourage the establishment of oil mills in India.

If anything is to be done, it must be by developing the internal markets for oil. Hitherto, but a moderate degree of success has attended the establishment of oil mills in India worked on modern lines. Largely, these failures have been due to imperfect appreciation of the factors which are essential to the successful operation of machinery, but in part they are also due to the seasonal character of the supplies of oil seeds which renders it necessary to hold large stocks if the plant is to be kept going throughout the year. It should be remembered that oil seeds are grown in most parts of India, and that where the crop is grown, there the oil is extracted. Everywhere there is a demand for oil, and everywhere there is a local supply. The chief movement of oil seeds on the railways is in connection with the export trade. The consumption of vegetable oils in India per head of the population is probably stationary, and the development of oil milling means either the introduction of new industries in which vegetable oils are required or the improvement of the processes of extraction. The latter may consist either in reduced working costs or in an increased yield of oil or both. The bulk of the oil is consumed in the kitchen; but not inconsiderable quantities are used for oil-baths, and notwithstanding the advent of kerosene oil, the old country lamp has not yet disappeared. The oil milling problem, therefore, resolves itself into finding cheaper and more efficient methods of extracting the oil, into providing higher qualities of oil which may be used as ghee substitutes, and into developing the manufacture of soaps so as to supply the rapidly growing needs of the country for that commodity, and possibly

also to opening up new markets for the same in the adjacent Asiatic and African countries, with which India has already a considerable trade.

Soap has been made in the north of India in modern factories for many years past; but the industry has never been a flourishing one, and has failed to keep pace with the demand which has grown up in the country, evidence of which is furnished by the fact that for some time past the imports from the United Kingdom have steadily increased. Many small Swadeshi factories have also been started turning out an inferior "cold process" soap, which usually has a short local vogue, and is then discarded. The industry is one which can be most efficiently worked by operating on a very large scale, and it should be located at a sea-port, so that supplies of raw material may be obtained from as wide an area as possible. A not unimportant factor in the manufacture of soap is the disposal of glycerine. In the "cold process" this by-product is incorporated in the soap itself, and helps to increase the gross yield. A really good soap, however, can only be made by the "cold process" from coconut oil and tallow, and this method of making soap, therefore, only of interest on the West Coast of India, where coconut oil is largely produced. If the soap industry is to be firmly established in India, obviously, we must look to the oil seeds as the main source of our supply of fat, and this involves the use of one or other of the "boiling processes." Boiled soaps are easily separated from the glycerine, but the recovery of the latter in a marketable form is an operation best carried out in bulk. There is a limited demand in India for glycerine, and it may be assumed that if the manufacture of soap is largely extended, the major portion of the glycerine will have to be exported. All the chemicals used in the soap factory must be imported at the present time; so that except in the matter of vegetable oils, and possibly rosie, the Indian soap boiler is at a disadvantage compared with his rival in Europe.

While it is not improbable that alkali manufacture may some day be established in India, for the present the only direction in which there are prospects of providing cheaper raw materials for soap boiling lies in the improvement of the methods of oil extraction now practised in this country, that is to say, whether we wish to obtain more oil cake for manure, or to render the country independent in the matter of soap or to provide more fat in the dietary of the poorer classes—all very desirable objects—we must turn our attention to the improvement of our oil extraction.

The technical aspects of the problem are simple, being merely to ascertain whether the methods fully worked out in Europe are applicable to the conditions prevailing in India. Much work has been done in several Indian provinces, and since the outbreak of war, public attention has been very forcibly drawn to the consequences of a diminished demand for oil seeds in Europe. As to the results accomplished, very little is known, and it is mainly with a view to promoting interchange of information and to securing some sort of co-ordination in the work going on that I have drawn up the following very brief account of the work done in Bangalore by the Industries and Commerce Department of the Mysore State since it was started three years ago.

TESTS IN MYSORE.

An examination of the rail-borne trade statistics revealed the fact that large quantities of oil seeds were exported from the State, and that large quantities of ghee and of vegetable oils were imported. It was established the fact that with the exception of one or two iron ghani mills driven by power in Bangalore, all the local extraction of oil was done in wooden or stone ghanies worked by bullocks. To provide a ghee substitute, cotton seed oil was considered promising, and after some preliminary enquiries and much delay on the part of the investing public, a Company was successfully floated to start a mill and refinery in Harihar or Davangere, where cotton seed is readily procurable. The war has, however, delayed the practical realisation of this project. From the country ghani mill worked by bullocks or the screw press used for castor seed which is worked by manual labour to the modern hydraulic press is a big step, and an intermediate stage seemed desirable. The iron ghani mill driven by power is undoubtedly an improvement on the country mill, and in many places it may be used with advantage; but a much better intermediate type of plant has been found in the Anderson oil expeller. One of these machines was set up in Bangalore for a firm of oil millers, Messrs. R. C. Muniappa and Co., who have worked the plant for about 18 months,

chiefly on honge seed (*Pongamia glabra*) with very successful financial results. Over a period of one year, during which 914 tons of seed were dealt with, an average extraction of 28.1 per cent. of oil was obtained. Commercial success depends as much upon the business capacity of the management as upon the suitability of the machinery for the work. As the net profit was about 40 per cent. on the capital invested (approximately Rs. 30,000) in the plant, it may be assumed that in this instance both were happily combined. Where a public supply of electric energy is available at very low rates, as is the case at both Bangalore and Mysore, the conditions are exceptionally favourable for the employment of an installation of this type, which requires very little labour and can be worked continuously. It is, therefore, likely that oil milling on these lines will expand in the near future. A few tests of the efficiency of extraction of the Anderson oil expeller on other seeds besides honge have been made, and in one or two cases, the analytical results have been checked by weighing the products of the process of extraction. Some tests on the extraction of oil from gingili seed in power driven iron ghani mills and in bullock driven country mills have also been made, and the results of these experiments are exhibited in the following tabular statement:—

Process of extraction.	Seed.	Per cent. of oil extracted by trial.	Analysis per cent. of oil in		Per cent. of oil extracted.	Loss of oil.
			Seed.	Cake.		
Anderson Oil Expeller	Groundnuts	44.3	33.0	8.0	27.4	17.6
Do	Castor seed	43.6	47.2	5.05	44.4	5.94
Do	Gingili seed	40.88	50.25	14.35	41.9	16.36
Do	Do	40.60	51.60	17.10	41.6	19.35
Do	Honge	40.60	57.60	17.95	41.0	20.55
Do	Do	...	30.80	13.40	30.4	23.40
Do	Do	...	36.25	15.00	25.0	31.00
Do	Mustella	...	38.9	10.9	31.1	19.20

From this table it will be seen that, with the exception of castor seed, the loss of oil is in all cases very considerable, and that the advantage of the Anderson oil expeller lies more in the ease with which it can be operated by power than in its superior efficiency as an oil extractor. Attention having been drawn to the large quantity of oil still left in the cake, it seemed desirable to make further investigations in this direction, and samples of various oil cakes on sale in the bazaars were purchased and the percentage of oil remaining in them was ascertained by analysis at the Indian Institute of Science. The results are given in the following table:—

Method of manufacture.	Cake.	Per cent.	Count.
Iron Ghani Mill, Bangalore	Copra	30.5	100
Do	Gingili	16.17	100
Do	Do	17.1	100
Country Ghani Mill, do	Do	17.0	100
Do	Do	17.8	100
Do	Do	17.85	100
Anderson Oil Expeller, Bangalore	Do	17.85	100
Screw Press, do	Do	17.85	100
Country Ghani Mill, Kergiri	Do	17.85	100
Iron Ghani Mill, Bangalore	Do	17.85	100

As it was not possible to obtain samples of the seed from which these cakes were produced, I have been unable to calculate the actual percentage of the original oil in the seed left in the cake. Comparison with the figures given in Table I, however, confirms the fact that about 20 per cent. of the oil in the seed is left in the cake. Where the cake is sold for manure, the oil left in the cake is not only absolutely wasted, but to some extent depreciates the value of the cake as manure. The oil adds weight to the cake without adding to its manurial value, and at the same time retards the decomposition which must take place before the available nitrogen can be assimilated as plant food. We may, therefore, assume that oil cake entirely free from oil when sold for manure will fetch a higher price per ton than a similar cake containing from 10 to 15 per cent. of oil. Where the cake is sold for cattle food, it should contain a certain amount of oil; but if the percentage is too large, the surplus oil is undigested by the cattle, and is in consequence wasted. Accurate information regarding the best percentage of oil in cake used for cattle food does not seem to be available.

Now, by the use of solvents such as carbon disulphide, carbon tetrachloride, trichlor ethylene or petrol practically all the oil contained in the seeds can be extracted, and it seems not improbable that in India it will pay to use some such process in connection with seeds, the cake from which is unsuited for cattle food. There is less likelihood of any advantage being obtained with seeds furnishing edible cakes; but the matter is one requiring detailed investigation. As regards oil seeds producing oil cakes only suitable for manure, it is necessary to determine the relative costs of expression by pressure and extraction by solvents to examine the prospects of a solvent plant working upon oil cake obtained from country mills and possibly also to ascertain whether a combination of the two processes would be commercially feasible. For oil seeds yielding edible oils and cakes suitable for cattle food, the enquiry should be directed to ascertaining if there is a solvent process which will yield oil absolutely uncontaminated by the traces of the solvent and a cake containing no more oil than is of real value as a cattle food. In the event of a negative answer, the enquiry should then turn to the question as to whether it will be of advantage to subject edible oil cakes such as are now on the Indian market or are exported from the country to any chemical treatment by solvents.

For some time past, the Department of Industries in Mysore and the Chemistry Departments of the Indian Institute of Science have co-operated in regard to the manufacture of soap and the realisation of the necessity for studying the supply of raw materials, for the industry has led to the initiation of an investigation along the lines indicated. Oil extraction by the use of solvents is not unknown in India; but, so far, it has not met with commercial success, and there is but little doubt that the use of solvents under Indian conditions requires a preliminary investigation such as can only be undertaken where there are facilities for chemical work. It seems almost certain that the soap makers will find raw materials which can be rendered available for his business by the use of solvents, and it is almost equally certain that when the conditions essential to success are better understood, the solvent process of oil extraction, which is so largely used in Europe, will be found applicable to India.

INDIAN TEA ASSOCIATION.

EXPORT DUTY ON TEA.

At the first meeting of the General Committee of the Indian Tea Association appointed for the year 1916-17 on the 15th March, the question of the export duty on tea proposed in the Budget introduced in the Imperial Council on the 1st March, has engaged the earnest consideration of the Committee. A note had been prepared indicating the position from the point of view of the Association, and this was, after approval by the General Committee, forwarded for information to the Hon'ble Mr. F. H. Stewart, C.I.E., representative of the Bengal Chamber of Commerce on the Imperial Legislative Council. The note went into the position in detail and explained fully how an export duty on Indian tea would affect the industry adversely in competition with the tea industries of other producing countries in which the teas were not so taxed. The Calcutta Tea Traders' Association had also submitted a representation regarding the exemption of forward contracts from the duty.

With reference to these representations, the Department of Commerce and Industry subsequently requested that representatives of the two Associations should visit Delhi for the purpose of discussing matters with

them and in accordance with this request, Mr. A. D. Gordon, Vice Chairman of the Association, proceeded to Delhi on the 6th March along with Mr. W. J. Lloyd, Chairman of the Tea Traders' Association. On his return from Delhi, Mr. Gordon submitted a report regarding the meetings Mr. Lloyd and he had had firstly with the Hon'ble Mr. Stewart and later with Sir William Clark, Member for Commerce and Industry, the Hon. Mr. Low, Secretary of the Department, and Mr. Ley, Deputy Secretary.

At this latter meeting, the whole question had been discussed at length and Sir William Clark had then indicated that no revision of the proposal regarding the duty was probable nor was it possible to say whether the tax could be regarded as temporary as the Finance Member, in view of the uncertainty of the future financial position could not bind either himself or his successors in office. With regard to the effect of the export tax on the position of India in competition with other producing countries, particularly Java, it was explained that the production of Java had very largely increased in recent years, and would increase still further in the near future. Sir William Clark pointed out that as Ceylon had imposed an export duty of the same amount as the proposed export duty, India was now being placed in the same position as her most formidable competitor, and that he would have thought that in comparison the advantage which would accrue to Java was a small affair.

In this connection the Hon'ble Mr. Stewart referred to the Conference which was, it was understood, to be held in Paris at which the Allies and the Dominions would be represented. He enquired whether the British Government would be prepared to recommend that a corresponding import tax should be imposed on teas from other countries, but with reference to this suggestion Mr. Gordon explained that such a tax would have little effect unless it was levied by Russia, the Dominions and other countries as well as by the United Kingdom. Sir William Clark stated that so far it was not known whether India would be represented at the proposed Conference, but, if it were, he thought this point might reasonably be brought forward.

On the question of the application of the tax to the unshipped balance of last season's crop, it had been urged that under normal conditions this tea would all have been shipped already, but that shipment had been impossible owing to the lack of freight. As the conditions were exceptional it had been contended that this balance should be exempted from payment of the duty. In regard to the question of tea, which had already been sold at public auction, it had been arranged that all tea so sold up to the 29th February should be exempted. But with reference to tea awaiting shipment in garden account Sir William Clark did not consider that any good reason had been advanced for its exemption from the duty as the same abnormal conditions applied to other industries which were affected by the shortage of freight.

SOME INDIAN TIMBERS.

A series of notes on Indian timbers is continued in *Forest Bulletins* which deal with blackwood or rosewood of Southern India (*Dalbergia latifolia*, Roxb.), dhauri (*Lagerstroemia parviflora*, Roxb.), and sundri (*Heritiera minor*, Lam.). In each case an account is given of the distribution and habitat of the tree, the character, properties, and uses of the timber and minor products, the reproduction and rate of growth of the tree, together with notes on distribution and extraction in different provinces, and statistics of output and prices. As in the case of the previous *Bulletins* a longitudinal section of each timber is included.

Blackwood or rosewood occurs over a large area of Peninsular India, but is rare in the north and is nowhere abundant. It is most common along the Western Ghats, where it reaches its largest size, trees of 20 ft. in girth and up to 90 ft. in height, with a clear bole of 70 ft., being found in the semi-moist deciduous forests of South Coimbatore, Madras. The heartwood is of a dark purple colour with rather conspicuous longitudinal black streaks. It takes a very fine polish and is largely used in the manufacture of high-class furniture as well as for internal decoration, panelling, doors, etc. It is stated to be one of the best timbers known for gun-carriage wheels, and is also used by the Ordnance Department in India for a great variety of other purposes. The timber has given excellent results as railway sleepers, but its high price prevents its being extensively used for this purpose. Rosewood is shipped to Europe in small quantities from the divisions of Central Coimbatore, Eastern Kanars, and Nilgiri, and there was formerly considerable trade from the South Malabar Division.

Dhauri is fairly common in certain parts of the Sub-Himalayan tract from the Sutlej eastwards, and is also found in Assam, Lower Bengal, Orissa, Central India, Northern Bombay and Burma. The wood is very hard and of a grey or greyish-brown colour. It is not very durable, especially in exposed situations, and is liable to the attack of white ants. It is used in constructional work for house-building, in the making of carts and tool handles and has been tried for railway sleepers and for opium chests with good results.

Sundri is found in the tidal forests, which lie on the inner side of the mangrove belts. In Bengal, such forests occur in the Sunderbans and along the Chittagong coast; and in Burma, along the coast of Arakan and Bassein and round the islands off the South Tenasserim Division. The heartwood is brown-red or dark red in colour, very hard, close grained, elastic, very durable and one of the strongest of Indian timbers. The timber is extensively used locally in boat and carriage-building, for agricultural implements, and for furniture and constructional work. Its use for the last-mentioned purpose might be considerably extended, but in Burma there is a preference for the standard timber, teak.

INDIAN HYOSCYAMUS.

OUSTING GERMAN CHEMICALS.

Mr. J. H. Barnes writes in the *Agricultural Journal of India*:-

The great European war which has now been raging for over seventeen months has brought the world face to face with many economic problems which have previously escaped the notice of the general public. We read of the disturbance caused in the world's dye markets and the trades depending upon artificial dyes by the isolation of Germany, and one important phase of this in Indian rural economics is that the natural Indigo trade has taken a new breath of life for the time being. Germany for the first time to the uninitiated appears in the rôle of the principal producer and controller of the world's supply of dye chemicals. Not least in importance of these are the many medicinals of which Great Britain and her dependencies now find themselves short, dangerously short. A number of these compounds belong to the class of the so-called synthetic drugs—that is to say, such medicines as antipyrine, sulphonal, etc., which are artificially manufactured from simpler compounds. But besides these the faculty still has to make use of a number of plant products, medicinal principles, which can be isolated only from specific plants and parts of plants like quinine from the cinchona bark; strychnine from the *Nux vomica*; and atropine from the *Atropa belladonna*. Similar to strychnine is another well-known mydriatic alkaloid of wide use, viz., hyoscyamine—which is obtainable from the *Hyoscyamus niger*—the henbane of the English country lane. The writer recently had occasion to analyse a sample of Indian *Hyoscyamus* (probably the *Hyoscyamus muticus*—an allied species of the genus *Hyoscyamus*) grown in the Punjab, where large quantities of the plant occur in the wild state along the river sides. The assay showed the dried plant to contain the very high amount of 0.827 per cent. of mydriatic alkaloids. This is very much richer than the English henbane, in fact it is nearly ten times as strong. Specimens of Indian henbane have been known to contain as much as 1.28 per cent. of alkaloid and unlike the English variety *Hyoscyamus niger* which contains the alkaloids hyoscyamine, hyoscyne, and scopolamine the Indian variety *muticus* is said to contain only hyoscyamine. As a source of this important alkaloid hyoscyamine Indian *Hyoscyamus* should receive the attention of the manufacturer of fine chemicals and drugs.

For the information of those readers of the journal who are interested in the chemistry of this subject or the manufacture of hyoscyamine below are given the details of the method of assay used, which is a modification of that devised by Rupp. (*Pharm. Zeit.* 1908, 738; *Chem. Zeit.* 1908; 32, 529; *Pharm. J. Russ* 1911, 138; *J. Pharm. Chem.*, 1911, 3551). The method can be used for assaying extracts of belladonna also.

Twenty-five grams of the powdered leaf are extracted with 300 cc. hot alcohol Sp. Gr. 0.829 in a Soxhlet tube (4 times was found sufficient to exhaust the leaves and obtain a washing free from alkaloids). The alcoholic extract is evaporated until a sticky brown mass is obtained. This is weighed and the weight noted. Six grams of the extract so obtained is weighed into a stoppered flask. About 50 cc. of water, 90 grams of ether and one gram of ammonium hydrate are then added and the mixture shaken for 15 minutes. After separation 60 grams of the clear ethereal layer is filtered off and the solvent evaporated. The residue is then treated with 5 grams of ether and again evaporated to dryness. This is repeated three times, each time with 5 grams of ether. The residue is then dissolved in 5 grams of alcohol 70 per cent. and the solution transferred to a graduated 100 cc. flask.

The first flask is washed out with another 5 cc. of alcohol 70 per cent. and then with water. To the bulked washings is added 20 grams of sodium chloride and 20 cc. of N/100 HCL are added with sufficient water to bring the whole contents up to 100 cc. After thorough agitation the solution is filtered. 50 cc. of the filtrate is transferred to a stoppered flask. 30 cc. of ether and 5 drops of Iodoacetic indicator are added. The excess of hydrochloric acid is then determined by titration with N/100 KOH in the usual manner.

In the meantime, a blank experiment with the same reagents but without any extract of the leaves, is performed to obtain the correcting factor for reagent impurities, and this is deducted from the above titration figure. This precaution is absolutely necessary as a correction of upwards of 2 cc. of N/100 HCL is frequently found.

Each cc. of N/100 HCL used by the alkaloids = 0.00289 of mixed alkaloids as hyoscyamine.

This is not the first time that Indian *Hyoscyamus* has been examined, for Dunstan and Brown examined a specimen (*J. C. S.* 1899, 75, 72), but only 0.1 per cent. of alkaloid was then recorded. It is possible that more than one variety of *Hyoscyamus* exist and that the alkaloidal contents of the varieties differ considerably. It is also more than likely that the amount of active principle present will depend upon the age and condition of the plant, for Godamer (*Arch. Pharm.* 1898, 28), has shown that in *Hyoscyamus muticus* the stalk contains 0.49 per cent., the leaf 0.9 per cent., and the seed capsule 0.585 per cent. of alkaloid.

Previous to the outbreak of the present war not only was a large proportion of the drug grown in Germany but German chemists practically held a monopoly for the manufacture of the alkaloid.

If then the supply of this substance falls short of the demand, English manufacturing chemists can obtain an adequate supply of the raw material from Northern India, for the plant can be exported in the dry state without impairing its value for alkaloidal manufacture.

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SATURDAY, APRIL 8, 1916.

SPECIFICATIONS

AND

ESTIMATES

FOR

TEA AND RUBBER FACTORIES,
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Letters to the Editor.

Intensifying Small Currents.

SIR,—In the course of certain experiments, I felt the necessity of intensifying small electric currents. Naturally I thought of employing a Post Office Standard Relay, but, finding that it was not easy to procure one in this mofussil town, I had to think of other means of effecting this intensification. I finally adopted the following arrangement. The small currents referred to above were made to deflect the suspended magnetic needle of a tangent galvanometer. The aluminium pointer attached to the suspended needle was made to touch two insulated metallic springs whenever deflected. The metallic rods were connected to a strong battery through an electric bell. Therefore, corresponding to the small deflections in the needle due to small currents, larger currents were produced in the circuit of the strong battery as long as the deflection in the magnetic needle was maintained by the small currents. On subsequent thought I find that such an arrangement may be used in the Telegraph Office instead of the Post Office Standard Relay. In the old system of needle telegraphy, we can attach to the horizontal axle of the magnetic needle or to the metallic frame in which the horizontal axle is supported one pole of a strong local battery, the other pole being connected through a Morse sounder to the brass strips on which the vertical needle of the galvanometer strikes whenever deflected one way or the other. Hence a small current from one station deflects the needle of the galvanometer at another station which strikes on one of the brass strips, completing the circuit of the local battery, which works the Morse sounder. This arrangement, therefore, combines both the old needle and the modern Morse systems, one or both of which may be used for telegraphic purposes. Thus the comparatively costly Post Office Standard Relay is dispensed with. May I now request you, or any of your numerous readers versed in telegraphy, to let me know directly or through the columns of your valuable daily, whether any such arrangement has been tried before and, if so, why the Post Office Standard Relay was preferred to this?

V. N. VISWANATHAN, M.A.,
Lecturer in Science, Salem College.

PLANTING MATTERS.

TEA.

THE LONDON BROKERS' REPORTS ON THE tea market during the past year are, on the whole, of a very encouraging nature, though here and there a note of warning is uttered as to the danger of coarse plucking. One always hears of this when prices for common tea are high. The crop from Southern India is the largest that has yet been shipped and average prices for Indian tea generally, in spite of the set-back in November and the beginning of December, have been the highest recorded since 1891. The quality of the South Indian tea grown at a high elevation in the Nilgiri District and in Travancore is found to be quite equal to Ceylon teas grown under similar conditions. A feature of the market has been the large increase of tea sent from Java, which to the end of October was 81 million lbs. against 60 millions in the same period last year. This tea is finding a ready sale in London. Sumatra tea is also attracting considerable attention, though the quantity imported is still small.

Planters have a good many difficulties to contend with in carrying on their business, in spite of Sir William Meyer's statement that they are well able to stand extra taxation. It would be easy to make a list of the various articles used on estates and in factories that have gone up surprisingly in price. But the increase in freight is so enormous that it is not much use mentioning comparative trifles. At the end of 1913 the rate was 27s. 6d. for 50 cubic feet of space from West Coast ports; it is now 177s. 6d. Freight and London charges for selling, warehousing and insurance used to work out at 3d. per lb.; they now amount with war risk to nearly 3d., and the new export duty will add another 3d. Compared with two years ago, it costs the planter 2½d. more to get his tea on the market. With a big crop last year his f.o.b. charges may have been a little under As. 5 per lb. With the probability of a smaller crop and the increased cost of various materials they will be over As. 5 in 1916. The 3½d. to be added to this leaves a margin of profit if present prices are maintained, but it is not a margin that indicates the tea planter as a special subject for taxation.

COFFEE AND RUBBER.

Coffee and rubber planters have also to pay these increased charges for freight. The latter are doing well and can carry on. But coffee men have not had a good year, and will feel the pinch, though it is likely that the bulk of their crop will have been shipped before the great rise in freight took place. So they can hope for good crops and lower charges next season. It is no use abusing shipowners for taking advantage of their position. Planters in India are not the only sufferers. It is when the shipowner complains that he is worse off than he was, that one feels slightly annoyed. Mr. A. S. Clift, writing in a London paper, remarks that "the ordinary ocean-going cargo steamer on time charter at rates which were current before the war made a net profit after allowing for depreciation and all expenses of about 7½d. per ton per month, which gave a return of about 5 per cent. on the capital value of the steamer. The present Government or Blue Book rate of hire for requisitioned steamers allowing for the increased cost of running leaves a profit of about 4s. 3d. per ton per month, or about seven times as much as owners were making ordinarily in times of peace." (Requisitioned steamers are not doing as well as those left for ordinary trade.)

One possible means of alleviation would be an increase of sales of tea and coffee in India, both by individual effort and the help of the Indian Tea Cess Committee. The Committee has taken some steps in this direction. Another help would be the placing of an import duty on tea brought into India, say, As. 4 per lb., instead of allowing the importer to put as small a value on it as he chooses. There are not expert valuers at many Indian ports. The Indian planter is taxing himself to find new markets, and ought to have fair play.

PLANTERS AND LABOUR.

The Labour Department of the U.P.A.S.I. has now been at work for a year and a half, and is generally admitted to be doing good work under the energetic and able management of Mr. Martin. It has more than 100,000 acres subscribing to it. It has been a heavy handicap for it to have commenced its work simultaneously with the outbreak of the great war. It has sustained heavy losses by the death of two of Mr. Martin's most trusted assistants within a few months of each other and by others of his fellow-workers having joined the army. Moreover, the Department has come in for more than its share of hostile criticism, which, perhaps, culminated at the last Bangalore Meeting of the U.P.A.S.I. We may hope that it will in future be allowed to carry on its work, and that those who do not require its services will leave it alone till they do. The Government of Madras have already recognised the usefulness of the Department to some extent, although it is not likely to take it so completely under its wing as the Government of India have the Labour Bureau in the North. Mr. Martin and the Committee have carried on in spite of a great deal of discouragement and misrepresentation. It is to be hoped they will soon find themselves in smooth water.

The more the reliability of local enquiries as to the character and status of maistries seeking advances is recognised, the better it will be for everyone concerned. This is a line on which the Labour Department is specialising. It ought in course of time to almost entirely relieve planters from having to resort to criminal courts to prosecute their employees. This would be a highly desirable state of affairs both to the planter and to Government.

The labour difficulty has been somewhat eased in the last year or so. The demand for coolies in the Straits has lessened, and since the war began there has not been so much new opening of land. But when business settles down again and openings for capital are looked for, the hundreds of thousands of acres of land in South India suitable for cultivation of various products are certain to attract attention. It is, perhaps, doubtful if the present area of coffee, 220,000 acres, is likely to be greatly increased. But with the seemingly unlimited demand for tea and rubber, the respective acreages of 64,000 and 44,000 in Southern India appear small. Given reasonable facilities, there is no reason that they should not both equal the area of coffee in the course of comparatively few years. Government can help development by providing facilities for transport, railways and roads, and at least one harbour on the West Coast which will be open all the year round. The policy of putting prohibitive rates on timber on land which planters want to take up, such as have been recently demanded in one Native State, ought to be discouraged. It does not appear to be any advantage to keep vast areas of jungle undeveloped. For the rest we come back to the same point, which is the necessity of going on organising the sources of labour supply, which seems likely to be more than ever necessary in the near future.

The triennial meeting of the Board of Forestry has just been held at Dehra Dun. An address was given by Mr. G. S. Hart, Inspector-General of Forests, in the course of which he had some remarks to make on the possibility of capturing some of the trade which until recently has been largely or entirely in the hands of the Germans. He mentioned two important products with experimental preparation of which the Chemical Adviser to the Forest Research Institute has been intimately concerned, namely, thymol and salicylic acid. The manufacture of these products has hitherto been almost exclusively in the hands of the Germans. Preliminary experiments, said Mr. Hart, in the manufacture of thymol carried out in February, 1916, in the chemical laboratory of the Forest Research Institute, demonstrated the practicability of undertaking its manufacture on a commercial scale, and two months later the Dixon Chemical Company established a factory at Dehra Dun, which is now turning out regular supplies of thymol of excellent quality from ajowan seeds.

SCIENCE AND PLANTING.

PHYSIOLOGY OF RUBBER TAPPING.

THE MOST IMPORTANT DISCOVERIES bearing on planting industries in Southern India which have been published recently are those relating to the influence of tapping and other factors on the storage of plant food in Hevea trees. These investigations have been carried out in both Ceylon and Malaya independently, and the conclusions arrived at agree closely on all the main points.* Starch is the principal form in which plant food is stored, and it is this body which has been chosen as a reliable index of the extent to which the energies of the tree are being drawn up on under different conditions. One would naturally expect to find some change in the starch content of the tree at the period of leaf fall and leaf formation, and, again, when the tree is tapped one would expect to find some diminution of starch reserves in the neighbourhood of the tapped area due to the drain on this store of food by the renewing bark. The results of the investigations show that the effect of careful tapping is localised. Starch is withdrawn from the wood immediately behind the cut and partially from a narrow zone of bark below and at each side of the tapped area, but the starch content of the bark right down to the top of the tapped area is unaffected. That is to say, the effects of tapping are almost purely local, which is rather a new idea, and this discovery will have a profound effect on the choice of the best tapping system to adopt. Thus it justifies the surmise that by changing the tapping from one part of the tree to another at intervals the resting period of each area so tapped is nearly as effective as if the whole tree had been rested, and it would, therefore, appear that the "change over" system would be of benefit not only as regards bark renewal, but also as regards rubber yield. This system is coming into growing favour with rubber planters in the East, a change over being made every six months, and by its means bark removal can be easily checked.

With regard to the effect of different systems of tapping the evidence is in favour of a small number of cuts, and there are indications that regular prolonged resting periods are of benefit to the tapped area. A tapping cut extending over half the tree's circumference need produce no more widespread effect in the neighbourhood of the tapped area than a cut extending over one quarter or one-third of the tree's circumference. Fitting was of the opinion that an examination of the starch reserves in the tree would be a useful method of determining when the trees were ready to be re-tapped after the whole of the bark had been removed once, and he recommended that such an examination of the starch reserves in the bark should be made at least every four years. The results now before us show that this is not necessary, but that the thickness of the renewed bark forms a perfectly safe criterion as to when the trees may be re-tapped. Any depletion of the starch reserves caused by tapping is small in amount and temporary in duration. As a rule, the rapid growth which takes place on the renewing surface, which is followed before long by the filling up of the newly-formed cells with starch, is not associated with a material diminution of the reserves in the neighbouring tissue, and it appears, therefore, that the amount of food brought directly from above to the renewing surface is adequate for its requirements.

The Hevea tree normally sheds its leaves during the dry period which occurs during the first three months of the year in Southern India, and this periodic defoliation is referred to by planters as "wintering." The practical point of importance to planters in connection with this wintering is to know whether it necessitates, or at any rate makes advisable, a temporary stoppage of tapping operations. The tree has to form a new crown of foliage, and this can only be done by drawing on the reserve of food stored in the wood and bark as starch.

* L. E. Campbell in Ceylon Dept. Agric. Bull. Nos. 16, 19 & 22.

E. Bateson in F. M. S. Agri. Dept. Circular.

Botanists and planters alike have often expressed the opinion that the trees should not be exhausted of their food reserves at this time by a removal of bark, and that tapping should, therefore, cease during the wintering period. In estate practice, however, this is not always convenient for various reasons, and it would result in a loss of rubber, and possibly in a disorganisation of the labour force. Any harmful effects of tapping during the wintering period will show themselves primarily in the exhaustion of the food reserves, and the problem was studied from this point of view. It was found by comparing the starch stored in a wintering tree being tapped on the one hand and in a wintering tree being rested on the other that during defoliation and while the trees are leafless there is, as would be expected from our knowledge of food translocation, no apparent diminution of the amount of starch in the lower part of the trunk, but that a diminution is noticeable after the bursting of the new buds.

Those who have advised resting the trees during the wintering season have assumed that the extra tax on the tree was only felt during the few weeks when it was shedding the old leaves and replacing them with new ones. It is not, however, this temporary inability of the tree to manufacture food while it is leafless, but the general impoverishment of the tree due to the call on its reserves of food in order to make a new crown of foliage which matters. This impoverishment lasts over a period of many months, and when it is considered how slight the depletion of food material caused by tapping is as shown above, it is clear that to stop tapping for a few weeks would have very little effect in conserving the food store in the tree as a whole. If the tree is given ample space in which to develop its crown, and here the importance of thinning out too closely planted trees comes in, it will recover in due course from the effect of wintering, even though tapped continuously during this period. The conclusion reached, therefore, is that the effect of wintering is spread over such a long period that it merely forms part of the general problem of discovering a method of tapping, which, over a period of years, will not so exhaust the tree as to check its full natural development, and that there is no need to stop tapping during the wintering period so long as the yield of rubber obtained justifies the amount of bark being used up in the process.

SECONDARY LEAF-FALL OF HEVEA.

On some rubber plantations in South India and also in other rubber growing countries in the East, besides the normal wintering in the dry weather a second leaf-fall occurs in the monsoon. Not all the leaves fall at this time as they do at the beginning of the year, but the foliage is very much depleted, some trees being more affected than others. This secondary leaf-fall has been found to be due to a disease caused by a fungus known as *phytophthora theobromae*. The fungus apparently first attacks the young fruits, and the fruit pods finally split, but do not shed their seeds in the normal explosive way, but remain hanging from the branches by their stalks. From these pods the fungus spreads to the stems, and finally to the leaf stalks and leaves by means of spores, the formation of which is favoured by the moist conditions obtaining during the monsoon. When attacked by the fungus the leaves fall off. This fungus is also probably the cause of bark rot during the monsoon. The complete life history has not yet been worked out, and it is not certainly known exactly where the resting spores which carry the disease over the winter are situated, though probably they are to be found on the branches. Practical means for resisting the attacks of this disease have yet to be worked out, and work is being continued on the subject.

This secondary leaf-fall has a marked effect on the health of the tree, and ultimately upon the yield of rubber to be obtained from it. It is obvious from what has been said above that the trees affected by this disease will experience a double drain on their food reserves, since the crown of foliage has to be replaced twice in the year instead of only once. Normally the food reserve reaches its maximum before the normal wintering begins, and it is then drawn upon to replace the foliage, and after that it is gradually restored during the year. In the case of trees attacked by the disease which causes the second leaf-fall, however, before the maximum storage is reached, there is another call on the food reserves, and the ultimate effect must be deleterious to the general health and development of the tree.

ARSENICAL SPRAYS FOR WEEDS.

In tropical agriculture the business of keeping down weeds is a big one, and estates which adopt a clean weeding system find that their weeding bill is a considerable item in the annual expenditure. Even when the more scientific practice of controlling weeds by means of a cover crop is adopted the natural weeds are a nuisance and require constant attention to ensure that they do not get out of hand. In past years a large number of experiments have been made with chemical sprays to kill weeds, and in the United States it is the practice to keep railways and road-sides clear of weeds by spraying them periodically with chemicals. When using such sprays on the weeds in a cultivated area the difficulty is to find a spray which will not injure the permanent crop. Recently the use of sodium arsenite has come to the front in the United States and Hawaii as a weed killer, where labour is expensive. This spray is easily made, and is found to be very effective, and unless it is used in excessive quantities it has no prejudicial effect on a permanent crop like fruit trees.

A few months ago the results of an investigation into the ultimate fate of the arsenic was published.* It was found that soils possess a strong fixing power for this element, and that when a sodium arsenite spray is used for killing weeds the arsenic will ultimately be deposited in the surface soil, there to remain in spite of the leaching effect of rain and irrigation. Chemical reactions are involved resulting in this fixation of arsenic in difficultly soluble forms. Apparently, however, there is little or no immediate danger to crops from this deposition of arsenic, and in some of the types of soil investigated the ammonifying and nitrifying bacteria were stimulated by its presence. Furthermore, it was found that in time the arsenic loses any toxic influence it may have on plants, so that there is no danger in using this spray. In how far such a method of destroying weeds would be of use in India, where labour is cheap, remains to be seen, but it might possibly be of use on newly opened estates, where labour is scarce and weeds grow rapidly. In some cases it is the custom to "ring weed" or "line weed" young rubber trees for the first few years where labour is insufficient to clean weed and where a cover crop cannot be established. In such cases an arsenic spray might possibly be used with advantage to keep the weeds on the unweeded area from seeding, now that it is known that there is no danger to the crop likely to result from the practice. Of course, great care would have to be taken that when the spray was being applied it did not reach the foliage of the permanent crop. In combating lantana and sensitive plant and similar weeds which are rapidly destroying available grazing grounds in some parts of South India such a spray might be of use. In Ceylon the attempted eradication of lantana has been taken up by the Government, but difficulties are being experienced. In a recently published administration report it is stated that it has been found that re-growths have to a great extent overtaken original clearance work, much of which has now to be done over again, and it is considered that even with the help of the new regulations on the subject it will not be possible to do more than prevent the further spread of the weed.

* W. T. McGeorge in Jour. of Agr. Research (U. S. A.)

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WORLD'S COTTON SUPPLY.

INDIA'S PLACE.

BY PROFESSOR J. A. TODD,

Author of "The World's Cotton Crops."

THERE HAS BEEN A GREAT DEAL OF DISCUSSION during the past six months with regard to the price of cotton and its remarkable recovery from the very low ebb to which it fell soon after the war. The facts are worth recalling, not only because of the importance of the cotton trade to India, but also as an illustration of the vicissitudes through which some of our great industries have passed as the result of the war. American middling, which is the basis price of cotton in all the world's markets, stood at 7s. 38d. per lb. in Liverpool on the 24th July, 1914, the last Friday before the war scare sent all the world's markets reeling downwards. Had the Cotton Exchanges not been closed by the world-wide financial crisis, which actually preceded the outbreak of war, there is very little doubt that prices would have fallen to an unprecedentedly low level; but the Exchange Committee fixed nominal prices, and reduced these gradually, though a good deal of cotton changed hands at lower prices than those so fixed. It was a very anxious time, and no one could tell how far prices would go down; but the turn came without any very definite or apparent cause before the end of October, and by the middle of December the crisis was safely passed. The Exchanges had reopened in November, and the minimum official price of 4s. 25d. was touched in the second week of December. In passing it must be noted that that price was really very good in the circumstances. The previous low record was 4s. 92d. in 1911-12 when an American crop of a little over 16,000,000 bales sent prices down again from the famine price of 8s. 50d. which had marked the failure of both American and Egyptian crops in 1909. If sixteen million bales sent the price below 5d. in normal times, what was to be expected of a crop of over seventeen million bales in war time, when the demand of all the world seemed to have dried up? It was, therefore, a remarkable proof of the real soundness of the world's position in cotton that the price only fell to such a comparatively high level, for after all 4s. 25d. is comparatively high if we recall the prices of twenty years ago, when American middling was below 3d. per lb. in Liverpool.

But the effect of this fall upon the cotton growers had next to be reckoned with. It went without saying that the fall in prices would seriously discourage the cotton planters in every part of the world, especially in view of the very high prices obtainable for other more or less competing crops, especially wheat, maize and stock. The situation which faced the American planters, for example, was difficult in the extreme. They had not merely to carry the largest crop they had ever grown and prevent it being thrown on the market as "distress cotton", but they had to take steps to secure a reduction of the next year's supply, so as to ensure an adjustment of the supply to the reduced demand. The second part of the task was easy enough; in fact, it achieved itself automatically, for the fall of prices was sufficient to lead to a heavy reduction of acreage without a word being said for such a policy. But it was in their unexpected capacity to hold the record crop of 1914 that the American planters astonished the world. It had always been understood that the cotton growers were in a chronically weak economic position, which compelled them to sell their crop at any price obtainable as soon as it was gathered. Again, it was always understood that there was no storage accommodation in the cotton belt for any large proportion of the crop. But both of these ideas were completely falsified. Whether from their own resources or by the aid of special financing arrangements the planters did hold a very large part of the crop, which, as a matter of fact, never came to market at all, and, indeed, it is doubtful whether some of the American crop of 1914 has come "into sight" yet. There is good reason to believe that a large number of bales was purchased by "continental" interests when prices were at or near the lowest, and that these have been held ever since awaiting either a chance to run the blockade or the return of peace when there will beyond question be a great rush for cotton in common with most other raw materials.

It was mainly due to this unexpected holding power that the price of cotton did not go much lower than it did, but it went low enough to discourage the growers from

planting the usual area in 1915, and before the season was very far advanced it became evident that the world's acreage had been very much reduced. Details are rather ancient history now, but it is beyond doubt that the three principal crops, American, Indian and Egyptian, showed a reduction of not much less than 30 per cent. over all. And as the season drew on it became apparent that 1915 was not to be favoured with the same unusually good weather as had produced the bumper crop of 1914. To make a long story short, the result was a reduction in the world's cotton supply for 1915 of at least seven million bales, or fully a quarter of the normal supply. But the cotton world relying on the supposed enormous carry-over from 1914 and the apathy of demand, did not worry about the shortage until about August, 1915, when prices suddenly began to soar, and the upward movement continued practically without a break until, in January, middling American touched 8s. 35d. in Liverpool, or nearly double what it had been little more than a year before.

This recovery then was merely the natural result of a much reduced supply combined with a recovery of demand to something like normal dimensions. But though demand was once again fairly normal in quantity, it was entirely abnormal in character and especially in its origin. The demand of Germany, Austria and Belgium was, of course, practically nil, while that of France and even England was very much reduced. But the United States and Japan came in to take their places to an astonishing extent, and it soon became evident that the world must have cotton even in war time, and was prepared to pay a high price for it.

But the question of greatest interest now to everyone whose hopes lie in cotton is as to the future. Will the present level of prices last, or is it only a flash in the pan or a temporary inflation due to the abnormal conditions of the war? It may be admitted that the latter is partly the cause of the very high prices in Liverpool, which are to some extent due to the impossibility of getting freights for cotton even at the present unheard of rates. But this does not affect the real basis price of cotton which is the price in New Orleans. In Texas, which supplies nearly one-third of the whole American crop and almost as much as the whole Indian crop, the cost of production of cotton and especially the labour cost has been going up in recent years by leaps and bounds until now it is certain that any price materially below twelve cents in New Orleans means that many of the planters are seriously discouraged from growing cotton, and although they cannot abandon cotton altogether, they will certainly reduce their acreage to some extent in favour of other crops which stand higher now and which have the great advantage of requiring less labour. For labour is the limiting factor in the American crop. Texas is absolutely necessary to the cotton world. There is no other country which could possibly take its place for many years to come. Texas, therefore, must get its price; and if it does so, the world's price of cotton must remain fairly high, something about present levels in short.

Now it hardly needs to be pointed out that the situation thus created is one of great interest to India. There is simply no country anywhere which could promise, say, a million bales more cotton every year for the next few years, except India. India certainly can grow more and better cotton than she has been doing in recent years, and it will pay her to do so at anything like present prices. There are, however, many difficulties to be faced if India is to take full advantage of the present opportunity. In many respects the present system of cotton cultivation in India is exceedingly unsatisfactory, as may be seen, for example, from two facts, that in quality and condition, the great bulk of the Indian crop stands at the very bottom of the world's scale, and that the average yield of cotton in India is only about 80 lbs. of lint per acre against over 200 in United States, and over 450 in Egypt. This very unsatisfactory state of affairs is due to several causes, of which probably the first and most important is the defective seed supply. The improvement of the seed supply is of the first importance in cotton, and until a comparatively few years ago nothing at all was being done in India. The efforts of the Departments of Agriculture since then have been most laudable and most successful, but they have long passed the point at which something further was necessary to carry their work to fruition. Seed farms for the distribution of the improved seed on a commercial scale are the logical outcome of the establishment of pure

7

Government of Madras.

HOME DEPARTMENT.

(EDUCATION)

G.O. No. 960, 12th September 1916

N.P

ORIGINAL.

Anderson oil-exPELLERS

Issuing orders on the proposals submitted by the Director of Industries in regard to the disposal of the — purchased by the Department of Industries.

GOVERNMENT OF MADRAS.

HOME DEPARTMENT

(Education).

READ—the following papers :—

I

Memorandum No. 4360-1, Educational, dated 13th December 1915.

A copy of the leading article on oil-pressing experiments which appeared in the "Hindu" of the 9th instant is forwarded to the Director of Industries for report as to the correctness of the facts stated and the conclusions drawn therefrom.

C. G. TODHUNTER,
Acting Secretary to Government.

To the Director of Industries.

II

Letter—from K. T. B. TRESSLER, Esq., Acting Director of Industries.
To—the Secretary to Government, Educational Department.
Dated—Madras, the 4th/5th January 1916.
No.—K-107.

In reply to Government memorandum No. 4360-1, Educational, of the 13th December 1915, I have the honour to state that before the war started preliminary enquiries had been instituted regarding the value of Anderson oil-expellers as substitutes for ordinary country mills. Soon after the outbreak of war, the sales market for oil-seed suddenly stopped and stocks began to accumulate. The suspension of work in Marseilles, which is the world's centre of the oil-crushing industry, afforded a chance of developing the export trade in oil instead of, as now, exporting the seed.

2. Measures intended to improve indigenous methods of oil-pressing I term substitutionary, those to afford relief to the congested seed market by pressing oil I term protective, those intended to develop the export trade I term progressive or expansionary.

3. I have repeatedly pointed out that substitutionary and progressive measures are mutually exclusive. The market for the two is different, the character of the product is different, the scale of work is different and generally there is no comparison between the two at all. In my original proposals it is true that I dealt mainly with the substitutionary aspect of oil-pressing but subsequently I made a great point of the necessity for doing at least something for protection. My idea was to purchase plant with the immediate object of protection but as the situation at that time was merely an ephemeral one, I pointed out that the smaller plant might be used subsequently for substitutionary purposes and the large plant for expansion purposes.

4. I observe that in the G.O. No. 52, Educational, dated 16th January 1915, Government deal only with the question of substitution and expansion, although the nature of the plant sanctioned (G.O. No. 158, Educational, dated 13th February 1915) leads to the inference that its protective value was also recognized. So far as substitutionary policy is concerned (namely, the demonstration of the value of an improved appliance) it is evident that one plant of each kind is sufficient. I proposed two kinds of smaller plant but only one was sanctioned (the Anderson expeller) and of this type I was allowed to purchase two machines mainly for the reason that immediate delivery had been promised.

5. My primary idea was to afford immediate protection with a view to further subsequent experiments with regard to substitution and expansion. This idea I have carried through and have also made extended experiments on the question of substitution. Expansion I have not been able to touch because I have been unable to obtain delivery of the plant.

6. The leading article in the "Hindu" ignores the protective aspect of my proposals. This is perhaps excusable since I observe that it has not been emphasized in the Government Order and in my first letter No. 146-G./A., dated 12th September 1914,

which the "Hindu" quotes (written a month after the outbreak of war when I had not fully studied the situation) I laid stress on substitution rather than protection. If, however, the writer had taken the trouble to study the whole literature on the subject and to make enquiries, he would have known that the primary object of the work was protective in character.

7. However, even if we leave the protective aspect out of the question altogether, the writer again falls into a grievous error because he has entirely ignored the third aspect of the question, namely, expansion. In the G.O. No. 52, Educational, dated 16th January 1915, it is clearly stated that the plant is sanctioned both for substitutionary and expansion purposes. The liabilities so far incurred are approximately Rs. 12,000 for the substitution plant and Rs. 60,000 for the expansion plant which has not yet been delivered.

8. As regards the substitution plant, I got the first Anderson expeller to work in October 1914 and made preliminary trials with a variety of seeds. As, however, the only practical test for a machine is by extended trial on one class of seed only, I selected groundnut and confined myself to this to begin with. Crushing was begun in October and carried on fairly regularly till the middle of December when there was a break of a month while the plant was being transferred to another site. After that work regularly continued until the middle of August. It was then discontinued for the time and this for two reasons: firstly because the export market had improved and secondly because the working parts of the machine had worn out entirely.

9. From the very commencement I had some doubts concerning the value of the expeller as a substitute for the country chekku. The following reasons will make this point clear :—

(a) An expeller costs Rs. 10,000 and will crush (according to the maker) 750 lb. per hour. A chekku costs Rs. 150 and will crush 60 lb. per hour. There is therefore no obvious saving in first cost. A chekku takes $2\frac{1}{4}$ horse-power—an expeller 16 horse-power. There is therefore a saving in power, but scarcely commensurate with the interest on extra capital.

(b) The case for the expeller as compared with the power chekku rests solely on improved extraction—a doubtful point that could only be resolved by actual trial.

(c) The third reason why I looked upon the expeller with suspicion was that the power chekku itself has not been particularly successful as a substitute for the bullock mill and the advantage of the expeller would have to be very marked to make it a really valuable substitutionary machine.

10. In spite of these doubts, I considered that the machine should be given an extended trial. As results were not satisfactory, I saw no object in bringing a second mill into commission seeing that I could get results just as well from one mill as from two. For protective reasons I sent the second mill to Cuddalore and offered its use to the ryots. The fact was given wide publicity and ordered to be notified in the district gazette and as no applications were forthcoming, I saw no reason for pushing on with the second mill until I had obtained satisfactory results with the first. So far as substitution is concerned, my present opinion is that the Anderson expeller is unsuitable for use with groundnuts chiefly for the reason that it cannot deal with decorticated seed and that the shell of groundnut contains so much sand that the cost of repairs to working parts exceeds the profits. It seems to me, however, that the expeller may be useful with gingelly and other soft-shelled seeds and I am now starting experiments on this seed.

11. From the above explanation it will be apparent that the leader contains the following misstatements :—

(a) That Government had sanctioned the purchase of expellers inter alia to test whether the export of oil could be undertaken, i.e., for expansion purposes.—Government sanctioned Anderson expellers plus a big oil mill for substitutionary and expansion purposes but there is nothing in the Government Order to show what particular purpose any particular machine was purchased for and the conclusion of the writer is incorrect.

(b) That the Madras mill made no systematic trials.—Returns have been maintained throughout and from the beginning of February they have been posted daily.

(c) *Few days of aimless experiment.*—The mill worked continuously on groundnut for eight months except when breakdowns occurred.

(d) *One lakh of rupees spent on this.*—The actual capital expenditure on substitution plant since last August has been Rs. 11,300. The working expenses have been Rs. 1,230 and the receipt Rs. 1,487. The total liabilities incurred on account of oil machinery are Rs. 52,640 and of this all but the abovementioned sum goes towards the large mill which is yet to be delivered.

12. As regards the last implication that no information is available ("these are questions that we should like to see answered"), I have to point out that the results of the work of this department are open to any one who likes to enquire about them. I have had no enquiries on oil mills that have not been replied to fully. I have further to remark that an address, of a very similar character to this leader though more comprehensive in its scope, was presented by the South Indian Chamber of Commerce to the Hon'ble Mr. Clerk about the middle of the year. On that occasion the Assistant Secretary applied for information which he received and which was reproduced in a distorted form in the address, without my being consulted regarding the accuracy or otherwise of the statements made. As it appeared to me anomalous that I should remain a member of the Chamber and so subscribe to a document which I knew to be untrue, I resigned that body. Government will therefore probably understand the reason for the article.

III

Memorandum No. 4360-2/15, Educational, dated 10th February 1916.

The Director of Industries is requested to submit a detailed report on the experiments conducted with the Anderson oil-expellers in connection with the pressing of groundnuts.

P. RAJAGOPALA ACHARIYAR,
Secretary to Government.

To the Director of Industries.

IV

Letter—from K. T. B. TRESSLER, Esq., Director of Industries.
To—the Secretary to Government, Educational Department.
Dated—Madras, the 26th/28th February 1916.
No.—K-141.

I have the honour to enclose herewith one and a half bulletins which describe the work hitherto done with the Anderson expeller.

2. It will be observed from the first bulletin that the mechanical trials are not satisfactory and further experiment is considered necessary before a definite pronouncement can be made on the merits of the expeller. At the present time preliminary tests are being made with all kinds of seed as described in the second bulletin and these tests will then have to be verified by further long period working as before.

3. The bulletins are proofs and I request therefore that they may be returned when done with.

V

Letter—from M. E. COUCHMAN, Esq., I.C.S., Special Officer, Department of Industries.
To—the Secretary to Government, Home Department (Education).
Dated—Madras, the 4th/9th August 1916.
No.—E-4.

I have the honour to state that two Anderson's oil-expellers and two filter presses were purchased during 1914 and 1915 for this department and a series of experiments have been conducted on them with different kinds of oil-seeds.

2. The result of these experiments has been to show that these machines are not likely to come into general use, and they are no longer required for the purposes of this department.

3. Several offers are being received some for outright purchase and some for hiring them on an annual lease. Under the circumstances, I have the honour to request permission to sell the two expellers and the two filter presses, or lease them for the best offer received by me either for purchase or lease.

4. In this connection I have to state that the purchase of one Ruston Proctor oil-engine along with one expeller was sanctioned—vide G.O. No. 931, Revenue, dated 26th March 1914. I do not propose to sell the engine as it is required for glass experiments. Again, in G.O. No. 1189, Educational, dated 22nd October 1914, a mechanic on Rs. 35 was sanctioned for the expeller, and I propose to retain the appointment as a mechanic is required for the new hydraulic oil mill. So I have the honour to request approval for retaining the oil-engine and the appointment of the mechanic.

5. Very early orders are requested.

VI

Letter—from M. E. COUCHMAN, Esq., I.C.S., Special Officer, Department of Industries.
To—the Secretary to Government, Home Department (Education).
Dated—Madras, the 19th/22nd August 1916.
No.—E-4.

In continuation of my letter E-4 of the 9th instant, I have the honour to report that I have received an offer of Rs. 10,000 for one of the Anderson's oil-expellers and filter press through the Secretary, Industries and Commerce Committee, Bangalore. This expeller together with the filter press was purchased a year ago for Rs. 11,450 and allowing $12\frac{1}{2}$ per cent depreciation per annum I consider the price offered very fair. I have therefore the honour to request sanction to dispose of the machinery for this amount. Very early orders are solicited.

VII

Letter—from M. E. COUCHMAN, Esq., I.C.S., Special Officer, Department of Industries.
To—the Secretary to Government, Home Department (Education).
Dated—Madras, the 2nd September 1916.
No.—E-4.

In continuation of Mr. Tressler's letter of 26th February last, I have the honour to report the further particulars of the Anderson's oil-expeller. Bulletins Nos. 16 and 26 are enclosed.

2. The output of oil ascertained by experiment is compared in the following table with that claimed by the makers:—

Seed.	Makers estimate.		Actual results.	
	LB. PER HOUR.		LB. PER HOUR.	
Groundnut	...	600 to 800	...	225
Gingelly	...	500	...	145
Castor	...	400 to 600	...	200
Cotton seed	...	400	...	133

3. The following table shows the working results of the oil-expeller compared with the working of the country bullock mill, the power-driven rotary mill, and the country hand screw press and the comparative capital cost for equivalent outturn per hour:—

Machine.	Capacity per hour with percentage of extraction						Charges per one ton of oil.		
	Groundnut.		Gingelly.		Castor.		Groundnut.	Gingelly.	Castor.
	Lb. per hour.	Percentage.	Lb. per hour.	Percentage.	Lb. per hour.	Percentage.			
Expeller (d)	225 (a)	36 to 37 per cent.	145	39½ per cent to 40½ per cent.	200	36	Rs. 70.	Rs. 83 (b).	Rs. 83.
Bullock ghanee	23	36 per cent to 37 per cent.	23	39 per cent to 40 per cent.	..	..	Rs. 45 to 50.	Rs. 100 (c).	..
Rotary mill	60	34 per cent to 36 per cent.	60	36 per cent to 40 per cent.	..	..	Rs. 45.	Rs. 65 to 70 (c).	..
Screw press	225	38 per cent to 39 per cent.	..	..	200	36 per cent.	Rs. 40 to 45.	..	Rs. 32 to 35

(a) Vide below.

(c) Inclusive cost of jaggery.

(b) Exclusive cost of jaggery, viz., Rs. 10.

(d) Vide below.

Comparative capital cost for equivalent outturn per hour.

	RS.
Initial cost of Anderson's expeller and 14 horse-power, engine, etc....	16,000
Do. for 15 bullock ghanees	3,000
Do. for 5 rotary mills and 14 horse-power engine	5,000
Do. for 1 screw press	500

It will be seen that the percentage of extraction is inferior to that of the screw press in the case of groundnut, and not superior to that of the country bullock mill. The figures for gingelly and castor, so far as available, do not show any superiority for the expeller.

The figures of cost per ton of oil extracted, which is of course the most important point, show that the expeller is much inferior to the other processes in the case of groundnut and castor, and inferior to the rotary mill in the case of gingelly.

4. There are the following additional drawbacks of the expeller:—

(a) Cost of repairs is heavy, and averages Rs. 1,200 per annum, because the cone through which the seed is compressed wears out very soon.

(b) Expellers cannot deal with kernels alone, apparently because the seeds are compressed into such a tight mass that the oil cannot freely escape from it. Hence it is usual to mix husk with the seed when milling it. This makes the cake unsaleable for feeding purposes, and much reduces its value for manurial purposes.

5. I enclose a confidential memorandum on the expeller prepared by the Director of Industries in the United Provinces which is also unfavourable.

6. I am not in favour of publishing the results of the experiments, as this might lead to litigation, but it may be said that the results do not show any superiority over the present methods of extraction, and persons who wish for more information may be advised to apply to the Director of Industries.

Order—No. 960, Home (Education), dated 12th September 1916.

The Government sanction the sale for a sum of Rs. 10,000 of one of the two Anderson oil-expellers and filter press as proposed by Mr. Couchman in his letter No. E-4 of the 19th August 1916. Mr. Couchman is requested to endeavour to dispose of the other expeller also by sale.

2. The oil-engine purchased with one of the expellers may be retained for the use of the department as proposed in paragraph 4 of Mr. Couchman's letter No. E-4, dated the 4th August 1916.

3. The retention of the services of the mechanic until the 31st March 1917, proposed in the same paragraph, has been sanctioned in G.O. No. 407, Educational, dated the 10th April 1916. His services may be utilized for the hydraulic oil mill.

4. The Government agree with Mr. Couchman that the results of the experiments made with the expellers need not be published and that persons who desire detailed information may apply to the Director of Industries.

(True Extract.)

P. RAJAGOPALA ACHARIYAR,
Secretary to Government.

To M. E. Couchman, Esq., I.C.S., Officer on Special duty,
Department of Industries.
„ the Accountant-General (paragraph 1 only).

NOTES CONNECTED WITH G.O. No. 960, HOME (EDUCATION),
DATED 12TH SEPTEMBER 1916.

[SUBJECT.—Oil experiments.]

*Extract of an article from the "Hindu", dated the 9th December 1915,
regarding the oil-pressing industry.*

DEVELOPING THE OIL-PRESSING INDUSTRY.

In our recent article on the Trade in Groundnuts, we pointed out that in consequence of the war, our foreign exports of this article had been considerably curtailed; that the loss was somewhat counterbalanced by the increased demand from Calcutta; and that the out-look for the large population dependent on the cultivation of this commercial produce was one full of the most serious anxiety and risk. Incidentally we promised to discuss separately the connected question of the development of the oil-pressing industry, with reference to the steps urged and undertaken by the Department of Industries on the advice and orders of Government. Perhaps, it may be necessary to remind our readers that the attention of the Government of Madras having been drawn to our leading articles in our issues of the 25th August 1914 and the 11th September 1914, advocating the prosecution of enquiries into the possibility of starting new industries, in view of the interruption to trade caused by the war, an Order in the Revenue Department was issued on the 16th September 1914, with commendable promptitude, calling upon the Director of Industries, among other things, to supply all available information and advice to private capitalists or manufacturers in order to enable them to start fresh industries. At the same time, they undertook, so far as they were concerned, to give through their officers all possible assistance by way of advice and information. The enthusiasm of the Director of Industries manifested itself in an interesting note he submitted to Government on the economic situation in general, from which we take the following as bearing on the oil-pressing industry: "I recommend the purchase of two more Anderson's oil-expellers I consider the plant worth purchasing the purchase of these machines is not proposed for 'protective' reasons but for what I term 'progressive' reasons, i.e., in order to utilize the present opportunities to the utmost possible extent I do not think the risk is a serious one, since even under normal conditions a demand for small oil-pressing machines seems to be springing up, and I have little doubt that I can ultimately dispose of the plant to private individuals." In a subsequent note he added that "the time is particularly favourable for the development of the oil-pressing industry and the chance is one that should not be allowed to slip."

The Government, however, did not then consider it necessary to purchase additional expellers of this type as proposed and observed that for experimental and demonstrational purposes, it would clearly be better to procure hydraulic plant capable of dealing with a large supply of oil-seed and furnishing a further object-lesson to persons willing to embark on the enterprise. In a further note on the groundnut industry written in October following, the Director of Industries once again urged that to deal with the industry on a small scale, the purchase of two more Anderson presses, in addition to the one already purchased, was necessary; that having got the press on hand to work in Madras, he will transfer the same to Cuddalore or Valavanur when the supply of nuts is exhausted. But the Government would not accord sanction for the purchase. The Director approached Government for a third time and elaborated his proposals for the development of the oil-pressing industry in an exhaustive letter he addressed to Government in November of last year. Here he indicated the relative merits and cost of what he termed the policy of substitution and the policy of expansion—the protective and progressive measures to be adopted for the benefit of the groundnut trade and industry, in view of the conditions that had arisen on account of the war. He put the cost of the expansion policy at Rs. 5 lakhs for three large plants, and of the substitution policy at one and one-third lakhs for five small plants. He summed up his proposals by saying that in view of the results which might be achieved, the larger and more risky proposition was to be preferred, at least to the extent of one factory. These repeated representations had at last their desired effect. This time the Government were disposed to be somewhat considerate to the Director's demands. In their Order issued in the middle of January 1915, after much hesitation and doubt, they observed that in view of the exceptionally favourable situation as regards raw material and the necessity for further experiment, they resolved to make an additional grant of rupees one lakh for a further investigation of the possibilities of extracting oil on a wholesale scale in this country, both for the purpose of supplying the local market and also with a view to testing whether the export of oil can be undertaken with any chance of financial success. The Director was called upon to state how he proposed to utilize this grant

and also to consider the feasibility of starting subsidiary industries for the utilization of oil in this country. On the general question of policy, they expressed themselves in favour of a combination of the policies of "substitution" and "expansion" and favoured the establishment of one of the three bigger plants asked for and some of the smaller plants, so as to experiment with the production of oil for export and also to make a practical trial of the apparatus considered *prima facie* suitable for adoption in substitution for country mills. These orders of January last were considered as encouraging and promising, and the public were led to hope that at last something was going to be done for the oil-pressing industry. For the next six months all was quiet, and the public were under the belief that valuable experiments were being carried on and that the results of these experiments would be made known in due course. In the beginning of August, a report of the Director was published. In the course of this report, the Director stated that "the groundnut question need not further engage the attention of Government." He proposed to abandon what he had termed protective measures and announced that he would not purchase the third expeller originally contemplated. An exception was, however, made in the case of the large oil mill, as the change in the situation had not affected that part of the scheme. The change here referred to as having occurred in the situation was stated to be that the price of nuts had recovered rapidly in Marseilles and that the demand there was at the time very much in excess of the supplies offered. The Government set their seal of approval upon these proposals by adding the word "Recorded." In answer to an interpellation in the Legislative Council in the preceding May, it was stated on behalf of Government that the Director of Industries had been directed to investigate the possibilities of extracting oil on a wholesale scale in this country with a view to testing whether the export of oil could be undertaken with any chance of financial success and that it was for this purpose they had sanctioned the purchase of three oil mills. In his Annual Administration Report written on the 17th July, the Director acknowledged that a large sum had been sanctioned by Government for the purchase of oil machinery and stated that some of the plants had been at work for several months; that one expeller which had been previously purchased by the department was erected in Madras and had been fairly busy since; that another one was delivered towards the end of the year and was erected at Cuddalore; and that when a third one was available it would be sent to the Ganjam district.

We have thought it necessary to make this chronological statement of facts, since they were with reference to the first attempts undertaken immediately after the outbreak of the war to develop the oil-pressing industry in this Presidency by departmental action and experiment. The Government Order of September 1914 called upon the Director of Industries to demonstrate to private enquirers the methods of working the Anderson's oil-expeller. Fifteen months have elapsed since this order was issued. The public had all along been deluded into thinking that plants have been busy working and that experiments were being tried. We had hoped that oil-pressing was going to be demonstrated as a profitable and practicable industry. But serious suspicions were aroused when the Southern India Chamber of Commerce told the Member for Commerce and Industry of the Government of India, the other day, that all was not well with the Department of Industries in Madras, and that really it was a case of all cry and no wool. We have since been awaiting the official statement of the results of the experiments so far made at a cost of a lakh of rupees which the Government had sanctioned. We expected that useful information would be forthcoming at the last meeting of the Legislative Council. There was an interpellation on the subject and the following amazing statement was made: "Two mills have been working, but they were not intended to make or capable of making anything but oil for local consumption. The mill which was ordered for the purpose of making oil suitable for export has not been received. No light has, therefore, yet been thrown on the possibilities of extracting oil for purposes of export." Let us leave alone the mill which has not yet arrived. What about the mills which have been working and from the experiments carried on by means of which we were led to expect so much? What are the results of these experiments? The Director considered Anderson's oil-exPELLERS worth purchasing and insisted on their being purchased. Two of these expellers have admittedly been at work for several months. What have they demonstrated? Have the methods of working the Anderson's oil-expeller been demonstrated to the public? We have made independent enquiries. We understand that the plant established at Cuddalore did not work for more than a single day and that it is idly rusting there now ever since it was erected. The plant erected at Madras did make an attempt at crushing, but nothing was achieved because no systematic trials were made. Even the failures would be worth knowing, at least to save others from similar fruitless attempts. What are the running costs of the mill, during what period has it been worked and how many bags have been crushed daily? These are questions we should have liked the Director to have answered. We gather from our enquiries that after a few days of aimless and unsystematic experiments in respect of groundnut, gingelly seeds are now being tried for a private trader without any useful experimental object in view. Surely, it was not for making oil for local consumption that a lakh of rupees of public funds was sanctioned in this time of financial stress! Has it been at least demonstrated that the Anderson's oil-expeller can make oil for local consumption on a wholesale scale, more economically and more advantageously than the country mill? The above rather long account will serve to show how the Department of Industries and the Government of Madras have been developing the oil-pressing industry, with the rare and unexpected chance the world war had given them; how their initial enthusiasm and their early attempts have come to nothing; and how between an incompetent department and an indifferent Government nothing has been done.

Send the *Hindu* article of yesterday at once to the Director for report.

C. G. TODHUNTER—10-12-15.

A draft memorandum is submitted for approval.

S.K.—11-12-15.

C.R.—11-12-15.

[Memorandum No. 4360-1, Educational, dated the 13th December 1915.]

From the Director of Industries, dated 4th January 1916, No. K-107.

The Director of Industries submits his remarks on the points noticed in the leading article, in the *Hindu* regarding oil-pressing industry. The main charges against the department are—

(i) that the possibility of exporting, with commercial success, oils manufactured in this country has not been demonstrated though this was stated to be the object for the purchase of the mills; and

(ii) that the results of the working of the Anderson expellers which have been purchased by the department have not been published for the information of the public.

2. With regard to these, it is submitted that towards the beginning of last year,

G.O. 52, Educational, 16th January 1915.

G.O. 158, Educational, 13th February 1915.

"also to make a practical trial of the apparatus considered *prima facie* suitable for "adoption in substitution for country mills." The large mill which was intended to

Please see Mr. Tressler's letters in G.O. 1303, Educational, 29th November 1915.

produce oil for export has not yet been obtained owing to the fact that the manufacturing firms in England have been taken over by the Munitions Department.

For the other object, viz., the substitution of improved methods for the country

G.O. 158, Educational, 13th February 1915.

Anderson oil expellers. Mr. Tressler was

Please see Mr. Tressler's letter and note on ground-nut in G.O. 2802, Revenue, 26th September 1914.

method of extracting oil, the Government sanctioned the purchase of two small expellers and he himself recommended their purchase more than once. In his present letter, however, he states that from the very commencement he had doubts concerning the value of the expeller as a substitute for the country *chekku*. His experiments have also shown that the expeller is not suitable for the extraction of oil

Page 2 of G.O. 158, Educational, 13th February 1915.

from groundnuts. It is submitted that in his letter recommending the purchase of Anderson expellers he did not express

any doubt as to their usefulness. Further

the machinery for oil-pressing was mainly intended to deal with groundnut. No report so far as to the usefulness of Anderson expellers in connection with the

Please see G.O. 2802, Revenue, 26th September 1914.

extraction of oil from groundnut has yet been submitted to Government by Mr. Tressler. It is for orders whether such a report may be called for from him so that it may be published for general information.

S.K.—14-1-16.

From a perusal of the correspondence before Government it seems that the attack of the *Hindu* on the Industrial Department in regard to the oil-pressing experiments is not altogether groundless. The experiments for the export of oil on a commercial

Mr. Tressler cannot be blamed for this.

P.R.—6-2-16.

scale for which the bulk of the grant of one lakh was made have not yet been started for want of machinery; while the

experiments with the Anderson expeller to introduce a better method of extraction of oil have so far proved unsuccessful. Mr. Tressler has now come to the conclusion that this

expeller is unsuitable, at any rate so far as groundnuts are concerned. It would have been better if he had submitted a report with facts and figures in support of this conclusion for the general information of the public. It is submitted that Mr. Tressler may now be asked to furnish a detailed report on the experiments conducted with the expeller in connection with the pressing of groundnuts so that it may be published for general information.

I think so.

P.R.—6-2-16.

A the public. It is submitted that Mr. Tressler may now be asked to furnish a detailed report on the experiments conducted with the expeller in connection with the pressing of groundnuts so that it may be published for general information.

V.S.—16-1-16.

Orders may issue as at A.

P. RAJAGOPALA ACHARIYAR—6-2-16.

Yes. But the question of publication may be reserved for decision later, after the report is forthcoming.

P[ENTLAND]—7-2-16.

A draft memorandum is submitted for approval.

S.K.—8-2-16.

V.S.—8-2-16.

P.R.—10-2-16.

[Memorandum No. 4360-2, Educational, dated 10th February 1916.]

From the Director of Industries, No. K. 141, dated 26th February 1916.

The Director of Industries submits a report on the results so far obtained on the working of the Anderson expellers. His experiments have not yet been brought to a close but are still proceeding. The report on the whole shows that the machine is not very suitable for oil-pressing in this Presidency. It is doubtful whether a report which condemns the machine may be published now. From a note submitted to the Legislative Council of the United Provinces by the Director of Industries there, it is observed that experiments with the expeller were carried on by an oil expert in those Provinces also and the note says that the report of the expert "which is necessarily to some extent confidential is available from the Director of Industries to any one interested in the trade". It will perhaps be sufficient if, in this Presidency also, after the experiments are completed, it is notified that the report on the working of the expeller may be obtained from the Director. If this proposal is accepted, no action is now called for on these papers and it is for orders whether they may be recorded, the bulletins received from the Director being returned to him as desired by him.

S.K.—6-3-16.

As the bulletins will be published in the usual course, these papers may be simply "recorded".

V.S.—10-3-16.

The bulletins are for perusal. Mr. Tressler may be told not to issue any of them to the public, but to complete the experiments and then send a consolidated report to Government.

P.R.—14-3-16.

P[ENTLAND]—15-3-16.

A. G. C[ARDEW]—17-3-16.

Let a demi-official issue to Mr. Tressler.

P.R.—18-3-16.

A draft demi-official is submitted for approval.

S.K.—18-3-16.

V.S.—19-3-16.

P.R.—21-3-16.

Demi-official—from the Hon'ble Diwan Bahadur P. RAJAGOPALA ACHARIYAR
Avargal, C.I.E., Secretary to Government, Educational Department.

To—K. T. B. TRESSLER, Esq., Director of Industries.

Dated—the 21st March 1916.

No.—4360-3/15.

With reference to your letter No. K. 141, dated the 26th February 1916, forwarding certain bulletins regarding the working of the Anderson expellers, I am to ask you not to issue any of the bulletins to the public, but to complete the experiments and then to submit a consolidated report to the Government.

The bulletins are herewith returned as desired by you.

From the Special Officer, Department of Industries, No. E-4, dated the 4th August 1916.

Please see the notes above. In December last the Director was asked to report on certain complaints made in the *Hindu* about the absence of any demonstration as to the possibility of exporting oil with commercial success and the non-publication of the results of the working of the two oil-expellers purchased by Government. The reports he submitted showed that the machines were not suitable for dealing with groundnuts and that he had been conducting further experiments. The Director was thereupon asked to complete the experiments and then to submit a consolidated report thereon. This has not been received. The question of publication of the report was reserved for consideration after its receipt.

2. Mr. Couchman now states that the result of the experiments has been to show that these machines are not likely to come into general use, and as the expellers are no longer required by the department and as several offers are being received, he requests sanction to sell them or to lease them when opportunity occurs.

Mr. Couchman also proposes to retain the oil-engine purchased along with the first expeller as it is required for glass experiments.

He further requests sanction for the retention of the mechanic employed for the new hydraulic oil mill to be erected.

3. Even before the Government undertook to purchase oil expellers, private persons had already installed such machines and it was suggested to Government specifically that experiments should be conducted with a view to pronouncing a definite opinion upon the use of these machines for crushing oil seeds under Indian conditions as there was some doubt on the point. Please compare paragraph 4 of Sir Frederick Nicholson's letter No. 589, dated the 10th November 1914. Though

Paragraph 4, page 18 of G.O. 52, Educational, dated the 16th January 1915.

Mr. Tressler doubted whether these expellers could be regarded as proper substitutes for the country mills, he was not prepared to give a decisive opinion and suggested further experiments. The matter is of some importance and a pronouncement on the result of the experiments is expected by the public. Mr. Couchman's opinion on the expellers, though it may be a natural sequel of that placed before the Government already by Mr. Tressler, cannot, it is submitted, be acted upon; and it may not be desirable to accord sanction to the disposal of the plant until the fuller report already asked for is submitted. The disposal of the plant alone will be inexplicable to the public. Mr. Couchman's statements that the machines are not likely to come into general use is not understood when read with his further statement that "several offers are being received, some for outright purchase and some for hiring them on an annual lease."

Further a proposal has been made to the Directors of the Indian Institute of Science whether they will be prepared to undertake the experiments connected with the development of the oil-pressing industry and the establishment of subsidiary industries for the utilization of the oil. It is likely that in connection with that arrangement the Government may be asked to supply the plant necessary for the experiments. Until some definite decision has been arrived at in connection with the matter, it may be premature to dispose of the plant already in hand.

4. The proposals to retain the oil-engine attached to the first expeller and the mechanic employed in connection with the working of the expellers may be considered later after a definite decision has been arrived at on the general question.

C. RAMANUJA ACHARIYAR—18-8-16.

Will Mr. Couchman please note further?

P. RAJAGOPALA ACHARIYAR—19-8-16.

OFFICE OF THE DIRECTOR OF INDUSTRIES.

Please see attached note.

M. E. COUCHMAN—2-9-16.

Note by the Special Officer, Department of Industries.

At the time when I wrote my letter of 4th instant I was not aware that a report on the oil-expellers was due from the Director.

I am now submitting a separate report, which shows that there are no advantages to be gained by using the expeller.

In the present note I will deal only with the criticisms on my proposal made in the office-note that my statement that the machines are not likely to come into general use is not understood "when read with his further statement that several offers are being received, some for outright purchase, and some for hiring them on an annual lease."

In view of the unsatisfactory results obtained from the expellers I have given strict orders that all persons enquiring about them, with a view to purchase, should be told all the facts about them, so that they might not complain afterwards if they also get poor results from them. On one occasion the Collector of Nellore suggested that the Co-operative Oil-monger Society of Sullurpet should get the Anderson expeller for use in place of the ten country mills they are now using. As a result of the explanation given to them by M.R.Ry. J. Narayana Murti, they dropped the idea. At the present time there are several offers from Cuddalore and Vizagapatam to lease the expellers. The real facts about the machines have been explained to them, and they are offering to lease the machines for Rs. 500 to Rs. 1,000 a year, whereas the interest and depreciation would amount to Rs. 3,440 per annum. To cover the cost of renewals and pay of the mechanic they offer Rs. 750 per annum, while the actual ascertained cost of renewals is Rs. 1,200, and the pay of the mechanic Rs. 500.

Offers to purchase are being received from Mysore. These are due to the fact that Mr. Chatterton, in an article in the Agricultural and Industrial Supplement of the *Madras Mail*, published on April 8th 1916, stated that 40 per cent profit was being made by the use of this machine. It is true that, if the article is read carefully, it becomes clear that this profit must have been due to some other reasons than the mechanical efficiency of the Anderson expeller. Mr. J. Narayana Murti says that the profit must have been due to (1) the oil-seed having been bought at a very low price, possibly by means of a monopoly, (2) to a very high price having been obtained from the tanners using the oil, owing to the great rise in price of tanned leather, (3) to a high price having been paid by planters for the cake as manure, perhaps owing to the shortage of groundnut cake. In fact Mr. Chatterton says in the article itself that the advantage of the expeller lies more in the ease with which it can be operated by power than in its superior efficiency as an oil-extractor. In Bangalore power can be obtained from the electric mains at very low rates. In spite of this Mr. J. Narayana Murti does not believe that even in Mysore the expeller is making so much profit in reality, nor do I. However, inasmuch as the offer to purchase has been received through the Director of Industries himself (Mr. Chatterton) I think that we can accept it with a clear conscience. If we can get rid of both the expellers to Mysore in the same way we shall be well rid of them. The experiment has been a failure, and we shall have to admit it. I see no harm in that, as one of the objects for which the department exists is to test new machinery to see if it is suitable for general use in India. For doing this the department deserves the thanks of the public, and not abuse!

On the general question, however, of what aid could be given to the oil industry, I am in agreement with Sir Frederick Nicholson, and I think that mere extraction of oil, even by improved mechanical processes, will not lead to any great results, as the real problem is how to dispose of the oil when made.

M. E. COUCHMAN—2-9-16.

HOME DEPARTMENT (EDUCATION).

Please see Mr. Couchman's letter No. E-4, dated the 2nd September 1916, and the note above. The results of the experiments carried on with the Anderson expellers do not appear to show that the machines are superior to the rotary mills and the screw press in use in the country. Mr. Couchman is not in favour of publishing the results

of the experiments and suggests that persons who wish for detailed information should be advised to apply to the Director of Industries. His suggestion may be accepted.

P.R.—7-9-16.

2. In his letter No. E-4, dated the 19th August 1916, Mr. Couchman solicits sanction to the sale of one of the expellers to the Secretary, Industries and Commerce

Yes.

P.R.—7-9-16.

Committee, Bangalore, for a sum of Rs. 10,000. It is for consideration whether the sanction applied for may be accorded.

3. As regards the other machine it does not appear desirable to lease it on the terms set out in the note above. Mr. Couchman may, therefore, be asked to endeavour to dispose of it by sale.

P.R.—7-9-16.

4. Mr. Couchman proposes to retain the oil-engine purchased with one of the expellers for use in the conduct of glass experiments. This proposal may be approved.

P.R.—7-9-16.

5. Mr. Couchman also desires to retain the services of the mechanic on Rs. 35 to look after the new hydraulic oil mill. The hydraulic mill has not yet been fully erected as some parts of the machinery have yet to be received from England; but Mr. Couchman will no doubt be able to find other useful work for the mechanic till the mill is brought into working order. The retention of the services of the mechanic

P.R.—7-9-16.

up to the 31st March 1917 has already been sanctioned in G.O. No. 407, Educational, dated the 10th April 1916.

N.K.—7-9-16.

In the circumstances now stated by Mr. Couchman his proposals to dispose of the expellers may be approved. His other suggestions also seem acceptable.

C. RAMANUJA ACHARIYAR—7-9-16.

Mr. Couchman has gone into the whole question carefully and I support his proposals in their entirety.

P. RAJAGOPALA ACHARIYAR—7-9-16.

P[RENTLAND]—9-9-16.

Early issue of orders on Mr. Couchman's letter of 19th August seems very desirable.

A. G. O[ARDEW]—11-9-16.

A draft order is submitted for approval.

S.K.—11-9-16.

N.K.—11-9-16.

C.R.—11-9-16.

P.R.—12-9-16.

[G.O. No. 960, Home (Education), dated the 12th September 1916.]

Home (Evⁿ) DEPARTMENT.

READ AGAIN G.O. No., dated 191

” ” ” ” ” 191

READ ALSO:—

C. No. 50, From the J. J., No. K107, dated 4-7- 1911

" 748 " ~~S. J.~~ " K141 " 26. 2. 191

"	"	2956	"	"	Sp ^l officer, Dept ^y Gen. E. L.	"	"	4	8	191
"	"	3083	"	"	"	"	"	19	8	191
"	"	3216	"	"	"	"	"	19	8	191

3683
3216

3246

ORDER.

Pres

No. 960, dated 12. 9. 1916

pag 12(a) of c.f.

para 4, p. 16 of up.

The Govt sanction the
Sale for a sum of Rs 10,000
of one of the two Anderson
oil expellers + filter press
as ~~recommended~~ ^{proposed} by
Mr Bonchman in his
letter ^(No E4) of the 19th August 1900.
Mr Bonchman is requested
to endeavour to dispose
of the other expeller also
by sale.

2. The oil engine purchased with one of the ~~two~~ expellers may be retained for the use

of the department as per
in para. 4 of Mr. Chokmani's letter No. E 4, 3 dated 1916.

The retention of the
services of the mechanic
until the 31st March 1917,
proposed in the same paragraph,
has been sanctioned
in G.O. No. 4007 Est., dated
the 10th April 1916. His
services may be utilized
for the hydraulic oil
mill.

4. The Govt. agree with
Mr. Conchman that the
results of the experiments
made with the expellers
~~should not be published~~ and that
persons who desire
detailed information may apply
~~to the Director of Industries.~~
to the Director of Industries.

8K
9.13.
11.9.16

11.9.16

12

9/16

27.9.16

(not for R.S.)

M.E. Conchman
offices on 8th. only, dep. 4th
see 1st (para 1 only)
copy of para 12/16

7.12.16

(abstract)

para 1. p 16 of C.F.

In approval of approval,
21.9.16.

NOTES CONNECTED WITH G.O. No. 960, HOME (EDUCATION),
DATED 12TH SEPTEMBER 1916.

[SUBJECT.—Oil experiments.]

Extract of an article from the "Hindu", dated the 9th December 1915,
regarding the oil-pressing industry.

DEVELOPING THE OIL-PRESSING INDUSTRY.

In our recent article on the Trade in Groundnuts, we pointed out that in consequence of the war, our foreign exports of this article had been considerably curtailed; that the loss was somewhat counterbalanced by the increased demand from Calcutta; and that the outlook for the large population dependent on the cultivation of this commercial produce was one full of the most serious anxiety and risk. Incidentally we promised to discuss separately the connected question of the development of the oil-pressing industry, with reference to the steps urged and undertaken by the Department of Industries on the advice and orders of Government. Perhaps, it may be necessary to remind our readers that the attention of the Government of Madras having been drawn to our leading articles in our issues of the 25th August 1914 and the 11th September 1914, advocating the prosecution of enquiries into the possibility of starting new industries, in view of the interruption to trade caused by the war, an Order in the Revenue Department was issued on the 16th September 1914, with commendable promptitude, calling upon the Director of Industries, among other things, to supply all available information and advice to private capitalists or manufacturers in order to enable them to start fresh industries. At the same time, they undertook, so far as they were concerned, to give through their officers all possible assistance by way of advice and information. The enthusiasm of the Director of Industries manifested itself in an interesting note he submitted to Government on the economic situation in general, from which we take the following as bearing on the oil-pressing industry:—"I recommend the purchase of two more Anderson's oil-expellers I consider the plant worth purchasing the purchase of these machines is not proposed for 'protective' reasons but for what I term 'progressive' reasons, i.e., in order to utilize the present opportunities to the utmost possible extent I do not think the risk is a serious one, since even under normal conditions a demand for small oil-pressing machines seems to be springing up, and I have little doubt that I can ultimately dispose of the plant to private individuals." In a subsequent note he added that "the time is particularly favourable for the development of the oil-pressing industry and the chance is one that should not be allowed to slip."

The Government, however, did not then consider it necessary to purchase additional expellers of this type as proposed and observed that for experimental and demonstrational purposes, it would clearly be better to procure hydraulic plant capable of dealing with a large supply of oil-seed and furnishing a further object-lesson to persons willing to embark on the enterprise. In a further note on the groundnut industry written in October following, the Director of Industries once again urged that to deal with the industry on a small scale, the purchase of two more Anderson presses, in addition to the one already purchased, was necessary; that having got the press on hand to work in Madras, he will transfer the same to Cuddalore or Valavanur when the supply of nuts is exhausted. But the Government would not accord sanction for the purchase. The Director approached Government for a third time and elaborated his proposals for the development of the oil-pressing industry in an exhaustive letter he addressed to Government in November of last year. Here he indicated the relative merits and cost of what he termed the policy of substitution and the policy of expansion—the protective and progressive measures to be adopted for the benefit of the groundnut trade and industry, in view of the conditions that had arisen on account of the war. He put the cost of the expansion policy at Rs. 5 lakhs for three large plants, and of the substitution policy at one and one-third lakhs for five small plants. He summed up his proposals by saying that in view of the results which might be achieved, the larger and more risky proposition was to be preferred, at least to the extent of one factory. These repeated representations had at last their desired effect. This time the Government were disposed to be somewhat considerate to the Director's demands. In their Order issued in the middle of January 1915, after much hesitation and doubt, they observed that in view of the exceptionally favourable situation as regards raw material and the necessity for further experiment, they resolved to make an additional grant of rupees one lakh for a further investigation of the possibilities of extracting

25/9/16

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27.9.16

oil on a wholesale scale in this country, both for the purpose of supplying the local market and also with a view to testing whether the export of oil can be undertaken with any chance of financial success. The Director was called upon to state how he proposed to utilize this grant and also to consider the feasibility of starting subsidiary industries for the utilization of oil in this country. On the general question of policy, they expressed themselves in favour of a combination of the policies of "substitution" and "expansion" and favoured the establishment of one of the three bigger plants asked for and some of the smaller plants, so as to experiment with the production of oil for export and also to make a practical trial of the apparatus considered prima facie suitable for adoption in substitution for country mills. These orders of January last were considered as encouraging and promising, and the public were led to hope that at last something was going to be done for the oil-pressing industry. For the next six months all was quiet, and the public were under the belief that valuable experiments were being carried on and that the results of these experiments would be made known in due course. In the beginning of August, a report of the Director was published. In the course of this report, the Director stated that "the groundnut question need not further engage the attention of Government." He proposed to abandon what he had termed protective measures and announced that he would not purchase the third expeller originally contemplated. An exception was, however, made in the case of the large oil mill, as the change in the situation had not affected that part of the scheme. The change here referred to as having occurred in the situation was stated to be that the price of nuts had recovered rapidly in Marseilles and that the demand there was at the time very much in excess of the supplies offered. The Government set their seal of approval upon these proposals by adding the word "Recorded." In answer to an interpellation in the Legislative Council in the preceding May, it was stated on behalf of Government that the Director of Industries had been directed to investigate the possibilities of extracting oil on a wholesale scale in this country with a view to testing whether the export of oil could be undertaken with any chance of financial success and that it was for this purpose they had sanctioned the purchase of three oil mills. In his Annual Administration Report written on the 17th July, the Director acknowledged that a large sum had been sanctioned by Government for the purchase of oil machinery and stated that some of the plants had been at work for several months; that one expeller which had been previously purchased by the department was erected in Madras and had been fairly busy since; that another one was delivered towards the end of the year and was erected at Cuddalore; and that when a third one was available it would be sent to the Ganjam district.

We have thought it necessary to make this chronological statement of facts, since they were with reference to the first attempts undertaken immediately after the outbreak of the war to develop the oil-pressing industry in this Presidency by departmental action and experiment. The Government Order of September 1914 called upon the Director of Industries to demonstrate to private enquirers the methods of working the Anderson's oil-expeller. Fifteen months have elapsed since this order was issued. The public had all along been deluded into thinking that plants have been busy working and that experiments were being tried. We had hoped that oil-pressing was going to be demonstrated as a profitable and practicable industry. But serious suspicions were aroused when the Southern India Chamber of Commerce told the Member for Commerce and Industry of the Government of India, the other day, that all was not well with the Department of Industries in Madras, and that really it was a case of all cry and no wool. We have since been awaiting the official statement of the results of the experiments so far made at a cost of a lakh of rupees which the Government had sanctioned. We expected that useful information would be forthcoming at the last meeting of the Legislative Council. There was an interpellation on the subject and the following amazing statement was made:—"Two mills have been working, but they were not intended to make or capable of making anything but oil for local consumption. The mill which was ordered for the purpose of making oil suitable for export has not been received. No light has, therefore, yet been thrown on the possibilities of extracting oil for purposes of export." Let us leave alone the mill which has not yet arrived. What about the mills which have been working and from the experiments carried on by means of which we were led to expect so much? What are the results of these experiments? The Director considered Anderson's oil-exPELLERS worth purchasing and insisted on their being purchased. Two of these expellers have admittedly been at work for several months. What have they demonstrated? Have the methods of working the Anderson's oil-expeller been demonstrated to the public? We have made independent enquiries. We understand that the plant established at Cuddalore did not work for more than a single day and that it is idly rusting there now ever since it was erected. The plant erected at Madras did make an attempt at crushing, but nothing was achieved because no systematic trials were made. Even the failures would be worth knowing, at least to save others from similar fruitless attempts. What are the running costs of the mill, during what period has it been worked and how many bags have been crushed daily? These are questions we should have liked the Director to have answered. We gather from our enquiries that after a few days of aimless and unsystematic experiments in respect of groundnut, gingelly seeds are

now being tried for a private trader without any useful experimental object in view. Surely, it was not for making oil for local consumption that a lakh of rupees of public funds was sanctioned in this time of financial stress! Has it been at least demonstrated that the Anderson's oil-exPELLER can make oil for local consumption on a wholesale scale, more economically and more advantageously than the country mill? The above rather long account will serve to show how the Department of Industries and the Government of Madras have been developing the oil-pressing industry, with the rare and unexpected chance the world war had given them; how their initial enthusiasm and their early attempts have come to nothing; and how between an incompetent department and an indifferent Government nothing has been done.

Send the "Hindu" article of yesterday at once to the Director for report.
C. G. TODHUNTER—10-12-15.

A draft memorandum is submitted for approval.

S.K.—11-12-15.

C.R.—11-12-15.

[Memorandum No. 4360-1, Educational, dated the 13th December 1915.]

From the Director of Industries, dated 4th January 1916, No. K-107.

The Director of Industries submits his remarks on the points noticed in the leading article, in "the Hindu" regarding oil-pressing industry. The main charges against the department are—

(i) that the possibility of exporting, with commercial success, oils manufactured in this country has not been demonstrated though this was stated to be the object for the purchase of the mills; and

(ii) that the results of the working of the Anderson expellers which have been purchased by the department have not been published for the information of the public.

2. With regard to these, it is submitted that towards the beginning of last year,

G.O. 52, Educational, 16th January 1915.

G.O. 158, Educational, 13th February 1915.

"also to make a practical trial of the apparatus considered prima facie suitable for "adoption in substitution for country mills." The large mill which was intended to

Please see Mr. Tressler's letters in G.O. 1303, Educational, 29th November 1915.

the Government sanctioned the purchase of certain oil mills "so as to experiment with the production of oil for export and produce oil for export has not yet been obtained owing to the fact that the manufacturing firms in England have been taken over by the Munitions Department.

For the other object, viz., the substitution of improved methods for the country

G.O. 158, Educational, 13th February 1915.

Anderson oil expellers. Mr. Tressler was

Please see Mr. Tressler's letter and note on ground-nut in G.O. 2802, Revenue, 26th September 1914.

method of extracting oil, the Government sanctioned the purchase of two small very sanguine about the success of these expellers and he himself recommended their purchase more than once. In his present letter, however, he states that from the very commencement he had doubts

concerning the value of the expeller as a substitute for the country chekku. His experiments have also shown that the expeller is not suitable for the extraction of oil

Page 2 of G.O. 158, Educational, 13th February 1915.

any doubt as to their usefulness. Further

Please see G.O. 2802, Revenue, 26th September 1914.

from groundnuts. It is submitted that in his letter recommending the purchase of Anderson expellers he did not express the machinery for oil-pressing was mainly intended to deal with groundnut. No report so far as the usefulness of Anderson expellers in connection with the extraction

of oil from groundnut has yet been submitted to Government by Mr. Tressler. It is for orders whether such a report may be called for from him so that it may be published for general information.

S.K.—14-1-16.

4 * NOTES TO G.O. No. 960, HOME (EDUCATION), 12TH SEPTEMBER 1916

From a perusal of the correspondence before Government it seems that the attack of the "Hindu" on the Industrial Department in regard to the oil-pressing experiments is not altogether groundless. The experiments for the export of oil on a commercial

scale for which the bulk of the grant of one lakh was made have not yet been started for want of machinery; while the experiments with the Anderson expeller to introduce a better method of extraction of oil have so far proved unsuccessful. Mr. Tressler has now come to the conclusion that this expeller is unsuitable, at any rate so far as groundnuts are concerned. It would have

I think so.

P.R.—6-2-16.

been better if he had submitted a report with facts and figures in support of this conclusion for the general information of

the public. It is submitted that Mr. Tressler may now be asked to furnish a detailed report on the experiments conducted with the expeller in connection with the pressing of groundnuts so that it may be published for general information. V.S.—16-1-16.

Orders may issue as at A.

P. RAJAGOPALA ACHARIYAR—6-2-16.

Yes. But the question of publication may be reserved for decision later, after the report is forthcoming.

P[ENTLAND]—7-2-16.

A draft memorandum is submitted for approval.

S.K.—8-2-16.

V.S.—8-2-16.

P.R.—10-2-16.

[Memorandum No. 4360-2, Educational, dated 10th February 1916.]

From the Director of Industries, No. K. 141, dated 26th February 1916.

The Director of Industries submits a report on the results so far obtained on the working of the Anderson expellers. His experiments have not yet been brought to a close but are still proceeding. The report on the whole shows that the machine is not very suitable for oil-pressing in this Presidency. It is doubtful whether a report which condemns the machine may be published now. From a note submitted to the Legislative Council of the United Provinces by the Director of Industries there, it is observed that experiments with the expeller were carried on by an oil expert in those Provinces also and the note says that the report of the expert "which is necessarily to some extent confidential is available from the Director of Industries to any one interested in the trade". It will perhaps be sufficient if, in this Presidency also, after the experiments are completed, it is notified that the report on the working of the expeller may be obtained from the Director. If this proposal is accepted, no action is now called for on these papers and it is for orders whether they may be recorded, the bulletins received from the Director being returned to him as desired by him.

S.K.—6-3-16.

As the bulletins will be published in the usual course, these papers may be simply "recorded".

V.S.—10-3-16.

The bulletins are for perusal. Mr. Tressler may be told not to issue any of them to the public, but to complete the experiments and then send a consolidated report to Government.

P.R.—14-3-16.

P[ENTLAND]—15-3-16.

A. G. C[ARDEW]—17-3-16.

Let a demi-official issue to Mr. Tressler.

P.R.—18-3-16.

A draft demi-official is submitted for approval.

S.K.—18-3-16.

V.S.—19-3-16.

P.R.—21-3-16.

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NOTES TO G.O. No. 960, HOME (EDUCATION), 12TH SEPTEMBER 1916 5

Demi-official—from the Hon'ble M.R.Ry. Diwan Bahadur P. RAJAGOPALA
ACHARIYAR Avargal, C.I.E., Secretary to Government, Educational
Department.

To—K. T. B. TRESSLER, Esq., Director of Industries.

Dated—the 21st March 1916.

No.—4360-3/15.

With reference to your letter No. K. 141, dated the 26th February 1916, forwarding certain bulletins regarding the working of the Anderson expellers, I am to ask you not to issue any of the bulletins to the public, but to complete the experiments and then to submit a consolidated report to the Government.

The bulletins are herewith returned as desired by you.

From the Special Officer, Department of Industries, No. E-4, dated the
4th August 1916.

2/ Please see the notes above. In December last the Director was asked to report on certain complaints made in the "Hindu" about the absence of any demonstration as to the possibility of exporting oil with commercial success and the non-publication of the results of the working of the two oil-expellers purchased by Government. The reports, he submitted, showed that the machines were not suitable for dealing with groundnuts and that he had been conducting further experiments. The Director was thereupon asked to complete the experiments and then to submit a consolidated report thereon. This has not been received. The question of publication of the report was reserved for consideration after its receipt.

2. Mr. Couchman now states that the result of the experiments has been to show that these machines are not likely to come into general use, and as the expellers are no longer required by the department and as several offers are being received, he requests sanction to sell them or to lease them when opportunity occurs.

Mr. Couchman also proposes to retain the oil-engine purchased along with the first expeller as it is required for glass experiments.

He further requests sanction for the retention of the mechanic employed for the new hydraulic oil mill to be erected.

3. Even before the Government undertook to purchase oil-expellers, private persons had already installed such machines and it was suggested to Government specifically that experiments should be conducted with a view to pronouncing a definite opinion upon the use of these machines for crushing oil-seeds under Indian conditions as there was some doubt on the point. Please compare paragraph 4 of

Paragraph 4, page 18 of G.O. 52, Educational, Sir Frederick Nicholson's letter No. 589,
16th January 1915. dated the 10th November 1914. Though

Mr. Tressler doubted whether these expellers could be regarded as proper substitutes for the country mills, he was not prepared to give a decisive opinion and suggested further experiments. The matter is of some importance and a pronouncement on the result of the experiments is expected by the public. Mr. Couchman's opinion on the expellers, though it may be a natural sequel of that placed before the Government already by Mr. Tressler, cannot, it is submitted, be acted upon; and it may not be desirable to ~~avoid~~ sanction to the disposal of the plant until the fuller report already asked for is submitted. The disposal of the plant alone will be inexplicable to the public. Mr. Couchman's statements that the machines are not likely to come into general use is not understood when read with his further statement that "several offers are being received, some for outright purchase and some for hiring them on an annual lease."

Further a proposal has been made to the Directors of the Indian Institute of Science whether they will be prepared to undertake the experiments connected with the development of the oil-pressing industry and the establishment of subsidiary industries for the utilization of the oil. It is likely that in connection with that arrangement the Government may be asked to supply the plant necessary for the experiments. Until some definite decision has been arrived at in connection with the matter, it may be premature to dispose of the plant already in hand.

accord

6 NOTES TO G.O. No. 960, HOME (EDUCATION), 12TH SEPTEMBER 1916

4. The proposals to retain the oil-engine attached to the first expeller and the mechanic employed in connection with the working of the expellers may be considered later after a definite decision has been arrived at on the general question.

C. RAMANUJA ACHARIYAR—18-8-16.

Will Mr. Couchman please note further?

P. RAJAGOPALA ACHARIYAR—19-8-16.

OFFICE OF THE DIRECTOR OF INDUSTRIES.

Please see attached note.

M. E. COUCHMAN—2-9-16.

Note by the Special Officer, Department of Industries.

At the time when I wrote my letter of 4th instant I was not aware that a report on the oil-expellers was due from the Director.

I am now submitting a separate report, which shows that there are no advantages to be gained by using the expeller.

In the present note I will deal only with the criticisms on my proposal made in the office-note that my statement that the machines are not likely to come into general use is not understood "when read with his further statement that several offers are being received, some for outright purchase, and some for hiring them on an annual lease."

In view of the unsatisfactory results obtained from the expellers I have given strict orders that all persons enquiring about them, with a view to purchase, should be told all the facts about them, so that they might not complain afterwards if they also get poor results from them. On one occasion the Collector of Nellore suggested that the Co-operative Oil-monger Society of Sullurpet should get the Anderson expeller for use in place of the ten country mills they are now using. As a result of the explanation given to them by M.R.Ry. J. Narayana Murti, they dropped the idea. At the present time there are several offers from Cuddalore and Vizagapatam to lease the expellers. The real facts about the machines have been explained to them, and they are offering to lease the machines for Rs. 500 to Rs. 1,000 a year, whereas the interest and depreciation would amount to Rs. 3,440 per annum. To cover the cost of renewals and pay of the mechanic they offer Rs. 750 per annum, while the actual ascertained cost of renewals is Rs. 1,200, and the pay of the mechanic Rs. 500.

Offers to purchase are being received from Mysore. These are due to the fact that Mr. Chatterton, in an article in the Agricultural and Industrial Supplement of the "Madras Mail", published on April 8th 1916, stated that 40 per cent profit was being made by the use of this machine. It is true that, if the article is read carefully, it becomes clear that this profit must have been due to some other reasons than the mechanical efficiency of the Anderson expeller. Mr. J. Narayana Murti says that the profit must have been due to (1) the oil-seed having been bought at a very low price, possibly by means of a monopoly, (2) to a very high price having been obtained from the tanners using the oil, owing to the great rise in price of tanned leather, (3) to a high price having been paid by planters for the cake as manure, perhaps owing to the shortage of groundnut cake. In fact Mr. Chatterton says in the article itself that the advantage of the expeller lies more in the ease with which it can be operated by power than in its superior efficiency as an oil-extractor. In Bangalore power can be obtained from the electric mains at very low rates. In spite of this Mr. J. Narayana Murti does not believe that even in Mysore the expeller is making so much profit in reality, nor do I. However, inasmuch as the offer to purchase has been received through the Director of Industries himself (Mr. Chatterton) I think that we can accept it with a clear conscience. If we can get rid of both the expellers to Mysore in the same way we shall be well rid of them. The experiment has been a failure, and we shall have to admit it. I see no harm in that, as one of the objects for which the department exists is to test new machinery to see if it is suitable for general use in India. For doing this the department deserves the thanks of the public, and not abuse!

NOTES TO G.O. No. 960, HOME (EDUCATION), 12TH SEPTEMBER 1916

7

On the general question, however, of what aid could be given to the oil industry, I am in agreement with Sir Frederic Nicholson, and I think that mere extraction of oil, even by improved mechanical processes, will not lead to any great results, as the real problem is how to dispose of the oil when made.

M. E. COUCHMAN—2-9-16.

HOME DEPARTMENT (EDUCATION).

Please see Mr. Couchman's letter on pages 13 to 15 of current file and the notes on pages 13 to 15 *supra*. The results of the experiments carried on with the Anderson expellers do not appear to show that the machines are superior to the rotary mills and the screw press in use in the country. Mr. Couchman is not in favour of publishing the results of the experiments and suggests that persons who wish for detailed information should be advised to apply to the Director of Industries. His suggestion may be accepted.

P.R.—7-9-16.

2. In his letter No. E-4, dated the 19th August 1916, Mr. Couchman solicits sanction to the sale of one of the expellers to the Secretary, Industries and Commerce

Yes.

P.R.—7-9-16.

Committee, Bangalore, for a sum of Rs. 10,000. It is for consideration whether the sanction applied for may be accorded.

3. As regards the other machine it does not appear desirable to lease it on the terms set out on pages 13 and 14 *ante*.

P.R.—7-9-16.

Mr. Couchman may, therefore, be asked to endeavour to dispose of it by sale.

4. Mr. Couchman proposes to retain the oil-engine purchased with one of the expellers for use in the conduct of glass experiments. This proposal may be approved.

P.R.—7-9-16.

5. Mr. Couchman also desires to retain the services of the mechanic on Rs. 35 to look after the new hydraulic oil mill. The hydraulic mill has not yet been fully erected as some parts of the machinery have yet to be received from England; but Mr. Couchman will no doubt be able to find other useful work for the mechanic till the mill is brought into working order. The retention of the services of the mechanic up to the 31st March 1917 has already been sanctioned in G.O. No. 407, Educational, dated the 10th April 1916.

P.R.—7-9-16.

N.K.—7-9-16.

In the circumstances now stated by Mr. Couchman his proposals to dispose of the expellers may be approved. His other suggestions also seem acceptable.

C. RAMANUJA ACHARIYAR—7-9-16.

Mr. Couchman has gone into the whole question carefully and I support his proposals in their entirety.

P. RAJAGOPALA ACHARIYAR—7-9-16.

P[ENTLAND]—9-9-16.

~~A. G. C[ARDEW]—11-9-16.~~

Early issue of orders on Mr. Couchman's letter of 19th August seems very desirable.

A. G. C[ARDEW]—12-9-16.

A draft order is submitted for approval.

S.K.—11-9-16.

N.K.—11-9-16.

C.R.—11-9-16.

P.R.—12-9-16.

[G.O. No. 960, Home (Education), dated the 12th September 1916.]

ORDINARY.

Scott. II-38-2-15.

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