

Government of Madras.

EDUCATIONAL DEPARTMENT.

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G.O. No. 52, 16th January 1915.

30. Jan 1915

Oil-pressing industry.

issuing orders on the proposals submitted by the Director of Industries for the development

Government of Madras.

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Passing orders on the proposals submitted by the Director of Industries for the development of the —.

Part
of the —

செப்பனிருபவர் பெயர்
M. சேஷசுந்தர்
செப்பனிருபவராக எடுத்துக்
கொள்ளப்பட்ட நாள் 1991
செப்பனிரு முடித்த நாள்
செப்பனிருபவர்
சுர்பார்க்கும்
மு.பா.ஏ.
கையொப்பம்.
ஆ ராய்ச்சி
உதவியாளர்
கையொப்பம்.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following papers:—

I

Letter—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.
To—the Secretary to Government, Revenue Department.
Dated—the 13th October 1914.
No.—Ref. 519.

A statement has recently appeared in the Madras newspapers that Government had desired the Director of Industries to prepare an estimate for the importation, on account of Government, of a hydraulic press for oils in order to provide an object lesson to the public in the matter of oil-pressing so that the present glut of groundnut and other seeds may be dealt with; Government indicated their preference for a hydraulic press rather than for Anderson's "oil-expeller." I have no means of knowing the precise character of the Government order as I have not seen a copy, but assuming the statement to be correct I venture to make the following remarks.

2. If the hydraulic press is merely to provide an object lesson for the public in dealing with oil seeds, whether the present glut or the normal outturn, I submit that the proposal is open to the following objections:—

(1) A press factory, *per se*, will be "in the air", an isolated machine, unless there is also provided a regular organization for the collection of seed, and for the sale or disposal of its products, including especially those low grade oils and what is called "foots" which can hardly bear the cost of removal to any distance. Moreover it will be necessary to dispose of the oils, and the very difficulty to be combated at present is that of getting rid either of seed or oil, though there is, I admit, a better market for oil than for seed, and oil can be stored with less trouble and risk of loss by fermentation, mould, and pests of sorts.

(2) It would take at least a year to obtain and set up even a single factory by which time the particular cause which has led to the Government suggestion may have been removed or minimized. In any case a single press or even a single factory would be useless in dealing even with Madras groundnut alone, since the output of 1,455,000 acres (1913) at only 5 cwt. per acre or say 360,000 tons would mock at the efforts of even a dozen factories which we could hardly expect to see even in a decade without quite different stimulation.

(3) Hydraulic presses are not actually necessary as mere object lessons but are already in use in several places in this Presidency (West Coast at all events) by Indian oil-pressing firms; at Cochin there are several of them in actual operation. So thoroughly have they been tried, for copra, that in both factories the owners have scrapped the original open press type (which they are willing now to sell for a small sum) in favour of the cylindrical cage presses, although the latter, as obtained by the millers, cost far more than the former.

The reason for the change is a very practical one, viz., that with open presses the material has to be made up in small parcels by hand in costly press cloths; these are then inserted one by one, with a steel plate between each, to the full number taken by the press; pressure is then applied, and after the oil has been extracted the reverse process is gone through. Each press cloth costs about Rs. 3 and only lasts a fortnight; some burst under the pressure and cause loss and trouble. Hence considerable running cost for labour and cloths. The cage press, however, is automatic in charging the cage, and cloths are not used. I may add that with material so full of oil as copra the open press has long been known to

have other inconveniences. It will be seen then that the Indian oil pressers (not West Coast men however but from Bombay) are quite alive not only to the value of hydraulics but to the best form of them.

3. But there is more to be said as to the projected use of hydraulics, for the very same millers who have shown themselves thoroughly awake to the use of the best hydraulics have, alongside of the hydraulics and in the same factory, established batteries of iron rotary (pestle and mortar) mills; there are also other firms (Calicut, etc.) who use only rotary mills. These are simply adaptations, in iron, of the country "chekku" to be seen in every oil seed-bearing village, and are actually preferred to hydraulics by some millers. The reason is obvious; a hydraulic may, at any moment, go wrong; a cylinder may split under the enormous pressure of two to three tons per square inch, and then the press must stop till a new and costly cylinder is obtained; in the open press type I have already mentioned the difficulties as to cloths and labour, and hydraulic pumps, leathers, etc., not infrequently give trouble involving temporary stoppages and costs; there is also the very heavy prime cost, involving large annual sums for interest and depreciation, and a fairly expensive engineer.

These rotaries are absolutely simple and if lined with manganese steel are almost indestructible; they cost very little, viz., about Rs. 160 to Rs. 180 each, so that a battery of 60 or more may be bought for less than the price—Rs. 12,500 to Rs. 22,000—of one of the large double cage hydraulics in use at Cochin; anyhow a battery of 30 cost only about Rs. 5,000, plus cost of shafting, gearing and buildings which are less costly than the foundations, hydraulic piping, buildings, etc., required for hydraulics. Then these mills require no cloths whatsoever, and if one gets out of order (there is little really to go wrong) it is simply disconnected for repair while the other 29 run on. But they are said to be less efficient after five years if made only of cast-iron; hence the introduction of manganese steel at a 20 per cent. higher price. As for attention, none is required except occasionally to remove the press cake (poonac) and put a fresh charge. The whole battery is run off one or two power shafts from which they are driven by undergearing. The H.P. absorbed is said to be about 1 H.P. per mill; anyhow in one factory a battery of 20 is driven by a 25 H.P. engine, which allows a margin; in another 48 are driven by a 40 to 45 H.P. engine. From subsequent information this appears to be N.H.P. and not B.H.P., the mills seem to take above 2 B.H.P. each and Messrs. Massey's prospectus states $2\frac{1}{2}$ B.H.P.

The total cost of 20 rotaries, exclusive of building, but inclusive of engine, boiler, shafting and accessories, is said to be Rs. 15,000, whereas that of hydraulics to do the same work with the necessary accessories is said to be above Rs. 25,000.

The copra pressed by 20 rotaries in a 14-hour day is said to be 25 candies of 700 lb. each (= nearly 8 tons) or $1\frac{1}{4}$ candies per mill or 875 lb. per day or $61\frac{1}{2}$ lb. per hour. A similar outturn is given for other mills of the same character in Calicut. The cost is given as the same for hydraulics and for rotaries, viz., Rs. 3 per 35 lb. of oil; this estimate probably does not take into consideration the interest and depreciation on the respective prime costs.

As for efficiency, it is admitted that the cage hydraulics practically get out all the oil from copra, while the rotaries are a little less efficient. Both in Cochin and Calicut the same figures are given me for rotary work, viz., $12\frac{1}{2}$ maunds (of 35 lb.) or 437½ lb. per candy (700 lb.) of copra and up to 455 lb. if the copra is very rich in oil. This amounts to 62.5 and 65 per cent. respectively, good Cochin copra containing about 70 per cent. The cage hydraulics yield 455 to 472½ lb. or even 490 if the copra is very rich or 65 to 70 per cent. Practically the cage hydraulics gets $17\frac{1}{2}$ lb. more oil from 700 lb. copra or about $2\frac{1}{2}$ per cent. than the rotaries.

This, however, is not an unmixed benefit if a benefit at all, for the rotary cake containing 5 or 6 per cent. of oil sells at high prices as cattle food, while the hydraulic cake is almost worthless for such purposes and is exported to Ceylon, etc., probably as manure; it contains hardly any oil. Hence there is no real difference in the returns or profit; if anything, counting the loss of interest and depreciation and the poor character of the cake, the profits are in favour of rotaries.

The oil from the rotaries is of the first class and quite equal in quality to that from the hydraulics.

The same firms sometimes crush castor, but I have no data as to the outturn, and on this coast no other seeds are crushed.

The above are figures obtained from Cochin and Calicut oil millers.

4. Now I am not, of course, objecting to hydraulics in their proper place, and it is quite possible that for ordinary Madras oil seeds—castor, cotton, groundnut, sesamum—hydraulics may be preferable to rotaries; in fact one Calicut miller who used to crush groundnut obtained only about 25 per cent. of oil, which is about 7 per cent. below the results of hydraulic first (cold) pressing; moreover, the rotaries could mill only about 420 lb. each per day. All that I point out is (1) that hydraulics are not novelties to the local oil-millers; (2) that though known and fitted up, they have not taken the place filled by increasing numbers of iron rotary mills; (3) that the comparative efficiency, comparative running cost, comparative desirability under Indian conditions of capital, mechanical knowledge, etc., of the several presses—rotaries, Andersons, hydraulics—have not yet been tested by experts, viz., by engineers in conjunction with oil experts. For instance, Andersons may be very good intermediates between rotaries and hydraulics, being comparatively simple and cheap, notwithstanding that their comparative efficiency has been questioned in their own home (America) both as regards the amount of residual oil in the cake and the power absorbed owing, probably, to the great friction caused by forcing the whole mass through a constantly constricting area; I note that a Bangalore mill capable of crushing 5 cwt. of undecorticated groundnut per hour is said to take 20 H.P. which is the power provided by hydraulic press makers for a somewhat larger plant. But, *per contra*, it may often be wiser, under present Indian conditions, to install a plant which is of low initial cost and easy to run and repair than a more perfect and perhaps initially more expensive plant which requires highly skilled mechanical knowledge; in India heavy prime cost alone may often mean the total absence of an industry.

5. It is, however, perfectly clear to my mind that what we need is much more than a mere hydraulic or even oil-pressing object lesson, and I write to urge on Government the larger idea of starting at once a more systematic and definite technological enquiry in view to the introduction of the several oil and fat industries so obviously suited to and needed by the country where oil seeds are so cheap and so abundant, where oil products, as food and necessities for man, beast and soil, are so extensively needed, and where the introduction of such industries is so highly desirable as an economic and social development. My suggestion is merely an expansion of that made in my letter of June 1913, read in G.O. No. 3553, Revenue, dated 3rd December 1913, and is that instead of a mere hydraulic press as an isolated unit Government should at once establish a group of small linked and contiguous factories forming a complete technological installation for the whole of the oil and fat industries, so far as they deal with actual Indian raw material and with desirable products whether existing or potential; I mean the proper extraction of oil, its refinement, its manufacture into edible fats and butter, soap, candles, glycerine, paint, lubricants, etc., and the development of the cake industry both for stock and soil.

6. This group would consist of a small but complete oil pressing unit of any of the well known types with hydraulic and other presses and with a (solvent) extraction plant; of a refining plant attached thereto and forming part of the regular outfit; of a soap factory for the utilization of the low grade oils and "foots" which form perhaps 15 to 20 per cent. of the outturn and which by their small value cannot bear transportation to any distance, to which may be added a plant for the winning of the stearic acid for candle-making; of a small glycerine plant for recovery of the valuable glycerine; of a plant for the manufacture of sweet edible vegetable fats and butter substitutes; and of a small paint and lubricant factory. Possibly it may eventually be feasible to add a hydrogenation plant for the hardening of the oils, it being well known that the hardening process not merely turns the fluid oils (olein) into solid fat (stearin) but in the

process completely bleaches and deodorises the oil, of whatever origin and produces a white fat like lard or tallow; this however cannot be immediately undertaken, and may not be necessary if the matter is taken up by a British firm as elsewhere proposed.

In every country these several industries are necessarily located together, e.g., in Marseilles the oil press and refineries are alongside both of the soap factories and of the hardening and margarine plants; so it must also be in India. Common manufacturing sense demands this contiguity.

7. The group would form a complete technological station for the several linked industries and is what we really need not merely as an object lesson and place of instruction but to ascertain by actual operations—

(1) why it is that with all the enormous mass of oil seed around us the oil industries are so remarkably absent or in a weak and primitive condition; what are the causes—technological, industrial, commercial, economic—which hinder their establishment;

(2) what are the plant and processes best suited to our conditions and the classes of material available.

I may mention here a curious fact showing the necessity for expert enquiry. In Europe copra containing up to 70 per cent. of oil is usually treated to two hydraulic pressings, the first cold and the second hot; even so the cake contains considerable residual oil, which may justify the use of the extraction process. But in Cochin the hydraulics (cage presses) extract practically the whole of the oil and with a single cold pressing, thus obtaining in one operation not only more oil than the European presses in two, but, being all by the cold process, it is of the finest quality. Apparently this is due to the climate; cocoanut oil is solid in Europe and is usually called cocoanut fat; in Cochin at a temperature of 90°F. it is wholly fluid and is readily won from the copra tissues. All oils are more fluid at 90° than at 60°F. and it is therefore possible that the Indian temperature may be an item in our favour.

8. It is not economically true that India does not want the oils and resulting oil products; it *does* want them and wants them badly, whether as edible oils, and fats, as butter, as soap, as paint, and—above all I might say—as oil cake, which is now leaving the country annually in the form of seeds in hundreds of thousands of tons. We annually import soap, candles, glycerine, paint and even oils, worth crores of rupees, and if the goods are cheaper and locally produced we should want (utilise) far more, e.g., butter and soap; as I have shown elsewhere, we imported soap in 1913 to the value of £460,000 and the imports are going up by about 15 per cent. annually; butter and edible fats we need most deeply for the improvement of our dietary. Exports are *not* a gauge of India's needs or even of its desires, but of the activity of its merchants, of the foreign demand and of the ignorance or inactivity of its people. We get silver in return, but I say that we want the stuff itself and, what is more, the industries which deal with the stuff, for a country without industries parallel with its agriculture is but a one-legged competitor in the economic race. Moreover, if we had the industries we could supply Ceylon, the Straits, China, Java and many places in the middle and Far East with the products.

Hence we *do* need both the oils, the cake and the industries, and we can have them all if we like.

9. The proposal sounds larger than it is, for one of my points, as mentioned in my letter of 1913, is that modern machinists have provided for very small installations, perfectly complete and up-to-date in themselves yet suited to small enterprises, eminently suited therefore for experimental purposes. The advantage of these is that with a small outlay we can obtain complete data, on which larger enterprises might safely rely, or which could be initiated by small or duplicated by medium capitalists.

10. For instance, a small oil pressing plant is invoiced at £572 f.o.b.; this includes a small steam boiler for heating, rolls, special castor rolls and groundnut decorticator, edge stones, kettle, hydraulic press, etc., but no engine and boiler;

it is, however, too small for the purposes I propose and is only mentioned as a sample of a small but sound and complete unit. A suitable plant with engine and boiler complete might cost something over £2,000 *plus* buildings, but would be a respectable unit, and would deal with 15 to 20 cwt. of seeds per hour. I would add an Anderson's press and a battery of rotaries for purposes of comparison and instruction; even a Dutch wedge mill, still common only a very few years ago in small mills in Europe and America, might be added since it is powerful if slow and being made almost entirely of wood could be put up in any village very cheaply; each press can work off about 1 ton of seed per day.

11. I would add a small "extraction" process for the recovery of practically the whole of the oil (down to one per cent.) from any seed. This should be tried both as a complete substitute for pressing or as a secondary process in extracting residual oil from the press cake. In the case of many oil seeds the nature of the oil cells, outer integument, etc., is such that not the most powerful of presses can get out all the oil; with such seeds the cake may contain from 7 to 10 per cent. of oil notwithstanding more than one pressure at from 2 to 3 tons per square inch. But with certain solvents this residual oil can be almost entirely extracted, and it is common in Europe to adopt what is called "huilerie mixte," that is, a first expression by hydraulic presses, followed by extraction by means of solvents. This is not needed for copra but is good for some other seeds. It is open to the objection that even if the solvent leaves no trace of itself—as smell or taste—in the cake, yet the cake is so devoid of oil as to lose much of its value as cattle food. But in the case of cakes only used for manure such as castor, neem, etc., this would be no objection but the reverse, as it would free the agriculturist from the existing disadvantages that he has to purchase cake with too much oil in it; e.g., in 100 tons of cake he may buy seven tons of oil for which he has to pay as cake both in prime cost and freight, and which he not only does not want but which he knows to be, *pro tanto*, harmful to his soil.

A small Merz extraction plant, which has the advantage of being able to use various solvents including the non-inflammable trichlorethylene, and dealing with one ton of seeds or cake per day, was invoiced in May for £250 to £300 f.o.b. London; it is unfortunately Austrian, but doubtless a British plant of the same capacity could be had for a similar sum; I only mention it as a sample.

This could be used in two ways, viz., either for the extraction of the oil direct from the crushed seeds without any pressing, or in the mixed system, in which the seeds are first pressed—hydraulically or otherwise—and the residual oil then extracted from the cake by solvents. It would thus be possible to ascertain whether the extraction process by itself may not be preferable—in some places or with some seeds—to the pressure process, or whether the combined method should be adopted for certain seeds, or whether it is inadvisable in any case.

An apparatus to deal with one ton charges (each charge takes 12 hours) may be had complete for £250 to £300. A ten-ton plant complete with engine, boiler, pumps, rolls, and two extractors will cost £1,500 to £2,200.

12. A refining plant is not costly; a one-ton size for refining cotton seed oil costs £164 or £263 with engine and boiler; if adapted both for the sweet (edible) and acid (soap) processes, it would cost something more. A fullers' earth plant for dealing with groundnut, sesamum oil, etc., costs £95 in the one-ton size; this includes a filter press. A cooling plant for the removal of stearine costs £400 for a one-ton plant; in refining cotton seed oil, this would be advisable.

13. A complete soap plant by the best London makers and capable of turning out ten tons of finished soap per week is invoiced f.o.b. at about £470, and this contains every machine necessary including a tablet machine. In Burns' catalogue I noticed a five-ton plant, complete with steam boiler, etc., for Rs. 8,800 or say £600.

The London firm alluded to will also provide a complete ten-ton per week glycerine recovery plant for about the price of the soap plant.

I have not enquired the cost of other plant (candle making plant, etc.), but these can easily be ascertained.

14. Allowing for freight and other charges the above oil pressing and extracting, oil refining, soap and glycerine plant and calculating the hydraulic oil press unit at £2,000 could be landed in Madras for about £4,000 to which must be added the cost of an Anderson press and rotaries, transport up-country, say, to the Coimbatore district (to take advantage of the oil seeds on one side and of the West Coast copra on the other) and the cost of buildings; see appendix.

15. The provision and pay of the experts is another matter, but oil-pressing is a mechanical industry requiring little scientific knowledge except that of preventing the oil from becoming rancid; pressing and refining are comparatively routine matters; hence press foremen can easily be obtained.

As regards soap and glycerine, however, we already have in Mr. A. K. Menon, a man not only trained in the chemistry of oils, fats and soaps, but a practical soap-maker in both hard and soft soaps, and with excellent certificates from London soap-makers; he is also acquainted with glycerine recovery. Hence we can begin as soon as the plant is available.

The plant for the paint and lubricant factories may be added later on.

16. I trust that Government will consider this matter altogether apart from any weakness or sketchiness in my presentation of the case; this matter has for years pressed for consideration, and the present seems a favourable opportunity for giving effect to ideas and plans which began to be possible when Government appointed Mr. A. K. Menon in 1913 as oil expert to the Fisheries Department with the possibility of subsequent expansion of work. This possibility has unexpectedly developed, we have now an opportunity of dealing with a pressing necessity.

17. In another letter I have pointed out, owing, under normal conditions, to excessive competition for oils in Europe, great centres of the connected industries are actually declining and factories closing; hence the opportunity offers for the development of the industries in the country of production. It is estimated by experts that the mere cost of getting our seeds to Europe costs £2-10-0 per ton; a similar amount must be paid on all products derived from these seeds which return to India; hence a practical bounty of £5 per ton on the value of all goods sent from and returned to India if such goods are worked up in the country. Moreover this bounty, coupled with India's position in the East, would enable her to compete, especially with Continental factories, in the supply of such goods to Ceylon, the Straits, China, etc. The war, though the conditions are abnormal, gives us an advantageous chance of cutting in, in that it may stimulate manufacturers to attempt what they might think hopeless in normal seasons.

18. May I press once more the object-lesson of the Fisheries Department? This deals with the unknown and primitive in every direction; the people are most ignorant, hide bound by prejudice, and poor; their plant is primitive and weak varying only from the catamaran to the canoe with nets and lines to correspond; the harvest is most uncertain and is highly inaccessible except in certain seasons and inshore localities; the raw material, everywhere delicate and difficult to deal with even in highly industrial countries, where stream, ice, rapid transport, and intelligent handling are almost universal, is in our tropical resourceless and backward conditions ruined by a few hours' delay or negligence; the sole indigenous method used in dealing with it are salt (not always) and plain beach drying. Not a European would venture capital in any item of the business and at the Industrial Conference at Ootacamund in 1908 it was expressly ruled out by the business representatives as being outside business consideration. But Government took up this despised and difficult business, have spent money liberally, and while we have only begun operations seriously in the last five or six years and have not yet touched work at sea, certain industrial successes have already been attained and others are approaching. The 211 private oil and guano factories which are one result of Government's work since 1908 are the beginnings of a splendid oil and manurial industry; canning has so far succeeded that I could myself sell ten times the amount that I can at present produce, and our efforts have so impressed British firms that I am confident that within three

or perhaps five years there will be a serious canning industry on the West Coast. It took more than five years for even the Americans with all their push and knowledge and resources to start sardine canning (from 1876), but Maine alone now cans about 2 million cases (200 million tins) every year, and the capital invested is very great. In other directions Madras fish-curing is advancing.

19. If then in so *extremely* difficult a matter as fish-curing—as the fishery industries rather—Government have seen fit to invest capital in pure experiment and subsequent demonstration, will it not also invest money and the energy of its experts in a serious scientific and systematic attempt at developing the oil and fat industries in the several connected departments, seeing that the material to be dealt with, the scene of operations and the class of persons (capitalists) to be stimulated, are so much more favourable to success than the corresponding factors of the fishery industry; if success has attended—in some degree—the one, *a fortiori* it should attend the other, the more so, that it is easy to get experts from managers, chemists, engineers, and foremen downwards, in every branch of the oil and fat industries, whereas in fisheries our pisciculturists have been our only experts while curing matters have had to be dealt with by learners. In my letter to a London firm of the 6th instant I have given some reasons why industries in general, and the oil and fat industries in particular, are neglected in the mufassal and even in towns and I need not here recapitulate them; suffice it to say that there are serious difficulties and that some one must spend time, capital and expert knowledge (1) in ascertaining, (2) in solving them. Private capital is scarce and shy and expert knowledge absent; it is left for Government who desire industrial progress to take up the experimental rôle in this and in other matters as they have done in fisheries.

20. May I in this connection ask whether Government will consider other methods of stimulating these greatly needed industries, and not merely these but others? I have suggested a special technological institution or series of small linked experimental factories where we could examine the true and very real difficulties attending the establishment of oil and fat industries, work experimentally at the connection between the several branches of pressing, refining, butter and soap, etc., making, hardening and so forth, demonstrate such connection, and train technological experts and ordinary artisans. But there are other modes of stimulation such as the relief of infant industries from taxation (income-tax), the provision of eligible sites by taking them up under the Land Acquisition Act and by granting them free of cost, the lending of experts, the grant of loans free of interest or even of grants-in-aid for experimental work or for tentative factories.

21. The fear of taxation is not a small hindrance, especially when, as in the early years of a new business, profits are dubious, unforeseen and necessary outlay continuous for several years and it is difficult to get assessing officers to look leniently on income and favourably upon outlay; the small private oil and guano factories have already felt the pinch though greatly relieved on enquiry by a wise Collector. Sites for great factories are often difficult to obtain and not only are there great delays but under the Hindu family law it is most difficult to get a title or to avoid practical litigation; a well known mufassal merchant once told me that he had just obtained a final decision in his favour over a factory site which he had duly and formally purchased from owners but regarding which he had been engaged in litigation by successive *dayadis* for 19 years. I know of a precisely similar case in another locality where peaceful possession for over 20 years of a site bought at a *Civil Court* sale has not yet sufficed to end the successive litigation by alleged heirs. Government take up land for railways and might do so for projected factories in the case of *new* industries. In the matter of the loan of experts and of funds we have—as in the previous items—almost universal examples not only in backward but in new countries, such as Ireland and Japan on one side, and Canada and Australia on the other; bounties, rebates, guarantees, direct loans, provision of cold storage, assistance in obtaining motor boats or plant, loans for sugar factories, provision of expert instructors; all are well known in foreign countries or in our Overseas Dominions; why not also in

India? I have mentioned something of this in my Notes on Japanese Fisheries and Agriculture, but I should like to draw up or to see drawn up a statement showing all the various methods and extent to which other Governments help on desirable industries, especially in countries which are backward or new; I think it would be a revelation. If Government will define a distinct and liberal policy of assistance in various methods basing such policy, if necessary, solely on what is commonly practised in similar cases elsewhere, I venture to predict that there will be far more rapid advance and far less need for Government demonstration factories than hitherto.

APPENDIX.

Rough Estimates.

	£	£
(1) [From Catalogue (13th edition) of Rose, Downs, Thompson of Hull]—		
Oil mill, Anglo-American, Colonial No. 5-A: complete mill including rolls, kettle, moulder, two plate (open) hydraulic 12" presses with pumps, engine and boiler, cotton seed separator, decorticator and etceteras, elevator, conveyor, complete gearing, foundation, and all piping, supply of press bagging, etc.		1,697
Add—1 castor seed decorticator	125	
1 groundnut decorticator	143	
1 copra disintegrator	70	
3 fluted rolls for copra	50	
1 set edge stones	107	
Spares, etc.	50	
		545
Total f.o.b.		2,242
Less discount at 15 per cent.		337
		1,905
Add double Premier cage 18" press with kettle and distributor and pumps complete in itself No. 330.	1,060	
Less discount at 15 per cent.	155	
		905
Total f.o.b.		2,810
Alternative (a)—		
Reduce cost by substituting the double Premier cage presses and kettle for the two open presses. Net reduction viz. gross reduction of £375 plus cost (£90) of more powerful pumps; less discount, about		240
		2,570
Alternative (b)—		
For the "Anglo-American" oil press as above plus the double Premier cage presses substitute one oil mill A-2 of the Improved Premier type (cage presses)		1,332
Complete as the "Anglo-American" mill plus castor seed, copra and groundnut decorticators, copra rolls, edge stones, etc., as above		545
		1,877
Less discount at 15 per cent.		277
		1,600

N.B.—"Premier" presses are cage presses, but the type comprised in A-2 mills and costing £497 with pumps and with 12" rams are much less powerful than the separate 18" presses invoiced at £897 plus pumps.

Castor seed and groundnut *shellers* are not included as this work can conveniently be done by hand where labour is cheap as in India.

(2) Oil refining plant—	£
Cotton seed combined sweet (edible) oils and acid (soap) oils for one ton per operation; about	350

N.B.—Plant for each process separately costs £164 each *plus* engine and boiler (£100) = £428. The combined plant costs more than each separate plant but less than the two plants.

(3) Fullers' earth plant—	£
For one ton charges	95

(For two ton charges—£134.)

(4) Oil cooling plants (for stearine separation): one ton size ..	400
(5) Extraction plant, Merz system, for one ton charge	300

(For ten ton charges—£1,500—£2,000.)

(6) Soap plant (Messrs. George Scott & Co., London) for ten tons finished soap per week	465
(7) Glycerine recovery plant—ten tons per week	470

All plant is f.o.b. In the case of oil presses Messrs. Rose, Downs, Thompson, mention in the *pro forma* invoices a discount of 15 per cent.

II

Letter—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director, Madras Fisheries.
To—the Secretary to Government, Revenue Department.
Dated—Madras, the 27th October 1914.
No.—Ref. 553.

In continuation of the appendix to my letter No. 519 of the 13th instant regarding oil and soap factories, etc., I have the honour to submit the name of Messrs. Greenwood & Battey, Limited, of Leeds, who are also first class oil press makers.

As an example of a small mill, suitable for small capitalists, may be mentioned their No. 2 "Universal" mill, which will crush and press about one ton of small seeds (sesame, decorticated cotton, linseed, etc.) *per day* of 11 hours; the presses are on the cage system, similar to the "Premier" presses of Messrs. Rose, Downs, Thompson; cage presses are recommended rather than open plate presses in this country in view of the quantity and fluidity of the oil in our seed, and nuts, and in order to avoid the cost, delay, etc., of packing the meal in small parcels of expensive and quickly worn-out press cloths; the cage presses require only press mats—very durable—which are dropped between each sub-charge of which 12 or 14 or more form one charge and consequently 12 or 14 or more cakes, per operation. The "Premier" of Messrs. Rose, Down, Thompson, and the "Leeds" of Messrs. Greenwood Battey are on this cage type.

This "Universal" is of course a very small mill, much smaller than even the "Premier" mentioned in the above mentioned appendix, and would require additional plant (decorticators, etc.) for completion. It is merely mentioned as a specimen of a small but complete mill, possibly suited for general requirements in a country of small capitalists or for experimental purposes. No estimate or price list has been obtained from this firm.

Both firms, of course, build mills, of *standard* pattern up to, say, 600 tons per week usually taken as 132 hours, working night and day.

2. I also enclose a pamphlet regarding soap and glycerine plant from Messrs. George Scott & Co., London, the firm that provided the estimates mentioned in my letter and appendix. As I have several other copies it need not be returned.

III

Letter—from K. T. B. TRESSLER, Esq., Acting Director of Industries.
To—the Secretary to Government, Revenue Department.
Dated—the 6th November 1914.

In continuation of my note on industries and the Government order thereon, I now have the honour to submit proposals for the purchase of oil-manufacturing machinery.

2. In order to make the position clear I must briefly explain the process.

Oil seeds may be divided into two classes: those which require once pressing only and those which require twice pressing. Oil-seeds of the first class may be pressed by the Anglo-American system: for the treatment of the second class of seeds the more expensive "cage" system is usually considered necessary. Either system may, however, be applied to the treatment of the other class of seed with a certain loss of efficiency in the one case and an excess in capital cost over what is absolutely necessary in the other.

Presses of the above types are made in all sizes, but the smallest commercial unit is one having a capacity of 20 tons or so per day. In reckoning capacities the quantity is always expressed in terms of raw seed and taken on a 22-hour day since the process of oil extraction is a continuous one.

3. To deal efficiently with smaller quantities of seed—say 3 to 4 tons a day—the expeller system was introduced into America about 15 years ago. This system is a modification of the cage system but appears to be going out of favour now. The reason, I believe, is that, like all other small plants, it does not yield the same products as a commercial sized plant, their collective value being considerably lower than that of the corresponding products in the case of a commercial sized plant. Of recent years the demand for the products has become much more specialised, and the small mill loses in two ways: first on account of the intrinsically lower value of the products; secondly on account of their depreciation owing to the fact that they do not exactly meet the market demand.

4. Take for instance groundnut. In a small mill the extraction will be about 80 per cent., in a large mill 88 per cent. or more. In the first case the resultant cake is richer in oil, but this does not materially enhance its value and the loss is about 8 per cent. on the oil. Then again in a large press the seed is pressed in two stages, the first oil being used for edible purposes and the second for soap—subsequently the residual oil is extracted by means of solvent, but with this question we need not here deal. With double pressing therefore we get two classes of oil, the first considerably more valuable than the second. In a small press the two qualities are mixed together. The mixture is better than second press oil, but the purchaser cannot separate the two qualities and as therefore the mixture can only be used in place of second press oil it only commands second press prices.

5. There is a further process applicable to certain classes of oil-yielding material, *e.g.*, cocoanuts in which the oil is separated by a species of boiling. In this process—at least as applied to cocoanut—the products are the same whatever the scale of production. They are however refined products and proportionately more expensive than crude ones to produce. Hence the process will only be profitable if supplying a high class market. This process I will deal with later.

6. So far as presses are concerned, the following (approximate) table will be of interest.

The outturn is given per day of 22 hours and is reckoned on seed treated. The figures are in pounds sterling.

Anglo-American system (Single Press).						
Outturn	1½	3	10	20 tons per day.		
Horse-power	5	10	20		45	
Oil machinery	350	400	1,400		2,300	
Extra engine	100	175	300		575	
„ accumulator	..	..	..		250	
„ for cotton	140	200	250		420	
„ for copra	..	..	120		150	

Cage system (Single Press).

Outturn	1½	3	10	20
Horse-power	5	10	20	45
Oil machinery	375	575	1,250	2,600
Extra engine	100	175	300	575
" accumulator				250
" for cotton	140	200	250	420
" for copra			120	150

Expeller system (1 size only).

Outturn	4			
Horse-power	14			
Oil machinery	* 800			
Engine	150			
Extra for cotton	250			
" for copra	120			

Double Pressing—20-ton plant requiring about 80 H.P.

	2 A.A. press system.		Combination cage and A.A.		2 cage system.	
	A	B	A	B	A	B
Oil machinery	4,500	5,500	4,900	7,000	5,200	8,200
Extra engine			900			
" for cotton			420			
" for copra			150			
" for buildings			1,200			

A = Quotation by the firm A. B = Quotation by firm B.

7. It has already been explained that plants under the 20-ton size cannot produce oil at commercial prices and in commercial quality. In using the word commercial I refer to the prices and qualities ruling in the world's market. In the Indian market conditions are less severe: the loss of a few per cent. in oil extraction is not a vital matter, and quality is a secondary consideration compared with cheapness. Speaking generally, an improvement in quality would not increase the market value in a degree at all commensurate with the extra cost of refining. The smaller sized presses—except the very smallest—certainly do appear to be more efficient than the hand or bullock presses now in use, and if our object is to substitute a more efficient process for those now employed in extracting oil for home consumption a small press—say the 3-ton size—is to be recommended or else the Anderson Expeller, though this latter machine considering the outturn is rather expensive.

8. A policy of substitution.—The substitution of a more efficient mode of extraction for a less efficient one is a policy for which a good deal may be said. The principal argument in its favour is that it requires little financing. Comparatively little raw material is required for working and may readily be obtained by a suitable selection of locality. The finished product is a bazaar article that commands an immediate sale at bazaar rates. Apart from the capital investment, the experimental working of a plant of this kind may easily result in a profit and in the worst case is not likely to lead to much loss. On the other hand the introduction of plant of this character will result merely in a differential economic benefit: the extra value of the outturn of the plant as compared with that of plants of the existing type, less say 12 per cent. interest and depreciation on the extra capital invested. The amount is small. Such plant can stimulate the industrial activity of the country only to the extent to which the home demand (which is the only demand the plant can satisfy) can be developed. My opinion is that the development of the home demand both as regards quantity and quality will be small. Moreover a policy of substitution is one that would be at least as effective under peace conditions as under war conditions and the present economic situation furnishes no special grounds for its adoption now in preference to any other time.

* Expeller and Rolls.

9. Seeing how large is the present export of oil-seed it is obvious that the future of the Indian oil-pressing industry lies in the export rather than the home demand and it is just the development of an export trade that the present situation more particularly favours.

Under normal conditions trade follows certain well defined channels and this makes it extremely difficult for any new sources of supply to gain a footing in an established market. This obstacle the present disorganisation of trade channels has temporarily removed and were India in a position now to prepare at once the products in demand abroad, she would stand an excellent chance of securing a permanent place for them in the world's markets. Unfortunately India is practically devoid of the necessary appliances for the preparation of such products—I refer now more particularly to the oil industry—and it is too much to hope that within the period during which the after-effects of the present war will persist, the pressing industry could be established in India on a scale commensurate with that on which it is now carried on in Europe. If the question is regarded from a different standpoint, viz., that of the "protection" or saving of the oil-seed crop the conclusion is the same that the wholesale pressing of the seeds now being exported is an impracticable scheme. This does not however preclude us from making a bid for a footing on the European market by putting up a small number of factories capable of manufacturing the products now in demand there.

10. Such a policy of expansion in conjunction with a foreign market offers a strong contrast to the policy of substitution in conjunction with the home market. Even in the limited form in which I now propose it, it holds out a prospect of economic benefit infinitely greater than that to be derived from a mere policy of substitution. The latter, as explained, yields merely a differential advantage: the advantage of an expansion of the pressing industry is positive all through and opens up unlimited possibilities. If a position, however small, can be gained in the European market there is nothing to prevent the oil-pressing industry ultimately being transferred bodily to India. I use the word ultimately advisedly. I anticipate no immediate revolutionary changes but I do contend that *c'est le premier pas qui coûte* and that the present opportunity offers an unique opportunity for this first step.

11. On the other hand I do not wish to minimise the risks that the adoption of policy of expansion involves. It is by no means certain that the pressing of oil-seeds for export is a commercial proposition in India. It is common saying that in modern manufacture the main product merely covers costs: it being on the sale of the bye-products that the profit depends. The oil miller sells his products in a number of different markets and so realises the best value in each. First press oil goes to the food-stuff maker—second press to the soap maker. Cake to the agriculturalist: "foots" not infrequently to the sweetmeat manufacturers, etc.

The pressing of oil in the country of production undoubtedly has its advantages, but the disposal of the products from the local centre may introduce losses that more than counterbalance the advantages.

Then again, the idiosyncrasies of the home demand have yet to be ascertained and satisfied. Regarding these we at present know little. Importance is attached by the buyer to certain characteristics which may be of little value in themselves but make all the difference in the price.

A man will pay to the utmost of his ability to secure what he wants but a product that does not exactly meet his tastes and requirements he will only take at his own price.

12. Further, when working on a large scale difficulties in connection with supply of raw material may be experienced. The only way in which an answer can be obtained to all these questions is by actual trial and by the regular consignments of trial samples to Europe for sale and broker's report: in other words by a process of what I may term testing the market. Such a process takes time and involves a considerable investment of working capital with the chance of a considerable amount of loss—a chance amounting to a certainty at least during the earlier period of the experiment. If the Indian oil pressing industry is to be

developed at all, this risk must be faced at some time or another, and that the present moment, owing to low prices, it is much less than it would be under normal conditions and the chances of success are also much greater. And there is this also to be said: that if the risk attaching to a policy of *expansion* is much greater than that associated with a policy of *substitution*, the prospective benefits in the event of success are also enormously greater in the first one than the second. Expansion partakes of the character of a gamble: substitution is a safe but poor investment.

13. Having thus explained the two alternative policies that may be followed I must leave Government to choose between the two. Personally I favour the more speculative one, but I may remark that Mr. Chatterton is of a different opinion.

In order to produce products of the character required with home market double pressing is essential and what I propose is the purchase of as many combination cage and A.A. presses in the 20-ton size as funds are available for. In the event of the combination not proving quite satisfactory it can be split up into its components, the cage press being used for oily seed and the A.A. presses for less oily seed, e.g., cotton or castor. Machines of the class made by the firm B appear to me materially better than those quoted for by A, but the price is prohibitive and I must therefore recommend the purchase of the A type plant. The cost of each unit, with buildings, may be estimated at about 1½ lakh of rupees, but an equal amount of working capital may also be required. If refining is to be done, the following extra plant will be required:—

Fuller's earth plant	£
Refining plant	125
	860

Further expenditure is also to be incurred in connection with the purchase of a tin making plant. If oil is to be exported, it must be properly packed. Barrels are leaky, expensive and insufficient in quantity, and to procure an adequate supply of tins at a cheap rate the only thing to do is to put down a tin making plant. Such a plant will also be required in connection with many other industries and will, if not sanctioned in this connection, have to form the subject of a separate reference later on. Meantime I am providing Rs. 7,500 for the purchase of such a plant.

14. For the purpose of submitting a definite proposition I will ask for three plants to be located in three of the following centres:—

Madras, Bezwada, Bellary, Coimbatore, Cuddalore, at a cost of about 5 lakhs for three plants including the cost of refining plant for one of them and Rs. 7,500 for the tin making plant. As regards working capital I should require about Rs. 5,000 for the purchase of sheet iron and, to begin with, say Rs. 75,000 for the purchase of raw material for the three factories. In the event of there being any delay in the disposal of the products further capital might be necessary. For each mill a temporary staff of one supervisor and two mechanical foremen would be necessary. Shipment of the plant might be expected two and a half months after the placing of the order and completion of shipment in five months.

15. If, on the other hand, a policy of substitution is to be followed, I would recommend the trial of several different types of plant. In this case single pressing only would be done though a preliminary treatment in country mill might be tried. I suggest an assortment of plants of the three types and the expellers in 3 and 10 ton sizes.

In connection with one plant I also recommend a small experimental refining plant.

Working expenses would not be heavy. Say Rs. 2,500 plus one mechanical foreman at Rs. 50 for each plant.

The total cost of a proposition for five plants amounts to Rs. 1½ lakhs, but the amount may, as in the former case, be increased or reduced at will by increasing or decreasing the number of plants purchased.

16. As I have already explained I, personally, am of opinion that, in view of the results that may be achieved, the larger and more risky proposition is to be preferred—at least to the extent of one factory—but on this point I must leave Government to judge.

Detail estimates are appended. The services of an expert for six months are provided for in the case of commercial plants. Time is the important factor in the present situation and I may find it necessary in case a certain type of plant cannot be delivered sufficiently quickly to substitute another type: for the same reason other modifications in detail may be required. I cannot therefore say exactly what particular plant I can get and can only estimate the sum required roughly as follows:—

	Purchase.*	Staff one year.	Working † expenses.	Total.
<i>Expansion.</i>	Rs.	Rs.	Rs.	Rs.
If 3 factories are sanctioned	3,94,000	15,200	75,000	4,85,000
2 do.	2,82,000	12,800	50,000	3,43,000
1 do.	1,58,000	10,400	20,000	1,93,000
<i>Substitution.</i>			Contingencies.	
If 5 plants are sanctioned	1,14,000	15,500	4,500	1,34,000
4 do.	95,000	12,400	3,100	1,10,000
3 do.	82,000	9,300	2,200	93,500
2 do.	68,000	6,200	1,300	75,500
1 do.	43,000	3,100	900	47,000

* Include buildings, 1 refining plant and 1 ice-making plant.

† Further grants may be required later.

If the plant is sanctioned at once, one half of the purchase price may be allotted on this year's budget and the remainder of the grant in next year's.

ESTIMATE I.

Double Press—Cage and A.A. Combination 20-ton plant.

1 Oil-seeds Factory—	£
One set of seed rolls	366
One seed kettle	1,800
One set of hydraulic pumps	165
One accumulator	314
Elevators, conveyors	40
Gearing	160
I.W.I. foundation tank	30
Oil pump and cistern	20
One set of edge stones	109
Bagging yarn	44
One set seed roll	337
Elevators	20
One seed heating kettle	91
One moulding machine	66
Four hydraulic presses	888
One W.I. foundation tank	20
One set of hydraulic stop	30
One paring machine	59
One oil pump and pipes	18
Gearing	160
Bagging, yarn and lathes	44
One 10-inch gauge and pipes	6
	4,787
Add—2 filter press at £120	240
Special plant account to class of seed to be treated	540
Engine (95 H.P.) and Boiler	900
	6,467
Total	6,467
Add freight and Ins.	7,000

Purchase of plant—

	RS.
Three plants at £21,000	3,15,000
Three buildings at Rs. 18,000	54,000
One 5-ton Fuller's earth plant (less filter) £125 add 10 per cent.	2,055
One Refrigerator at £862 add 10 per cent.	14,120
One tin-making plant	75,500
Contingencies	1,325

Working expenses—

One expert for six months (and return fare)	3,700
One Supervisor at Rs. 100 for each plant	7,200
Two mechanical foremen at Rs. 50 for each plant	
Erection at Rs. 1,700 for each plant	5,100
Working capital at Rs. 25,000 each plant	75,000
Total	4,85,000

Temporary staff to be sanctioned—

One Supervisor at Rs. 100.
Two mechanical foremen for each installation at Rs. 50.

ESTIMATE II.

SMALL PLANTS.

Cage.

	3-ton plant.	10-ton plant.
	£	£
Rolls	80	140
Seed kettle	34	91
Two premium press	214	400
Pumps and gearing	80	297
Press mat, etc.	30	33
Extra for cotton decorticator	202	Oil pump. 20
	640	981

	RS.	RS.
= with freight and insurance	10,600	15,120
Engine with fittings and small boiler	2,300	3,000
Filter	1,300	1,300
Shed	4,000	4,000
Erection	1,000	1,000
	19,200	24,420

A.A.

	£	£
Rolls	80	140
Kettle	20	49
Moulding machine	127½	66
Press		278
Pumps	28	97
Gearing	20	197
Paring machine	..	71
Oil pump and cistern	..	20
Yarn, etc.	30	33
	305	951

RS.	RS.
= 4,600	15,000

A.A.—cont.

	RS.	RS.
Engine, etc.	2,300	3,000
Filter	1,300	1,300
Shed	4,000	4,000
Erection	1,000	1,000
	13,200	24,900

Expeller.

One expeller delivered	10,000
Rolls	1,500
Engine	2,200
Filter	1,300
Erection, etc.	1,500
	15,500

Temporary staff to be sanctioned—

One mechanical foreman at Rs. 50 for each installation.

IV

Letter—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.
To—the Secretary to Government, Revenue Department.
Dated—Madras, the 10th November 1914.
No.—Ref. 589.

I apologise for troubling you once more on the question of the linked oil industries; the importance of the matter must excuse me.

2. I find that the rotary mills take too much power and seem therefore out of the question especially in a country where fuel is so dear as in this Presidency; they are cheap to buy but not cheap to run so far as driving power, and consequent efficiency per H.P. absorbed, is concerned; e.g., one Anderson Oil Expeller absorbs ten B.H.P. and will, it is said, work off 700–800 lb. copra per hour; the expeller, with necessary rolls, tempering kettle, and 12 B.H.P., etc., engine, costs about Rs. 16,000, viz.—

	RS.
Expeller (nett)	10,000
Rolls, etc.	2,600
Twelve B.H.P. Hornsby oil-engine	3,000
Shafting	400
Total	16,000

Twelve rotary oil mills work off 720 lb. copra per hour and will cost—

Twelve mills at Rs. 200	2,400
Thirty B.H.P. Hornsby engine at	4,500
Accessories	1,100
Total	8,000

Hence the prime cost of rotaries and an Anderson doing the same work are as 1 to 2.

But since each rotary mill takes 2½ B.H.P. the 12 rotaries will absorb 30 B.H.P. as against 12 B.H.P. for the Anderson. Turned into figures with oil at 8 annas per gallon the oil bill alone for 40 weeks of 132 hours each at one

pint of oil per B.H.P. hour (including lubricating oil) would be something as follows, viz.—

	RS.
Twelve rotaries for 40 weeks of 132 hours each, using 30 B.H.P. require 19,800 gallons of oil costing	9,900
One Anderson doing the same work but using 12 B.H.P. (including the working of the rolls)	3,900
Difference in favour of the Anderson per annum in the matter of fuel	6,000
Taking labour, buildings, etc., as similar we have the following schedule of running costs—	
One Anderson—	
Interest on prime cost of Rs. 16,000 at 12½ per cent. per annum	2,000
Depreciation at 10 per cent. per annum	1,600
Fuel and lubricating oil	3,900
	7,500
Twelve Rotaries—	
Interest on prime cost of Rs. 8,000	1,000
Depreciation at 10 per cent.	800
Fuel and lubricating oil	9,900
	11,700
Balance in favour of the Anderson	4,200

The figures do not pretend to be exact; the point is that, by the makers' own statements, each rotary mill working off 60 lb. copra per hour absorb at least 2½ B.H.P. while the Anderson claims to work on 10 B.H.P. and must be able to do something of that sort since the engine supplied with the machine can only be run at a maximum of 14 B.H.P. and a usual load of 12 B.H.P. I find in practice that a mill with 19 rotaries is run by a new 45 B.H.P. oil engine; another with four rotaries by a 9½ B.H.P. engine, and so on.

The one advantage of rotaries is that a few can be used if the whole battery is not required, and conversely that one can be cut out of the working if it gets out of order, without disturbing the rest.

3. Hence for serious work in this Presidency the choice seems to be between Andersons and hydraulics, with the reservation that for small village mills, the old Dutch stamper or wedge press may yet find a place.

4. I note that there is an Anderson in Coimbatore and another in Pollachi, so that if these are running it should be easy to ascertain their practical efficiency. Also whether the criticisms of Lewkowitsch that they do not get the same amount of oil out of the seeds, and that the movement of the mass through the contracting cone badly corrodes the steel, even tool steel, are borne out by India experience.

5. I hold no brief for any sort of press; I am only desirous of showing how little is known on the matter in India, and that consequently there is good reason for Government experimental mills and factories whether in oil or in the linked industries. The note of the Director of Industries of 12th September on the groundnut question, which I have only just seen in the Indian Trade Journal for 29th October, affords additional arguments which I will mention.

6. I note that the Director and myself are in agreement that the rushing into a local oil industry simply because of temporary low prices and absence of a market, is out of the question; the industry, if based on those grounds, would revert to the continent as soon as conditions and trade channels become normal. My proposal however is, and always has been, to try and establish in India the oil and linked industries as a matter of a regular normal industry, seeing that we have the raw material in its best condition, the demand for—and still more the need for—the finished products and for the industries themselves, and certain favourable conditions in climate, avoidance of long transport to and from Europe, freshness of goods, knowledge of the exact character of the articles required, and so on.

7. But the Director's note suggests certain difficulties which confirm my view that we need Government experimental work, viz.—

- (1) supposed deterioration of seeds;
- (2) supposed deterioration of oils;
- (3) objections to pressing the seed and winning the oil in this country.

8. *Deterioration of seeds.*—I have considerable doubts whether as regards our main seeds—copra, groundnut, castor, cotton—there is any serious deterioration by keeping, provided that the usual precautions are taken, viz., proper drying and airing. Copra we know is kept by the producers in the shell for a year and more, and this copra will produce the fine Cochin oil. Ground-nut deteriorates at once if the shells are removed and only the kernels bulked, as they ferment rapidly, but, subject to correction, my impression is that well dried and aired groundnuts will keep, in the shell, a very long time without serious deterioration; cotton seed in the same way. But our very ignorance on this matter points to the need for experimental work.

9. *Deterioration of oils.*—The Director says: "The oil, if undisturbed, will probably last over a year without turning bad." The Director here suggests a possibility, viz., that of the oil turning bad (going rancid, presumably) in a year or so, and if he is right in the suggestion of such possibility, there is great need to enquire experimentally. However, I think, that this fear may be dismissed; oil when ordinarily purified and shut up in containers without the access of air, moisture, and light, will keep perfectly good, i.e., free from rancidity, almost indefinitely; there are at least two instances of good sound oil from the Egyptian tombs of 2,000 to 3,000 years old, though we need not appeal to such ancient authorities. My own fish oil, though derived from readily putrescible animal tissues, and without any purification other than simple washing, is as good today as it was a year or more ago, when kept in ordinary closed kerosine tins; air-tight barrels are equally good. The vegetable oils contain certain mucilaginous and other impurities, and since they are seldom heated to sterilising point in the process of manufacture, they contain natural enzymes which acting on the free fatty acids in the presence of light, air and moisture will cause rancidity. But vegetable oils are readily purified by simple processes, e.g., washing, settling, filtering through Fuller's earth, steaming, etc., and when so purified and deprived of moisture there is no such thing as their turning bad, if kept as stated, in air-tight containers, to which light, air and moisture have no access. Hence this objection to oil pressing in India may be set aside, but if there is any well-founded doubt there is an obvious reason for experiment. Moreover, it is equally obvious that since the above precautions are necessary to prevent rancidity, Government should demonstrate the simple methods needed in a Government factory; for instance, I had to find out for myself the fact that fish-oils have to be washed, deprived of moisture, and kept in air-tight vessels if they are to keep good, and the small oil miller will have to be taught the same.

10. *Objections to pressing the seed and winning the oil locally.*—These the Director states as (a) the difficulties of finding a new market for oils instead of seeds, (b) the difficulty of providing containers, and (c) the uncertainty whether the ryot and dealer want the oil pressed. I must unwillingly add a fourth, and that is (d) the high tariff wall erected against the entry of oils—as oils—into Europe, especially in the case of refined oils such as, in view of the possible deterioration of crude oils en route, we should have to export.

My contention always has been that the country is losing its needed oils, etc., just because industry and industrial enterprise are in such a poor condition, and new industries so difficult to start without much skilled pioneering and loss of capital that it is found easier and more immediately and certainly profitable for the capitalist or merchant to be a mere exporter of raw produce, and that it is precisely because of these difficulties that Government must step in as experimenters first and demonstrators afterwards. It is initially difficult to divert a trade as the Director of Industries says, and it is just because of these initial difficulties that Government have to step in (for no one else will run the risks) since it is absolutely necessary to retain the oils and cake and obtain the industries

for this country. It is *not* necessary to do it on a large scale; I contend that if we show in detail, by experts, the methods and prospects of oil pressing, refining, of soap, glycerine, paint, and artificial butter making, private enterprise will follow suit; Government need only be the bell-wether.

Again, it is partly because of the difficulty in despatching oils to Europe (containers, freight, wastage, brokerages and commissions, tariff, etc.), added to the needs of the country, that I so strongly desire to use the oils in the country, and if, as I have proposed, we can show the way to utilise oils not merely for soap and paint, but mainly for food, the ryots and merchants will not want to export, but will find their market within our borders. Again, I repeat, it is not a question of temporarily advantageous conditions, but of deliberate industrial enterprise to be carried out irrespective of abnormality.

Containers can easily be made, of course, by the million, with a can-making plant; moreover good casks for the large cocoanut oil trade are already made in Cochin, and a demand would increase and establish the much needed co-operative industry.

11. But whether Government take up these linked industrial enterprises or not, I trust that the question of concessions, of various sorts, to those who are bold and skilled enough to pioneer, or to any who take up industries in the *infant* stage, may be deliberated, and that they may become part of the regular Government policy.

V

Letter—from K. T. B. TRESSLER, Esq., Acting Director of Industries.
To—the Secretary to Government, Revenue Department.

Dated—the 6th December 1914.

No.—252-T.

In continuation of my previous letter regarding oil-crushing plant, I have the honour to state that I have been approached by Messrs. Dymes & Co. regarding the pressing of seed. That firm has sent home samples crushed in an ordinary country mill and is of opinion, from reports received, that a permanent oil business can be started which will continue after the war.

2 As I have explained to Government this is my opinion also, based on information received from the trade when last in England—a year ago. The principal difficulty in connection with any large scale oil enterprise, as pointed out in my previous letter, is the working capital necessary. Messrs. Dymes & Co. are large purchasers and exporters of groundnuts and would supply the seed required, paying a reasonable hire for the plant, so that this difficulty may be overcome. Of course there would be no definite guarantee of continued supply, but there must always be some risk attaching to a new enterprise and the expressed intention of a large and well-informed firm to attempt the export of oil seems to me as good a guarantee as could possibly be got.

3. I accordingly request that this offer may be specially considered in connection with the proposals already submitted.

VI

Letter—from K. T. B. TRESSLER, Esq., Acting Director of Industries.
To—the Secretary to Government, Educational Department.

Dated—the 11th January 1915.

No.—19.

I have the honour to state that some time back I was informed that sanction has been accorded for the purchase of oil-pressing machinery. I have not yet been furnished with the orders on the subject or information regarding the character of the ground. As all machinery is urgently required I request that the Government order may be communicated to me at the earliest possible date.

Order—No. 52, Educational, dated 16th January 1915.

Owing to the recent great decline in the over-seas demand for oil-seeds, as a result of which extensive stocks are likely to come upon the market at prices much below those hitherto prevalent, the Government have made a careful examination of the expediency of undertaking oil extraction on a large scale in this country. On the facts which have been placed before them they entertain serious doubts as to the feasibility of local arrangements for the extraction of oil for exportation to continental markets, not only on account of the tariffs levied by many countries on oil, but also owing to the greater difficulties attendant on shipping oil as compared with exports in the form of seeds and to the desire of the consumers for oils of standard qualities which continental manufacturers and dealers are accustomed to.

2. The Government, however, recognise that, whether an oil export industry can be successfully created or not, there still remains much which can be done towards the improvement of the present wasteful methods of extraction and in the attempt to build up local industries for the utilization of oil; it is conceivable, for example, that a suitable vegetable substitute for ghee might be produced, while the manufacture of soap might also, perhaps, prove a profitable venture.

3. The Government have already sanctioned the initiation of experimental work in connection with the introduction of machinery for the crushing of oil-seeds, but in view of the present exceptionally favourable situation as regards raw material and the necessity for further experiment, they now resolve 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 of Industries will accordingly be requested to state how this sum can best be utilized for the purposes indicated and to consider the feasibility of starting subsidiary industries for the utilization of the oil in this country.

In his letter of the 6th November 1914 Mr. Tressler has sketched out alternative methods of procedure varying in respect of the financial provision necessary and the extent to which speculative propositions are considered permissible. In the opinion of the Government the desideratum is a combination of the policies of "substitution" and "expansion," and as at present advised, they are in favour of establishing one of the three plants mentioned in paragraph 14 of Mr. Tressler's letter and some of the smaller plants referred to in paragraph 15, 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.

Detailed estimates will in any case be necessary before work can actually be started, but the Government desire that their preparation should be pushed on with the utmost expedition in order that, if possible, a portion of the outlay in issue may be debitable to the revised estimates for the current financial year, thus reducing the allotment otherwise required for 1915-16.

(True Extract.)

P. RAJAGOPALA ACHARIYAR,
Secretary to Government.

To the Director of Industries.
" Financial department.
" Revenue department (with copy of notes).

NOTES CONNECTED WITH G.O. No. 52, EDUCATIONAL, DATED
16TH JANUARY 1915.

[SUBJECT.—*Development of the oil industry.*]

To the Honourable Member—

3. Sir Frederick's second letter and his demi-official* accompanying it of 13th October 1914 open a large field of development which, I think, requires examination with reference to the Secretary of State's prohibition of pioneer work, but I submit it at once to the Honourable Member as it contains much important matter germane to the connected oil trades.

L. DAVIDSON—15-10-14.

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.

To—the Hon'ble Mr. L. DAVIDSON, C.S.I., I.C.S., Acting Secretary to Government, Revenue Department.

Dated—Chepauk, the 13th October 1914.

I think that Government will excuse my sending them this letter on the matter of oil and fat industries for this Presidency. Possibly my suggestions have already been anticipated.

Until people are pretty sure that they can overcome the difficulties in working these linked industries on more favourable terms than is the case in Europe, and until they see the types of plant and methods visibly before them, they will not start the industries; there have been several sharp lessons to inexperience—in paper, glass, etc.—even since I came to India. No one will, as a private capitalist, undertake the enquiry which is necessarily expensive and experimental: hence Government must do it. Capital, especially in India, will not build oil-mills and soap works, etc., till they are pretty sure as to method and as to success; object lessons are essential.

I should like Sir F. Nicholson's letters of the 12th† and 13th October

† Dealt with in G.O. No. 3562, Revenue, sent un-officially today to Mr. Tressler dated the 5th December 1914.

with the request that he will come and talk the matter over with me as soon as I reach Madras which will be on Thursday next, the papers to be regarded meanwhile as confidential.

A. G. C[ARDEW]—17-10-14.

To Mr. K. T. B. Tressler u.o.—

[With originals of Sir F. Nicholson's letters, dated 12th and 13th October 1914.]

With reference to the Honourable Member's note *supra*.

L. J. P. JOLLY—17-10-14.

To the Honourable Member—

I expect the Honourable Member should like to have the file at hand when Mr. Tressler comes to see him tomorrow.

L. DAVIDSON—21-10-14.

Thanks. I have seen Mr. Tressler who will write in u.o.

A. G. C[ARDEW]—26-10-14.

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.

To—the Hon'ble Mr. L. DAVIDSON, C.S.I., I.C.S., Acting Secretary to Government, Revenue Department.

Dated—Tanur, the 22nd October 1914.

I have rather largely revised and added to my letter No. 519 of 13th instant regarding oil and soap factories, etc.; the revised letter should reach you on Friday as it goes to my office for re-typing with this.

The chief new point is that the Cochin oil-millers have scrapped their *open* hydraulic presses and have put up much more expensive *cage* (or box) hydraulics, and, concurrently, have added or are running many scores of the rotary oil mills in the same factories. Whether these latter are as good for seeds as for copra is a question for experiment.

I have also proposed, and added the cost, of an oil "extraction" plant, and of a cooling plant (for the removal of stearine from oil, especially cotton-seed oil), and in an appendix have given an abstract estimate of the cost of several classes of plant; all taken either from the latest price lists of the best firms or from actual *pro forma* invoices of recent dates.

Please note the discount offered—for direct orders?—by Messrs. Rose, Downs and Thompson: this was taken from an actual tender.

To Special Officer—

The u.o. communication from Mr. Tressler may, it is submitted, be awaited.

B.V.—28-10-14.

V. A. ANANTARAMA AYYAR—28-10-14.

In his second letter Sir Frederick suggests the establishment of a "technological station" which is practically a counterpart of the press factory I propose except that it is on a much smaller scale and is intended to prepare a larger number of products. Personally I do not think that the size of press proposed by him would be of any industrial value and the refining of by-products seems to me rather too big a proposition to take up at once.

In an official letter I am submitting estimates for pressing machinery on the minimum commercial scale, i.e., to deal with about 20 tons a day.

I may add that I am quite willing to withdraw from this matter and let Sir Frederick run the proposed factory, but would suggest that, as our ideas are in many ways opposed, it would be impracticable to try and run a conjoint concern.

K. T. B. TRESSLER—29-10-14.

Letter from Sir F. Nicholson, dated 27th October 1914, No. 553.

To Under Secretary—

Please see the u.o. note by Mr. Tressler above written after discussion with the Honourable Member and the Secretary. Submitted for orders.

2. Mr. Tressler's official letter about pressing machinery has not yet been received in the office.

B.V.—29-10-14.

K.A.M.—30-10-14.

M.R.N.—30-10-14.

To Secretary—

L. J. P. JOLLY—30-10-14.

To the Honourable Member—

L. DAVIDSON—31-10-14.

It is not easy to keep this subject clear owing to the different points of view from which it may be regarded.

2. * * * * *

3. Leaving the hardening process on which Sir F. Nicholson has laid so much stress, and reverting to the question of disposal of oil, and especially of the valuable vegetable oils, the question may be considered either with reference to the present emergency caused by the war or from the point of views of the development of a permanent industry. So far as the emergency due to the war is concerned, we have done what is possible by telegraphing to the Secretary of State and asking him to bring the large supplies of oil to the notice of manufacturing firms in Great Britain. It is really impossible to do anything in the way of creating an industry except with a considerable expenditure of time. As regards the possibility of creating such an industry, the question is whether it should address itself to production for Indian consumption or for export to Europe. Against an export trade in oils are the facts, (1) that seeds in bags are more easily carried than oil in barrels; (2) that foreign countries impose a heavy import duty on oils, while admitting seeds free; (3) that no one in Europe will buy oil from India because of the inveterate habit of adulteration for which the Indian producer has so bad a name. This could be got over if a factory once established a name for itself, but there would be considerable difficulty in the initial stage. These reasons seem to militate strongly against an export trade in oil. For Indian consumption oil could be probably produced cheaper in improved mills than in the country mill which is only economical when it is worked by bulls who have to be kept for agriculture and are employed on the mill when not needed in the fields. But the experts seem to differ as to which type of mill is the best. On this subject we must await Mr. Tressler's promised proposals; please send them up sharp when received.

A. G. C[ARDEW]—1-11-14.

Letter from the Director of Industries, dated 6th November 1914.

To Under Secretary—

Mr. Tressler's proposals since received are at pages 11-17 of the Government Order. Orders are requested on his proposals.

2. The further notes on industries submitted by Mr. Tressler with his present letter have been separated and are put up separately for orders in another file. The note on groundnut may be perused in this connection.

K.A.M.—10-11-14.

M.R.N.—10-11-14.

C.V.R.—10-11-14.

V. A. ANANTARAMA AYYAR—10-11-14.

To Secretary—

I am inclined to think that Mr. Tressler might perhaps "test" the European market with the products of his smaller expeller in the first instance. He asks for a large grant of cash on the strength of very little information and that mostly technical: he does, however, realise to some extent that the marketing of his product needs consideration. To my mind the shipping and marketing present a much more difficult problem than the extraction of the oil which would probably be quite feasible under Mr. Tressler's direction; he gives no information about prices of oil in various parts of the world nor of the cost of shipping though I presume he has made enquiries in these directions; nor does he say how he proposes to get his oil on the market he desires to test; for this purpose I presume it would be necessary to appoint a firm of agents at the port to which he proposes to export since I doubt very much whether any of the large exporting firms who buy up the groundnut here would care to take on a consignment of say 500 tons of oil; if they did and found a good market at home they would only buy here at their own price. Mr. Tressler lays stress on the fact that the present is a good time to try and start such an industry as he proposes owing to the dislocation of the usual trade channels; I cannot, however, see that there is any likelihood of a bigger demand for oil at home than for groundnuts; the only advantage of starting on a wholesale scale now would be that owing to the cheapness of raw material less capital would be necessary to run the plant at first. Incidentally Mr. Tressler gives no figures by which it is possible to test his estimates of the capital required to run the plant he suggests; these appear to be rather low.

The recent letter in which Mr. Tressler complained of the over critical attitude of Government towards his suggestions was perhaps intended to prepare the way for his present proposals; in this case so far as the financial possibilities of the venture go he has, as I have pointed out already, not even supplied any estimates or material for examination. I hardly think any private individual or company, even if possessed of the resources of Government, would be prepared to put down £12,000—the lowest amount necessary to start Mr. Tressler's "expansion" policy—on the strength of the information he has supplied.

L. J. P. JOLLY—10-11-14.

Letter from the Honorary Director of Fisheries, No. 589, dated 10th November 1914.

To Under Secretary—

A further communication on the subject from the Honorary Director of Fisheries, dated 10th November 1914, since received has been added to the file.

K.A.M.—10-11-14.

M.R.N.—10-11-14

To Secretary—

Sir F. Nicholson's idea is to manufacture and retain the oils in this country subsequently using them for the manufacture of soaps, vegetable butter, etc. There seems to be more chance of success in such a venture than in sending the oil to Europe and reimporting the soap for example. I do not think Government would be wise to encourage the expressing of oil in this country at a faster rate than this country can make use of it; the quantity consumed in this country could certainly be largely increased if the industries of soap and vegetable butter making could be operated successfully here.

To the Honourable Member—

L. J. P. JOLLY—11-11-14.

As the Honourable Member has asked that Mr. Tressler's proposals should be "sent up sharp when received," I do not detain them for detailed scrutiny. There is, I think, much force in Mr. Jolly's note, dated 10th November 1914, *supra*. From what the Chief Secretary tells me, I gather that, in the absence of

a strong case for urgent action, there is at present little likelihood of funds being found for an experiment of the magnitude contemplated by Mr. Tressler, and the technical nature of his proposals makes a leisurely examination desirable, if the Honourable Member is not more favourably impressed with the project than I expect he will be. It is wearisome and confusing dealing with a mass of manuscript or typed matter, and the present time is so fully occupied with legislative work that I suggest for Honourable Member's consideration the expedience of printing up and deferring action on this file until the case is ready in print.

L. DAVIDSON—12-11-14.

Yes.

A. G. C[ARDEW]—14-11-14.

Submitted.

K.R.N.—2-12-14.

M.R.N.—2-12-14.

L. J. P. JOLLY—2-12-14.

This case has now been separated off and printed up and has thus assumed a form in which it is much easier to deal with. The main issues are—(1) whether any experimental factory in connection with the oil pressing industry should be opened, (2) whether it should be on a large or a small scale, (3) whether it should include ancillary industries or not, (4) whether the direct control of such factories should vest in Sir F. Nicholson or Mr. Tressler.

2. In one important respect Sir F. Nicholson and Mr. Tressler are directly at variance. The former lays stress on the difficulties incidental to the despatch of expressed oil to Europe—difficulties on account not only of the freight, wastage, brokerage and commission involved but also of the high tariff wall erected against the entry of oils. He is evidently not sanguine of success in any endeavour to compete against European manufacturers in their local markets. His idea is to rely, in the first instance, on the Indian market and to trust to the growing Indian demand not merely for oil but also for by-products such as soap, candles, glycerine, edible fats, paint and lubricants; for this reason he presses for a complete outfit covering the whole group of connected industries, thus following the manufacturing practice in European countries, where the main product frequently only meets the cost of production and the profits are provided by the by-products. The uncertainty and initial expense involved are such as to deter private persons from taking up such an enterprise and it is therefore, Sir Frederick argues, incumbent upon Government to take the first step; if the venture should prove successful, he has little doubt that private business firms will be ready to follow suit. In regard to the question of expert staff, he lays stress on the presence of the trained oil expert Mr. A. Kesava Menon now working under him; here I may remark incidentally that Mr. Tressler, I believe, distrusts this expert's capacity and would probably not be willing to employ him in any responsible position.

Mr. Tressler, on the other hand, looks on the establishment of the complete group of connected industries as too large a proposition, relies on the chance of finding a home market for expressed oil and disbelieves in the possibilities of developing the Indian market.

3. As between the two schemes irrespective of the personal factor I must confess to being more attracted by Sir Frederick's proposals which seem to me to be more comprehensive and to offer a larger prospect of ultimate success by the development of the Indian market than Mr. Tressler's scheme which involves hazardous competition in fields already served by established European businesses. But the personal element cannot be disregarded. It is not likely that Sir Frederick will stay in India long enough to carry through his proposals to completion and it is doubtful whether any enthusiast capable of taking his place in the matter would be forthcoming. Mr. Tressler will be available for an indefinite

period and he is much more likely to do useful work, if allowed to initiate a scheme of his own rather than compelled to work out Sir Frederick's proposals.

4. As to whether a large or a small factory should be established, our hands are tied by Lord Morley's Despatch—*vide* pages 17 and 18 of G.O. No. 3446, dated 27th October 1910. We have been ordered to avoid the semblance of a commercial venture and instructed merely to familiarize the people with such improvements in the methods of production as modern science and the practice of European countries can suggest; it must be left, we have been told, to private enterprise to demonstrate that these improvements can be adopted with commercial advantage. These orders are, I fear, a fatal bar to the taking up of experiments on a commercial or large scale. Another obstacle is the prohibition recently laid down by the Government of India against the incurring of fresh expenditure until the financial position of the country has improved.

5. These circumstances seem therefore to lead to the conclusion, which personally I regret, the Government must content itself with the comparatively trivial work of demonstrating the existence of more efficient methods of oil extraction—what Mr. Tressler calls a policy of substitution. His recommendation under this head is set out—not very clearly—in paragraphs 15 and 16 and estimate II appended to his letter of the 6th November 1914 at pages 15 and 17 of the Government Order. The cost is estimated as varying from Rs. 47,000 to Rs. 1,34,000 including working expenses for one year according to the number of plants sanctioned. Such measures would be of a demonstrational and instructional character and might serve as a satisfactory test, to use Sir Frederick's words, of the comparative efficiency, comparative running cost and comparative desirability under Indian conditions of capital, mechanical knowledge, etc., of different varieties of presses. If this view commends itself to Government, it is evident that estimates in much greater detail will be required before any further steps can be taken.

6. At this stage I do not circulate the case for preliminary scrutiny in the Financial department. In the first place, estimates in greater detail are clearly requisite; secondly, until the Honourable Member has decided which of the varying alternatives to advocate, it is not certain which proposals will need scrutiny from the financial aspect.

L. DAVIDSON—4-12-14.

There are in my opinion some very important objections to Sir Frederick Nicholson's scheme. Sir Frederick Nicholson proposes to utilize the valuable vegetable oils of India for the production of such articles as soap and candles. In this I am assured that he is entirely wrong. For the production of such purposes as these the cheapest forms of fat and oil are sufficiently good and it would involve actual loss to utilize cocoanut oil, groundnut oil or cotton seed oil to make such articles as soap. In another letter in a separate file Sir Frederick Nicholson has stated that he was offered from Europe a good form of fat at £41 per ton f.o.b. Seeing that cocoanut oil is worth under ordinary conditions about £35 a ton and groundnut and cotton seed oil from £30 to £35 a ton and that the processes of manufacture may be taken at £10 a ton, it would obviously not pay to convert these valuable vegetable oils into soap, tallow, etc., if a suitable fat is available at £41 a ton. Sir Frederick Nicholson's proposals may apply accurately to such oils as have hardly any market value at present, such as fish oil, but not to oils which can be used, at least the higher grades, for edible purposes.

But Sir Frederick Nicholson also contemplates a refining plant and a plant for the manufacture of sweet edible vegetable fats and butter substitutes. Is it a fact that the native population of India eat butter or would take a butter substitute? I think the native fat is not butter but ghee, and it is most problematical whether a vegetable substitute for ghee palatable to the Indian consumer could be produced. It is certainly a fair matter for experiment but is nothing like so certain as Sir Frederick Nicholson assumes.

It is also not perfectly certain that there would be a large Indian market for soap and candles. Europeans would probably refuse to buy an Indian product

which would be sure to lack the finish of the European article and though there is probably an increasing field for soap among the native population of the country, I doubt the demand for candles being large. When Sir Frederick Nicholson says that we annually import soap, candles, glycerine, paint and even oils "worth crores of rupees," he cannot be said to be speaking by the book. The total imports for the whole of India of some of these articles were—

	Value. 1912-13.
	RS.
Soap	71,42,000
Oils (linseed)	8,46,000
Ghee	5,13,000
Paints and colours	59,82,000

A liberal deduction must be made from the value of the paints in order to arrive at the value of the oil alone. Candles and glycerine are not separately shown in the returns and represent probably quite small values, and the whole value of the articles mentioned by Sir Frederick Nicholson probably not greatly exceed a single crore for the whole of India. It is not even free from doubt whether there would be a market in India for the oil cake which is a valuable by-product. No doubt it *could* all be used in India but will the ryot pay for it?

Sir Frederick Nicholson's views expressed in these letters were probably largely derived from his so-called oil expert Mr. A. K. Menon, but although the latter may know a lot about the manufacturing processes, he is probably quite innocent of any ideas as to the commercial side of the industry. Moreover, Sir Frederick Nicholson's plans involve the laying down of very extensive plant and I do not think we should be justified under the Secretary of State's rules, as they at present exist, in embarking on such an enterprise. I dealt with other difficulties in the way of a scheme such as that of Sir Frederick Nicholson in my speech in the Legislative Council on the Zamindar of Polavaram's resolution.

As regards Mr. Tressler's proposals, I have had the advantage of hearing the whole question discussed by him, Mr. Chatterton and Dr. Marsden and I received the general impression that while Sir Frederick Nicholson is entirely wrong in proposing to convert our expensive oils into soaps and so on, Mr. Tressler is also more or less wrong in proposing to make a large bid for the foreign market. The outstanding fact about oils seems to be that no one will buy any oil unless they are absolutely certain of its quality and they won't be absolutely certain of the quality of any Indian oil until a long period of trial has been gone through and a reputation for uniform quality has been built on. Hence it is entirely useless to expect any sudden invasion of the European oil markets by the Indian product. I was assured that Marseilles manufacturers at present would not look at Indian-pressed oils and that we should have to begin with small consignments and gradually build up a connection and acquire the confidence of the foreign manufacturer. This alone is sufficient to show that the temporary effects produced by the war cannot be counted upon to assist us very much and that it would really be better to leave the war mostly out of account as a factor of the position and make our plans on the basis of the permanent conditions of industry, as they were formerly and as they will probably be again when peace is restored.

Adopting this point of view I think that we should now follow the lines which Mr. Tressler lays down to some extent, but I would combine what he calls a policy of substitution with a policy of expansion. I would propose that we should put down one of the three refining plants which he refers to in paragraph 14 of his report and some of the plants suggested in paragraph 15, so as both to make a start in the production of oil for export and also make trial of the best plants to be adopted in substitution for country mills, just in the same way that we are endeavouring to substitute improved sugar crushing machines for the ordinary sugarcane mill. The Hon'ble Sir Harold Stuart the other day in the Legislative Council said speaking privately to me that he would be prepared to find money for making at any rate some attempt to exploit the oil-seed industry in this Presidency. I think therefore that we may expect that the Financial Department, in spite of the restrictions laid down by the Government of India, will be prepared to make a

grant, say, up to a lakh and a half, to enable the definite propositions which Mr. Tressler has put forward to be given a trial. The file had better be sent at once to Financial in order that a definite decision on this point may be come to.

A. G. C[ARDEW]—7-12-14.

L. DAVIDSON—7-12-14.

Financial Department u.o.

II

[SUBJECT.—Development of the oil industry.]

From the Director of Industries, No. 252 I., dated 6th December 1914.

Submitted that this letter may lie over awaiting the return of the main file which was sent to Financial on 8th December 1914.

K.R.N.—11-12-14.

M.R.N.—11-12-14.

Ask them for that file.

L. J. P. JOLLY—12-12-14.

Financial Department u.o.

III

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.

To—the Hon'ble Mr. L. DAVIDSON, C.S.I., I.C.S., Acting Secretary to Government, Revenue Department.

Dated—the 9th December 1914.

No.—27.

In my several letters regarding the oil and soap, etc., industries, I have advocated Government experimental factories, and also the grant of concessions to any serious private enterprise which might be willing to risk capital and energy in starting these and other industries. You will have observed in the journals that the Home Government is now extending direct aid to various industries in Great Britain—notably the dye and chemical industries—to enable them to capture or share in such industries which, in the past, have been almost monopolized by Germany and Austria; one form of this aid is the taking of debentures in companies formed to exploit these industries. May I add that the Madras Government has already recognized this policy of concessions for new industries in the grant for a term of years of free fuel to the defunct glass factory, a grant of great nominal value, since fuel is the main item of raw material in glass manufacture?

2. I now write to sound Government on concrete proposals; I will not make formal proposals which would involve detailed estimates and plans till I know whether Government is likely to accept either of my suggestions.

3. The first is that Government shall themselves start forthwith, and without troubling about other linked industries, a soap and glycerine factory, preferably at Coimbatore; Government Coimbatore we have every class of oil and fat in abundance and close to our doors; cotton, gingelly and castor are largely grown in this and the neighbouring districts; the cocoanut oil of the West Coast is inexhaustible; good fish oil can be obtained in hundreds of tons; the tallow which I have procured and am using is excellent, and since Coimbatore is the sheep-researches, and the Cordite Factory will be a customer for any quantity of refined glycerine. In paragraph 13 of my letter No. 519 of the 13th October, I have pointed out that a 10-ton per week soap and glycerine plant can be obtained f.o.b. London from the best makers, for about £1,000, to which must be added £500 for steam boiler, small steam engine, tanks, and

miscellaneous plant such as for toilet soaps, and another £500 for buildings; total capital cost £2,000 to £2,400 delivered in India. For current expenses including the pay of the Technical Superintendent, purchase of oils, fats, and chemicals, labour, fuel, etc., another £1,000, or Rs. 15,000, would have to be provided; this would be a minimum, based on the assumption (with due margin) of a monthly turn-over, viz., the monthly purchase of 30 tons of oil and fat at Rs. 350 per ton, with rosin, chemicals, fuel, etc., the pay of the staff, miscellaneous expenditure, credit to salesmen, etc. *Per contra* there would be sales of 40 to 42 tons of soap monthly, at from Rs. 400 to Rs. 500 per ton, and of a varying amount of glycerine which, when crude, is worth £60 per ton, and when refined, considerably more.

4. The Oil Expert appointed by G.O. No. 3553, Revenue, dated 3rd December 1913, has recently been working up some of my commonest fish oil with certain vegetable oils into coarse soap, and I have gone most carefully into every item of cost including depreciation of plant, pay of Superintendent, etc. Substituting for the fish oil and vegetable foats used for this soap, the better class vegetable oils and tallow, the cost of which I know accurately, I can give with some precision the cost of a ton of good ordinary soap; and the results are most promising. In addition, soaps of a finer quality could easily be prepared with perfumes either of local or foreign manufacture, which would suit Indian taste, and the profit on these would be very great.

5. The production of glycerine, however, is a most important matter; it is produced either as a by-product from the spent lyes in the soap-making process, or by direct splitting of the several oils; for which latter purpose fish oils at Rs. 180 per ton would be valuable. I need hardly point out the great importance of a local glycerine production since the Cordite Factory requires this article in hundreds of tons, and with a soap factory at, say, Coimbatore, a considerable quantity could be supplied; the process of recovering crude glycerine from the lyes is simple and cheap, while a single distillation from the crude glycerine yields "dynamite glycerine" that is glycerine suitable for the manufacture of nitro-glycerine, and the plant proposed yields this in perfection, the single distillation costing only about £3 per ton in manufacturing charges and loss of material. Glycerine, moreover, would be used extensively in making toilet soaps and in various arts; India imports at present very considerable quantities.

Hence it might cost Government a first outlay of Rs. 36,000 at most as a capital expenditure, with a current monthly outlay of Rs. 15,000, which, however, would be recouped monthly with profit. Apart from direct profit there would be the economic and educational profit to the country, and the advantage to the Cordite Factory of glycerine obtainable at its very gates.

Being located at Coimbatore it would give me pleasure to act as Honorary Director, with the present Oil and Soap Expert as actual technical manager; my term of service in Fisheries expires on 30th June next and medical opinion is strongly against my working any longer on the West Coast where I continually get a very weakening form of fever; Coimbatore would be healthy and very accessible for me from Coonoor which will then be my home. The plant could not arrive and be set up till the middle of the year at earliest.

6. The second proposal is that if Government are unwilling to manufacture directly, it should encourage private enterprise by granting (1) the gratuitous services of its Oil and Soap Expert as technical manager in the purchase and setting up of the plant and thereafter for at least three years from date of first soap-boiling operations, and (2) if necessary, the loan of the required capital for, say, 10 years, such capital, fixed and current, say Rs. 50,000, being repayable by annuities at 4 per cent.

7. I believe that a syndicate or company could at once be arranged which would undertake the business on these terms. The risk to the capitalists is, of course, considerable, because everything is, to some extent, unknown, especially the all important commercial one of the market for the products, and much of the early work would be experimental; hence concessions are necessary, though in the case suggested the only concession is the pay of the expert for a limited period. The risk to Government will be slight, being covered by the plant, and since the loan is repayable by annuities, will be a constantly diminishing risk.

8. These are rough outlines of a concrete proposition; if Government entertain either idea, I will give further details. I believe personally that the enterprise will be very lucrative, and that if Government itself starts operations and runs the factory for three or four years it could sell the plant and business as a going concern at considerable profit, besides such annual profit as it might have derived while working.

REVENUE DEPARTMENT.

The main file regarding the oil and soap industries was sent to Financial for remarks on 8th December 1914. A further report received from Mr. Tressler on the subject of these industries was also sent to Financial on 14th December 1914.

with the request that the main file might be returned to Revenue. The file has not been received back. Sir F. Nicholson's demi-official above may be sent to Financial with the request that it may be added to the main file.

K.R.N.—16-12-14.

M.R.N.—16-12-14.

L. J. P. JOLLY—17-12-14.

To the Financial Department u.o.

IV

Telephonic message—from the Chief Secretary to Government.

To—the Director of Industries.

Dated—the 17th December 1914.

Will you please let me know whether the sum of Rs. 50,000 on account of industrial experiments entered by you in the schedule of new schemes relating to budget for 1915-16 includes any provision for the oil manufacturing machinery scheme referred to in your letter to Government of the 6th November 1914.

Telephonic message—from the Director of Industries.

To—the Chief Secretary to Government.

Dated—the 18th December 1914.

The oil machinery is not specifically contemplated in the estimate; but if I undertake oil experiments I should leave out some other experiments proposed and half the allotment or so would thus become available for oil experiments. The cost of a copper oil mill will be about Rs. 75,000.

FINANCIAL DEPARTMENT.

Please see the Revenue Secretary's note and the Hon'ble Mr. Cardew's note on pages 5 to 7 ante. The Revenue department propose to approve of Mr. Tressler's proposals for the opening of experimental factories in connection with the oil pressing industry. Mr. Tressler's outlines of his scheme are given in his letter dated 6th November 1914; and a rough

* [For a policy of expansion—

Cost will vary from 1.93 lakhs to 4.85 lakhs, according to number of factories.

For policy of substitution—

Cost varies from .47 to 1.34 lakhs according to number of plants.]

expect a sum of 1½ lakhs to be provided in next year's budget to enable Mr. Tressler to give a trial to his proposals; and this file has been sent to Financial for determining the amount of the provision to be entered in 1915-16 for the scheme.

2. Attention is solicited to the Financial department notes on page 5 of notes to G.O. No. 2802, Revenue, dated 26th September 1914, in which this department has agreed to find in the current year a sum of about .75 lakh for the purchase of

† Mr. Tressler's proposals have been sent with reference to G.O. No. 2802, Revenue, dated 26th September 1914.

Apparently,

B.L.

a hydraulic press in connection with the oil industry. Apparently the scheme † now under consideration supersedes the former proposals and if so, no expenditure will evidently be incurred in the current year.

3. In the budget for 1915-16 a sum of .50 lakh for expenditure on experiments, which Mr. Tressler wanted to be included, has been approved, and it has been provided under the head 26-Q. SCIENTIFIC, ETC. DEPARTMENTS—MISCELLANEOUS. Mr. Tressler did not then furnish any details of the schemes on which he proposes to spend the sum of .50 lakh in 1915-16. He now states in reply to a telephonic message (a) that the oil machinery is not specifically contemplated in the estimate for experiments of .50 lakh, but that if he undertakes oil experiments, he should leave out some other experiments proposed and that half the allotment or so (viz. .25 lakh) would thus become available for oil experiments and (b) that the cost of a copper oil mill will be about .75 lakh.

4. In view of the Government of India's orders that we should not budget for a deficit next year, the various departmental budgets were very closely scrutinized and large reductions have been made under Public Works heads and provisions for grants to local bodies to maintain equilibrium. It is for orders whether the full sum of 1½ lakhs asked for by Revenue should be agreed to or whether Mr. Tressler may be asked to undertake the experiments on a more moderate scale by starting with a fewer number of plants. In any case, the sum of .25 lakh out of the .50 lakh for experiment already provided in the budget—vide at K. ante—may, it is submitted, be taken into account as reserved for oil experiments, and the balance only need be allotted as additional provision in 1915-16.

For orders.

A.S.—19-12-14.

I do not find that Honourable Member (Financial) promised any definite sum.

A.B.

Honourable Member has virtually promised to make an allotment. Rs. .50 lakh have already been provided in next year's budget for experimental purposes; and perhaps an additional lakh may now be assigned.

B. LAVILLE—19-12-14.

We have allotted .50 for experiments in 1915-16. Mr. Tressler says that out of that sum half may be devoted to these oil experiments. But Honourable Member (Revenue) wants 1.50 for these experiments alone so we have to find 1.25 more.

I don't think we can do it.

We stand thus, so far: (for 1915-16)—

	LAKHS.		LAKHS.
Receipts	769.03	Receipts	769.03
Charges	747.91	Charges	747.91
		Balance	21.12
* Books for Courts	.15	* Items already noted for unallotted.	13.61
Contributions in aid of municipal balances	.50		
Grants to local bodies for roads	3.00	Reserve	7.51
Grants to minor sanitary works	8.46		
Vizagapatam and Godavari Agency works	1.50		
(All these have been ruthlessly cut down to the lowest possible figure.)			

Mr. Francis is protesting against the cut of 4.00 out of 12.00 for Municipal Water and Drainage schemes, while Public Works department say that they cannot supply anything more to Local and Municipal on this account because their own budget has been cut by 16.00.

Honourable Member wanted a reserve of at least 5.00. We have 2.51 in excess of that, but other demands are likely to be brought to notice and, if the wishes of Local and Municipal are to be met to the extent of a lakh or two, there will be very little left over the 5.00 minimum reserve.

At the very outside we might raise the grant to Mr. Tressler for experiments generally from .50 to 1.00.

I do not know whether the Copper Oil Mill is essential to Mr. Tressler's oil experiments, but, if it is, that item alone will absorb .75 and a total grant considerably in excess of that figure will be required by him I suppose.

A. BUTTERWORTH—19-12-14.

I agree with my Honourable colleague in his conclusion though I cannot accept all his premises. For example, I do not believe that Sir Frederick Nicholson is wrong in thinking that the vegetable oils of India can be used for the production of soap. My information is that both cocoanut oil and groundnut oil are used for soap, as is olive oil. Indeed it was the favourable situation of Marseilles in respect of the olive-growing country that gave it its commanding position in the soap industry and it now supplements the supply of olive oil by large imports of tropical vegetable oils. I do not follow my Honourable colleague's arithmetical calculations in the first paragraph of his note, but possibly "fat" is a mistake for "soap."

2. We know that the price of ghee has risen enormously of late years and that a much adulterated article is now usually supplied in the Indian bazaars. This suggests that there would be a good demand in India for a suitable substitute for ghee and I should like to see experiments made in that direction. There is already on the market a substance called "cocotine" manufactured in Pondicherry which makes a very good substitute for ghee and I have no doubt that other substitutes could be discovered by systematic investigation. It is the Indian market rather than the foreign market that I should like to see attacked first, and though I do not object to the proposal to make experimental shipments to Europe I hope that the possibilities suggested by Sir Frederick Nicholson will not be neglected. Mr. Kesava Menon has been working at the Institute of Science, Bangalore, on the purification of fish oils and I was told on the occasion of my recent visit that he had met with considerable success. His services might be utilized for purifying vegetable oils.

3. Sir Frederick Nicholson's argument, as I understand it, is that oil pressing alone, if divorced from the connected industries, is not likely to be remunerative as it is the utilization of the by-products which gives the profit. Mr. Tressler's experiments, however, will show us whether this is the case or not and I therefore welcome them. I may add that I believe the Institute of Science intends to take up this very question of oil products and to work at it on a commercial scale, so perhaps we may be spared the cost of any experiments beyond those which we now propose to sanction.

4. Turning now to the question of finance, I think, we can give Mr. Tressler an additional lakh next year making the total of his grant for experimental purposes 1.50 lakhs. Possibly he could get some of his plant before the end of the present financial year as I understand that funds have been provided in the revised estimate.

H. A. S[UART]—21-12-14.

The arithmetical position in paragraph 1 of my note, dated 7th December, was merely that if vegetable oils sell at £30 to £35 a ton as oil, it would not pay to turn them into fat at a cost of £10 a ton when a good form of fat is already on the market at £41 per ton.

2. As regards ghee, the Industries department exists to make experiments and I am quite ready to agree to experiments towards the production of substitutes for ghee being undertaken.

3. Sir F. Nicholson's demi-official, dated 9th December 1914, may be sent to Mr. Tressler for very early remarks.

4. Meanwhile I hope that it will be possible to get out orders to Mr. Tressler on his present proposals before the holidays and to include the additional lakh to which Hon'ble Sir Harold Stuart agrees in his budget estimate. He should be particularly asked whether he can't incur some of the contemplated expenditure before 31st March 1915, so as to bring the payment against the revised estimate instead of against the budget estimate.

A. G. C[ARDEW]—22-12-14.

Transfer to Revenue again after taking the necessary action in Financial as at A on previous page.

A. BUTTERWORTH—22-12-14.

Draft telephonic message asking the Accountant-General to include an additional provision of one lakh in next year's budget under the head 26-B. SCIENTIFIC AND MINOR DEPARTMENTS—MISCELLANEOUS as directed by Honourable Member is submitted for approval.

2. With reference to the last sentence in Honourable Member's note, dated 21st December 1914, above, it is submitted that the revised estimate for the current year does not include any provision for the expenditure now in question on oil-manufacturing machinery.

3. Paragraph 4 of Revenue Honourable Member's note on previous page.—As regards the report to be called for from Mr. Tressler whether he can incur in the current year any portion of the expenditure on the oil-manufacturing machinery, if the intimation is received about the close of January, the necessary alterations which are required in the budget for next year can be carried out in the second edition of the civil budget estimate which has to be despatched to the Government of India early in the first week of February. The Revenue department may, it is submitted, be requested therefore to ask Mr. Tressler to report on the point before the 26th January 1915.

A.S.—23-12-14.

B. LAVILLE—23-12-14.

Revenue department u.o.

REVENUE DEPARTMENT.

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.

To—the Hon'ble Mr. L. DAVIDSON, C.S.I., I.C.S., Secretary to Government, Revenue Department.

Dated—Coonoor, the 22nd December 1914.

In my Demi-official No. 27, dated 7th December 1914, making preliminary concrete proposals for a soap factory at, say, Coimbatore, I mentioned that I should be pleased to act as an Honorary Director.

This was a mere incidental remark and should not be taken as an essential part of the proposal. I am in no way concerned in the matter as a *personal* question. I am merely anxious that Government should start the experiment. Coimbatore may not be considered a suitable place, or it may be deemed advisable to place the experiment under other supervision, etc. That is all one to me. I only want to see the industry started.

So please put my remarks as to Coimbatore and my own suggested part in the matter, *entirely* out of consideration.

A rough draft prepared in rather a hurry is submitted. The instructions to incur expenditure before 31st March 1915 should be conveyed to Mr. Tressler by demi-official I think.

L. J. P. JOLLY—23-12-14.

A further demi-official may go to Mr. Tressler, but I have added to the draft remarks about this point. It should go to Honourable Member before issue. Send it to him today by special messenger and fair copy immediately he has passed it.

Then print the case very emergently and I will talk it over with Mr. Tressler during the holidays if I can get hold of him.

L. DAVIDSON—24-12-14.

I am afraid we have got on to wrong lines in this matter, owing to Sir Frederick Nicholson's having addressed the Revenue Department. His Excellency the Governor has declined to accept my proposals for the transfer of certain branches of the Director of Industries' work to the Revenue Secretariat and one of these branches is the carrying out of experiments connected with Industries. Mr. Tressler ought, under G.O. No. 892, Revenue, dated 21st March 1914, to have addressed the Educational Secretariat on this subject, and we have been going beyond our last in dealing with them. The file must now be transferred to Educational for such disposal as that Department determines on.

Remove draft before transfer. Ask Educational to let Revenue have a copy of the notes.

L.D.—27-12-14.

The notes in Revenue have been written through inadvertence and the Revenue draft should be withdrawn from the file.

A. G. CARDREW—26-12-14.

To the Educational Department, u.o.

EDUCATIONAL DEPARTMENT.

Demi-official—from the Hon'ble Mr. A. G. CARDREW, C.S.I., Member of Council.
To—the Hon'ble Diwan Bahadur P. RAJAGOPALA ACHARIYAR Avargal, Secretary to Government, Educational Department.
Dated—Adyar, the 26th December 1914.

I send you for disposal two demi-official letters from Sir Frederick Nicholson together with copy of my reply.

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.
To—the Hon'ble Mr. A. G. CARDREW, C.S.I., Member of Council,
Dated—Coonoor, the 20th December 1914.
No.—30.

As I believe you are to take a prominent part in an Industrial Conference next week, and as you have recently spoken in the Legislative Council on industrial matters, especially on oils, soaps, and edible fats which will presumably be largely discussed at the Conference, I venture to send you a few remarks—solely for your personal use—on the oil, etc., question in particular. I have sent, and am sending, notes to Davidson on glass, paper, and pencil making, but I am specially interested in the oil and fat industries for the Presidency, and have recently sent to, or rather as a part of, my previous more general proposals for experimental work by Government in the oil and fat and linked industries.

2. While I do not believe in any probable success in the glass, paper, or pencil manufactures, except as stated in my notes, I believe that we are most favourably situated for success in the oil and fat industries. In advocating them at this time I have expressly dissociated my suggestions from present abnormal conditions; so far from wishing or expecting to take advantage of them, I have, in previous notes, expressly deprecated any such idea, using in fact the expression that it would be like trying to build a house on the sand because it was low tide. My original suggestions were made to Government in June 1913 more than a year before the war, and my more recent ones asked that steps should be taken irrespective of abnormal conditions and as a matter of ordinary industrial experiment and encouragement. Hence they are not open to the criticisms you rightly made in Council as to sudden attempts to capture an industry which—as I have said—when the tide returns might and probably would be washed away with great loss, if based merely on abnormal conditions. Nor have I suggested the absurdity of vast efforts to deal instantly with hundreds of thousands of tons of oils, a manifest impossibility. All that I have suggested and do suggest is the beginning of deliberate, experimental work, on the small factory scale, in the linked industries for which, I contend, the general economic conditions are highly favourable, both as regards the local abundance of the best and cheapest raw material, the small need for fuel and for imported materials, the presence in the Presidency of an expert, the comparative simplicity of operations, and the existence of a market.

3. The objects of this note to you are (a) to recommend favourable consideration for my existing proposals, whether the larger one of October–November for the establishment on a small scale but with the most suitable plant, of an oil press, oil refinery, soap and glycerine

works, and possibly—later on—paint and varnish plant, with an experimental laboratory for the preparation of artificial butter and ghee solely from vegetable oils plus milk, or the restricted one of December for a small soap and glycerine factory working on purchased oils. Both proposals are purely experimental and demonstrational, especially demonstrational, since much of the work is hardly experimental at all; but the small capitalist requires a demonstrational lead; (b) to remark on certain parts of your speech in Council which appear to me open to friendly criticism especially by myself who have absolutely no axe to grind and whose remarks therefore may be incorrect but are quite unprejudiced.

4. As regards (a); all papers are in the Secretariat and I need say nothing further about my proposals, except this, that we need not wait for a hydrogenating factory before experimenting on artificial butters, since we can procure from England vegetable oils ready hydrogenated for our experiments, and I am in fact doing so for use in my Canning factory when making fishpastes, etc. In fact, during the next few months I hope to find a mixture which will give an excellent vegetable butter free from all animal fats except milk.

5. As regards (b) I refer to certain paragraphs in the *Madras Mail* of 25th November, from the words "supposing an industry for the pressing of oil were started" down to "He felt very doubtful whether any solution of these difficulties could be arrived at." I enclose the cutting for ready reference and will ask you to excuse the pen markings which were for my own guidance. As regards this last sentence may I suggest the old schoolmen's reply to the logically insoluble paradox, viz., *Soleitor ambulando*, a phrase I first officially used nearly 20 years ago when opinion was dead against the possibility of co-operative credit in India. There are difficulties in establishing the oil and fat industries, but conditions are—as compared with other large industries—so economically favourable that they are worth practical factory experiment, and that is all I ask for. Government, though doubtful, may arrive at certainty—one way or other—at moderate expense and I have what seem to me convincing grounds for believing that the result will be favourable; I am quite certain that there will be such success that a business company would take over any Government plant, i.e., after Government have broken the ground and have established, possibly at some small preliminary expense, the best methods and the market.

Extract from the "Madras Mail" of 25th November 1914.

Supposing an industry for the pressing of oil were started, the question which had to be considered was whether a market was to be found in India, or in Europe. If a market were to be found in Europe it would be necessary to take notice of the fact that European countries had imposed protective duties against oil, in order to guard themselves against exportation from India. Then again, oil was more difficult to transport than seeds. He was assured by people who knew something about the matter that there was the strongest possible disinclination in Europe to buy oil at all from India at present, as there was risk of adulteration. Oil cakes, which possessed a market in France, would probably not possess an equally good market here. On the other hand, if manufacturers set up presses and started oil manufacture, to supply the Indian market, the question was whether there would be any room for the extension of the consumption of oil in India. No doubt there would be room for improved methods of pressing oils. At present India got all the oil she wanted, and it was very doubtful whether there was any room here for any large increase in the consumption of oil.

It was suggested in the Resolution that the manufacture of soap, glycerine, candles, tallow and so on might follow the production of oil. He was not able to speak with authority on this subject, but he believed it was true that the various oils of India, all of them valuable oils, would not pay to turn into products such as soap, candles, tallow and glycerine. The fats produced in Europe from very inferior oils, by being subjected to processes of hydrogenation, could be put on to the market at a much cheaper rate, and it would probably be a dead loss to turn the valuable vegetable oils of this Presidency into soaps. Margarine or butter might be produced in this way, but he did not think there was a large consumption of butter in this country. What the people of India wanted was ghee. The question of making ghee was a very difficult one, for the greatest expert would find it difficult to turn out ghee to suit the palate of the consumer. There were the difficulties in the way of developing industries connected with oil seeds. He felt very doubtful whether any solution of these difficulties could be arrived at.

than she now enjoys and that there is immense room for further consumption; that it is just because there are no oil and fat industries in the country that the oil is not locally used, and that the oil and fat industries if, introduced, will cause a needed and an immensely increased internal consumption. I don't want to make mere assertions but please consider; soap is a great oil industry and India imports rapidly increasing quantities, already valued at above 70 lakhs (£476,000) annually, which means perhaps 10,000 tons of oil and fat; paints and varnishes, all, except spirit varnishes, made with oil, mainly linseed, of which India grows enormous quantities; candles are largely imported but should all be made from local stearates; glycerine is needed (and imported) not only for the Cordite factory and other explosive purposes but for many pharmaceutical preparations. As for edible fats, what causes the enormous and universal adulteration of ghee but the need for more and cheaper ghee almost the only edible fat generally available? Why do the people near forests and jungles use whenever they can get them, the comparatively rare Shea, Kokum, Mohwa, and other vegetable fats? Why is tinned butter—of any sort—coming so very greatly into a use apparently limited only by price? What is the meaning of the general opinion—please ask a few hundred Indians of all classes, as I have—that the masses would gladly use cheap edible vegetable fats with their rice, porridge, or chupatties, if they could get them? It is now possible—by hydrogenation especially—to make a butter, either solid to represent butter or fluid to represent ghee, which will be a perfect and

6. "At present India got all the oil she wanted and it was very doubtful if there was room here for any large increase in the consumption of oil." But that is precisely the point at issue, and I, with others, take exactly the opposite view. I say that India "wants" (needs) far more "oil" for herself

digestible edible fat and can be sold pure and unadulterated, at much less than half the price of genuine ghee, and for this we have every material in the country, in the shape of cocoanut, cotton seed, groundnut and other oils; only the industry—the skill and the factories—are absent.

Moreover, we must not forget that not only would these industries increase the consumption of oil for India's own needs, but that she could then use her abundant oils for other countries' needs, so that India would *pro tanto* "want" more than she now uses or would use for herself. In a recent trade journal I note an American Consul's report that Aden imports—for the Hinterland chiefly—above 13,000 cwt. of soap annually and suggests that America should supply this, pointing out at the same time that purely vegetable soap is desirable; in another I note the increasing demand for soap in Abyssinia and in East Africa; we also have Ceylon at our doors.

If we consider all the above and other facts, including the importance of being able to supply our Government explosive factories with an internal source of glycerine, and the great economic-social importance of the mere existence of the industries in India, I think it will be clear that the country does *not* enjoy all the oils of her own production that she needs, and that there is room for very greatly increased local consumption.

I should add that no thinking person wishes or expects all Indian oils to be expressed, still less utilised, in India; all that I claim is that India is not enjoying the use of really so much of her own oil as she *needs*, and that the industries which would give her the direct use of much of those oils are wanting and should be supplied.

7. "He believed it was true that the various oils of India, all of them valuable oils, would not pay to turn into soap, candles, tallow (sic) and glycerine" (The word tallow is presumably a misprint; "valuable" I think here means "high priced".)

I think there is here some misconception. It is precisely these oils that *are* being used for soap, etc., viz., the vegetable oils of India; *only* they are mostly expressed in Europe instead of in India. All oils are found in various grades, the sources of grading being either the method and stages of expression as regards individual oils, e.g., cold or hot pressed, first or second or third pressing, foots, etc., or else the character of the oils as regards oils in general, e.g., whether edible or not, whether drying or non-drying, and so on. The best oil seeds (e.g., cocoanut, ground nut, etc.) are pressed from two to three successive times and yield successively oils of different grades; solvents are also used to get out the last portions of oil. Some small oil-seeds are only once pressed, but even in this case there are foots, and a second grade of oil is often obtained by extraction with solvents. Even on the West Coast where the finest cocoanut oil in the world is produced, usually by a single pressing, a second grade is often obtained by breaking up the cake and repressing with hydraulics, and extraction by solvents is similarly practised in Europe; at Calicut the oil expert has discovered a quantity of cocoanut foots for which the pressers had *no use*, but which we have turned into soap.

8. Hence in Europe the usual method, e.g., at Marseilles which may be taken as the greatest oil and soap centre in the world, is to press *our* copra, groundnut, etc., and to use the first or cold pressed oils for edible purposes, and the second and third pressings for soap, candles, etc.; the glycerine, of course, is obtained either from the spent soap lyes or oil is expressly split up in its fresh state (being a tri-glyceride) to obtain glycerine primarily and the fatty acids (for soap) secondarily. In glycerine recovery or extraction cocoanut oil is important, for it contains 13 to 14 per cent. of glycerine as compared with the 9 or 10 per cent. of other oils. The stearine for candles is usually obtained from the oils of the soap class, either by the old methods or by the new one of hydrogenation. But I believe that in Price's and other candle works the best oils are used such as cocoanut, because glycerine is often a primary object and not *merely* a by-product. But in any case it is mainly obtained from our vegetable oils since it is only of late that oils such as fish oils can be hydrogenated into odourless white stearine.

I may add that for the finer qualities of soap, especially toilet soaps, *no oil is too good*, and first quality cocoanut oil is used for such purposes.

9. You will see, then, that it is precisely our valuable oils which *are* being used for even the above purposes; *only* they are utilized in Europe instead of in the country of their production—where they are not only at their cheapest, but at their best, being free—if decently voyaged. Moreover, if you add, as I add, the need for edible fats in India, then it is precisely the finest qualities of our oils that are needed for our local use as they are needed and used in Europe.

This edible fat question I have dealt with *passim*, as in my letters on hydrogenation which consequently enabling cocoanut oil and other fluid and odorous oils to be used as solid, white, inodorous, neutral fats.

What I contend is that a fair proportion of our oils be utilised just as they are utilised in Europe, viz., by proper expression followed by the use of the finest qualities (cold drawn) for edible purposes or such other special purposes as may be desirable, and the lower grades and foots for soap, etc., not forgetting however the facts on the one hand that the finest oils may

advantageously be used for soap, glycerine, etc., and on the other that second-grade oils (oils of the second pressing, cotton seed oil, etc.) may, by the hydrogenation process, be made available for edible purposes and not *merely* for soap.

10. "The fats produced in Europe from very inferior oils by being subjected to a process of hydrogenation could be put on the market at a much cheaper rate and it would probably be a dead loss to turn the valuable vegetable oils of this Presidency into soap."

This remark is mainly answered *supra*, paragraphs 7 to 9, since I have pointed out that it is mainly second and third grades of our vegetable oils that are being used for soap, etc., purposes.

I think, however, that there is some misunderstanding as to the work of hydrogenation. This process—which is not in itself a saponifying process—does not *newly* enable very cheap oils to be used for soap-making; *every class* of these has been used for many scores of years. What it does do is—

- (a) it converts fluid olein into solid stearin;
- (b) by so doing it makes subsequent saponification somewhat more easy and gives harder soaps because of the substitution of stearic acid for oleic acid;
- (c) incidentally it bleaches and deodorises while it hardens.

These advantages are common to *all oils* whether of good or inferior quality and the process is consequently applicable to the soap-making grades of all oils, e.g., to the cocoanut and groundnut oils used in Marseilles, etc., for ordinary soap; it does not enable very cheap oils to be *newly* brought in for soap-making, but is a mode of assisting soap-making. As regards fish oils, however, it *does* enable these to be used for hard soap-making, because it converts the olein of which fish-oil mostly consists, into stearin and both bleaches and deodorises it in the process; these are the only oils that I can think of that are newly enabled, by hydrogenation, to take a place in the general category of *hard soap* material, but they have all along been used for soft soaps and for special industrial soaps, and the available quantity for soap-making is very limited, since they are much needed for other purposes.

Moreover it must not be forgotten that hydrogenation is a process *additional* to that of soap-making proper; hence it adds considerably (£5 per ton as a minimum) to the cost of bringing oils into the hard soap-making line, and since the process is as costly for cheap as for better oils it is disproportionately costly for the very inferior ones. I would say, in fact, that hydrogenation enlarges—very slightly—the category of hard soap-making oils, rather than cheapens the process; what it *does* do is to render a vast quantity of oils edible as solid fats for margarine, compound and vegetable lard, etc. Moreover, if hydrogenation is good for Europe it is equally applicable—if needed—to this country (where fish oils are now being produced) but except for edible fats—my contention is that probably we do not need it, since we have very great advantages here in having our oils and fats *on the spot*, without the heavy costs of transport to Europe (let alone those of the return journey in the form of soaps, etc.), and without the certain losses by leakage, fermentation, etc., *en route*; fresh oils are better both for hydrogenation and for saponification since they are free from rancidity with its consequent inodorous and acid qualities.

I conclude, then, that hydrogenation does not injuriously affect the prospects of utilising Indian oils and fats in Indian soap-making.

As a matter of fact I have had soap made here from inferior oils of which there is abundance in this Presidency, which, after the most scrupulous allowances for all expenses, works out far below the lowest English prices, and on the basis of this experience I am convinced that even in a small factory we can make and sell good *pure* ordinary soap, without the numerous "fillings" of European soaps and with a minimum of moisture contents, at least £3 per ton below European prices, without counting the valuable by-product of glycerine.

11. "The greatest expert would find it difficult to turn out ghee to suit the palate of the consumer." Possibly, but the Indian people use more fats than ghee already; gingelly and other oils are much used in cooking, cocoanut, etc., oils in sweets, natural vegetable fats (shea, etc.), as butter. Hence, as everywhere else, we may conclude that a sweet, digestible, neutral fat of guaranteed purity, and of very low price—such as *can* be manufactured already from cotton seed and other oils—will be acceptable; cocotine is already much used, not only by Europeans, and this is far from being of neutral flavour.

As a matter of fact I know that a great British firm has produced a ghee substitute from Indian oils and that it will shortly be placed on the Northern India market.

12. My main contention is in favour of the utilisation as far as possible of our oils and fats *in India*; that they should not be wholly exported but worked up into soap, candles, glycerine, paints, butter, etc., in India itself. One or two suggestions however occur to me on remarks on exported oils in the earlier part of the cutting sent.

I don't consider oil more difficult to transport than seeds if you take all matters into consideration. True, it requires good containers, and containers leak, but immense quantities are sent from Cochin without difficulty. The 1½ per cent. leakage, which a great British firm told me is the usual loss, and the cost of containers are at least balanced by the fact that kernels (and even nuts in husk) are apt to ferment and mould on the voyage, and Marseilles merchants pay a low price for Indian "kernels" in consequence, and actually relegate the oils

from such kernels to soap-making (that is a case), and an important one of our valuable oils becoming inferior merely by export; moreover the oil of a ton of groundnut in husk can be sent in a hoghead.

The "risk of adulteration" is a real one and gives point to my suggestion in my letter of June 1913 for the appointment of an oil expert for (*inter alia*) analytical purposes. It is an additional reason for using our oils in India. Still, it ought not to be difficult to prevent the adulteration of exported oils; in Japan this is dealt with partly by Government but mainly by Trade Associations who unite in order to keep up the standard of their exports.

The market—potential, at all events, and probably actual—for oil-cake in this country is, I believe, far larger than you think; it must be so, since cotton seed is all used in that way, while the cake from the village presses is similarly used, when edible, or is sold to planters; coconut cake on the West Coast is wholly sold as cattle food, though it may partly be exported to Ceylon for that purpose. If cake is abundant and consequently cheap, none of it would be wasted; my great complaint against the export of oil-seeds is that cake is consequently scarce and dear. Chadwick may be asked as to the actual and potential demand for cake.

Excuse the freedom of my remarks; I am intensely interested in the subject.

P.S.—I enclose a second cutting on Government action in Great Britain.

The supply of Dyestuffs, "Oil and Colour Trades Journal," 21st November 1914.

The Board of Trade have had under consideration the question of the supply of dyestuffs and colours, the shortage of which at the present time, owing to the cessation of supplies from Germany, is causing great apprehension in the textile trades and in other important British industries. After consultation with the Committee on Chemical Manufactures, appointed in August last under the chairmanship of the Lord Chancellor, it appeared to the Board advisable to take such steps as were possible to develop the immediately available sources of supply, and also to encourage the permanent manufacture of dyestuffs and colours in the United Kingdom on a large scale, so as to guard against any recurrence of the present difficulty.

As regards interim steps, arrangements have been made to encourage the immediate expansion of the various existing sources of supply. As regards the permanent supply, after preliminary consultations with representatives of some of the principal bodies of consumers, a meeting was held at the offices of the Board of Trade on 10th November, which was attended by representatives of 22 important associations and firms engaged in the colour-using industries. There was laid before the meeting a scheme for the formation of a limited company with a large capital, of which the bulk would be subscribed by the consumers of dyestuffs and colours and others interested, the Government indicating their willingness conditionally on this being done to subscribe a certain proportion of the share capital, and to guarantee the interest on a large debenture issue for a term of years.

Precautions would be taken to preserve the British control of the enterprise and to prevent undue encroachment on other branches of the chemical trades.

The meeting was informed that preliminary arrangements had been made enabling H.M. Government to acquire important dye-producing works in this country for the purposes of the new company if established, and that the Government would be prepared to take all necessary steps to secure the acquisition of any other concerns in the United Kingdom whose transfer to the new company might be desirable.

The meeting unanimously adopted a resolution approving in principle of a national effort being made by the trade to increase the British supply of synthetic colours, and welcoming the assistance of H.M. Government for that purpose. A small committee, representing the trades concerned, was appointed to confer with the Board of Trade with a view to the elaboration of a scheme on the lines discussed at the meeting. The first meeting of this committee was held later in the afternoon.

A further announcement as to the proposed company will be made at an early date.

Demi-official—from Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries.
To—the Hon'ble Mr. A. G. CARDEW, C.S.I., Member of Council.
Dated—Coonoor, the 23rd December 1914.

I am not sure that I have made myself clear in my demi-official regarding oils to you, in paragraph 10, relating to the hydrogenation of "inferior" oils, and accordingly send the following addition:—

(a) Hydrogenation will not let in, for soapmaking, a mass of oils "very inferior" as compared with Indian oils; for one thing they don't exist; the only oils cheaper than our vegetable oils being fish oils which are of very limited quantity and much used for other purposes; moreover we are now producing appreciable quantities of fish oil which, if used in Europe, could also be used in India.

(b) It is precisely our Indian vegetable oils, or oils of parallel character, price, and quality, that are the subjects of hydrogenation for soap-making, for instance, in specifications which I possess of various hydrogenating patents the oils expressly mentioned as "cheap vegetable oils" are, for instance, soya bean and cotton seed oils; these may be taken as oils of £24 to £25 per ton; soya was dearer in 1913. Now cotton seed oil is precisely one of our Indian oils, producible in enormous quantities (one of my complaints is that the seed is so largely exported), and in the latest technical journals I read as follows: "Manchester; soap making cotton oils and in the latest technical journals I read as follows: 'Manchester; soap making cotton oils are quoted here at 22s. 6d to 25s. (per cwt.), the cheaper oil being from Bombay seed.' Hence it is actually our oils that are the inferior qualities. Soya oil is about £25 per ton, and though we do not produce it, it is comparable for cheapness with our castor oil (excellent for soap-making) at a similar price in Europe, and with our good groundnut oil at Madras export normal prices of £25 to £26 per ton. Moreover, it must be carefully remembered that not only do we produce these export oils at cheap rates, but that there are in the country cheaper grades of the same oils, not worth exporting, but which we, here, could readily use for soap-making; it does not pay to export second or third pressings or foots; from village pressings there is a large quantity of low class oils and residues.

Hence it is we also have and produce the cheap oils in soap-making grades.

(c) The fact is that the words "cheap oils" for hydrogenation are used—as regards soap-making—in comparison with tallow, which is the great soap-making fat. Tallow contains three times as much stearine as oleine and is consequently the general basis of hard soaps; oils are just the other way. But by hydrogenation the oleine of the fluid oils is turned into stearine so that, for example, fluid yellow cotton seed oil becomes a solid, white fat, largely stearine—according to the degree to which hydrogenation is pushed—, and as good as tallow for soap-making. Now good tallow is quoted at £30 to £35 per ton with lower prices—say for soap-making. Now some greases are quoted at £27 to £30. Hence olive oils at £27—for lower qualities: even some greases are quoted at £27 to £30. Hence olive oils at £22 to £25 can be hydrogenated into a very pure white solid fat, mainly stearine, at a cost of £5 per ton, they will compete with the tallows and even with the best palm oil: and, what is equally important, they so greatly enlarge the masses of technical (soap-making) fats that they thereby prevent tallows, etc., from rising, by competition, to unduly high prices.

(d) Moreover, in reasoning as to the results of hydrogenation we must not mix up that of oils for soap-making with that of oils for edible purposes: it is in this latter process that oils comparatively "inferior" are raised to a higher grade and in enormous quantities, and used to compete with, or mix with, animal fats of far higher prices in making margarine: mere beef tallow used as the basis of "oleo-oil" for margarine is priced at £31 to £37 and "edible beef stearine" at £45 to £50: even drippings for fish-frying is £40 per ton, and for this purpose the hardened cotton and other oils are immensely used under various names such as "vegetable lard", etc. In Austria alone according to a United States American Consular report of 1913, 300 tons of coconut butter are made per diem, and in the process a quantity of coconut oil is also turned into soap fats. Considering our export prices of oil, as compared with the prices in Europe (e.g., coconut at Madras at £33 per ton; in Great Britain £47 to £59), I have, as you may know, proposed to a great British hydrogenating firm to establish a factory out here, since our oils are not only much cheaper, but, being produced *in situ*, are fresh and free from rancidity which is the great enemy of hydrogenation.

A propos of another point in my letter, viz., that Indians are likely to use cheap vegetable fats as food, if ghee is not available, I may mention that in a report of 1913 by a German Consul (*jas est ab horte doceri*!) it is stated that since butter (from sheep and goats' milk) is very dear in Turkey in Asia, immense quantities of both margarine and vegetable butter are being used there; coconut butter alone—Austrian no doubt, or German—was imported into Beirut alone, by many tons per annum at prices from £40 to £50 per ton, or, say, 5d. per lb. wholesale. If so, we could make our own vegetable butters and sell them wholesale, *ex factory*, at 4d. per lb. (a price, by the way in which I had previously calculated on various data) and where would ghee then come in? We ought to make and sell edible fats and soaps to the whole of the middle and near east as well as to parts of China and Africa, and above all to ourselves.

Demi-official—from the Hon'ble Mr. A. G. CARDEW, C.S.I., Member of Council.
To—Sir F. A. NICHOLSON, K.C.I.E., Honorary Director of Fisheries, Coonoor.
Dated—Adyar, the 26th December 1914.

I am much obliged to you for your demi-official No. 30, dated the 20th December, and also for that of the 23rd. The fact is however that I am not taking any part in the Industrial Conference next week and although I recently spoke in the Legislative Council on certain industrial matters it has now been decided that all these subjects are to be dealt with in the Educational Department and that Department will in future deal with them. (This does not of course apply to fisheries)—I am forwarding your demi-officials to Mr. Rajagopala Achariyar for consideration in Educational.

With best wishes for the season.

EDUCATIONAL DEPARTMENT.

This file relates to the question of erecting plants for the extraction of oil from groundnut, copra, etc.

2. In G.O. No. 2862, Revenue, dated the 26th September last, the Government stated that, for experimental and demonstrational purposes, they would be prepared to erect a hydraulic plant capable of dealing with a large supply of oil-seed and requested the Director of Industries to submit detailed proposals together with an estimate of the cost involved. With reference to this, Sir Frederick Nicholson, Honorary Director of Fisheries, pointed out to the Government in a letter, dated the 13th October 1914, the relative merits of hydraulic press and other oil-pressing machines in dealing with large quantities of oil seeds and urged the desirability of establishing a large factory for the extraction of oil to meet mainly the demand in India and also to establish factories to deal with the by-products, e.g., for the manufacture of soaps, candles, glycerine, &c. Sir Frederick Nicholson has also been writing subsequently on the desirability of establishing such a factory to deal with the oil-seeds.

3. Mr. Tressler, however, was not in favour of the scheme put forward by Sir Frederick Nicholson, as he thought that it was too big a proposition to take up at once. His scheme, which confines itself to the extraction of oil from seeds, will be found described in his letter of the 6th November 1914 (pages 11 to 17 of the Government Order). He points that there are two methods by which the problem may be faced; one a method of substitution and the other of expansion. According to the former, improved machines will be utilized for the extraction of oil in place of the country methods now adopted. This Mr. Tressler points out will stimulate the industry only to the extent to which the demand for oil in India can be developed. According to the method of expansion, machines capable of dealing with a large quantity of oil seeds will be set up as an experiment and the oil manufactured will be exported to other countries. Mr. Tressler has furnished a rough estimate of the costs involved in the adoption of the two methods. He is personally of opinion that the policy of expansion should be tried. The Revenue Department are in favour of Mr. Tressler's proposal as against the proposals of Sir Frederick Nicholson. In the opinion of that Department the two methods of substitution and expansion should both be adopted simultaneously as far as it could be done within the provision made for the purpose. At the instance of the Revenue Department an additional allotment of one lakh has been made in the next year's budget for these experiments.

4. It is for consideration whether orders may now issue as proposed by the Revenue Department. The Hon'ble Sir Harold Stuart and the Hon'ble Mr. Cardew have approved of the proposal. The file may be circulated to His Excellency the Governor.

5. As regards Sir Frederick Nicholson's proposal to start soap and glycerine factory, the Hon'ble Mr. Cardew has directed that it may be sent to Mr. Tressler for remarks. It is for consideration whether his subsequent letter (pages 14 to 19) may also be similarly referred.

C. RAMANUJACHARI—3-1-15.

As personally directed by the Secretary the draft prepared in Revenue has been obtained and a typed clean copy of it is placed below. If approved, it may be submitted to His Excellency the Governor for approval. The draft is on the lines approved by the Hon'ble Sir Harold Stuart and the Hon'ble Mr. Cardew.

2. As regards the new industries proposed by Sir Frederick Nicholson, attention is invited to paragraph 4 of the Hon'ble Mr. Davidson's note, dated 4th December 1914, on page 7 *supra* and paragraph 4 of Lord Crewe's despatch on page 24 of G.O. No. 3851, Revenue, dated 30th December 1912. The latter

allows only "the purchase and maintenance of experimental plant for the purpose of demonstrating the advantages of improved machinery or new processes, and for ascertaining the data of production," but expressly prohibits trading on commercial lines. The despatch also approves of the definition of the functions of the department as given by Dr. Travers, which is to the effect that the department can collect information as to the

possibility of introducing new industries and carry out and direct experiments for the purpose. Sir Frederick Nicholson considers that, in undertaking the soap and glycerine manufacture as proposed by him, the Government would only be stepping in as experimenters first and demonstrators afterwards. It is for consideration whether Sir Frederick's proposals will be covered by the Despatch. If it is decided that they are, further reference to Mr. Tressler may be made on Sir Frederick's proposals; otherwise the proposals may be dropped, Sir Frederick being informed demi-officially that they are not permissible under the existing rules. The matter may be reconsidered if the reference that has been made to the India Office as to the action taken by the Home Government in the present crisis discloses the possibility of a reconsideration of the present policy and steps are actually taken in that direction.

C. RAMANUJACHARI—9-1-15.

This matter has already been dealt with in the Revenue Department, and Financial Department have allotted one lakh for the purpose in the next year's budget under the head of "Experiments connected with the Department of Industries" in addition to the Rs. 50,000 previously provided for. That being so, I think that the draft Government Order prepared by Revenue may be adopted and issued so as to avoid delay. In regard to Sir Frederick Nicholson's plea for starting a soap and glycerine manufactory, I am doubtful if the starting of such a concern under Government management and with Government funds would not contravene the orders of the Secretary of State. Lord Morley has explicitly negatived the establishment of Government factories "in order to demonstrate that articles can be manufactured and sold to the public at a profit;" and even under the subsequent despatch sent out by Lord Crewe, what is permissible is only "the purchase and maintenance of experimental plant for the purpose of demonstrating the advantages of improved machinery or new processes and for ascertaining the data of production." I have grave doubts whether a regular soap and glycerine manufactory such as that proposed by Sir Frederick Nicholson can be brought under Lord Crewe's despatch. The proposal approved in the draft Government Order for "investigating the possibilities of extracting oil on a wholesale scale, 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", would, I think, come within the scope of the activities of the Department of Industries as laid down in the

later despatch. If His Excellency would approve the draft Government Order which has already received the concurrence of Revenue and Financial Departments, it may be issued at once. The question of starting a soap and glycerine manufactory, as suggested by Sir Frederick Nicholson, could be reserved for future consideration.

H. A. S[UART]—19-1-15.

Departments, it may be issued at once. The question of starting a soap and glycerine manufactory, as suggested by Sir Frederick Nicholson, could be reserved for future consideration.

P. RAJAGOPALA ACHARIYAR—11-1-15.

P[ENTLAND]—15-1-15.

* Issued as No. G.O. 52, Educational, dated the 16th January 1915.

Issue: * and after issue circulate for perusal to Honourable Members.

P. RAJAGOPALA ACHARIYAR.—16-1-15.

Seen.

A G CARDW[ELL]—18-1-15

On reading through the papers again I feel sceptical about the usefulness of these experiments, but as His Excellency and the Hon'ble Mr. Cardew approve of them I will not oppose the expenditure. It will serve as a test of Mr. Tressler as well as the oil problem.

H. A. S[THURTELL]—19-1-15.

P. S. S[IVASWAMI AYYAR]—19-1-15.

Submitted to His Excellency for perusal of the Hon'ble Sir Harold Stuart's note at the bottom of the previous page.

P. RAJAGOPALA ACHARIYAR—20-1-15.

His Excellency the Governor—

In reference to Sir H. Stuart's observations above, there will be opportunity for final consideration when these detailed proposals—now asked for—are before us.

P[ENTLAND]—21-1-15.

[G.O. No. 52, Educational, dated 16th January 1915.]

From the Honorary Director of Fisheries, No.519 d/13-10-1914.

" " " " " " No.553, d/27-10-1914.

" " Director of Industries, dated 6th November 1914.

" " Honorary Director of Fisheries, No.589,d/10-11-1914.

" " Director of Industries, No.252 T., d/ 16-12-1914.

Order:-

P.S.

52 Sol
26-1-15

Owing to the recent great decline in the over-seas demand for oil-seeds, as a result of which extensive stocks are likely to come upon the market at prices much below those hitherto prevalent, the Government have made a careful examination of the expediency of undertaking oil extraction on a large scale in this country. On the facts which have been placed before them they entertain serious doubts as to the feasibility of local arrangements for the extraction of oil for exportation.

*Specimen
for
analysis
CA
10/11*

52 Ed.
16-1-15

exportation to continental markets, not only on account of the ~~tariffs~~ levied by many countries on oil, but also owing to the greater ~~the~~ difficulties attendant on shipping oil as compared with exports in the form of seeds and to the desire of the consumers for oils of standard ⁵qualities which continental manufacturers and dealers are accustomed ^{to}.

2. The Government, however, recognise that, whether an oil export industry can be successfully created or not, there still remains much which can be done towards the improvement of the ~~the~~ present wasteful methods of extraction and in the attempt to build up local industries for the utilization of oil; it is conceivable, for example, that a suitable vegetable substitute for ghee might be produced, while the manufacture of soap might also, perhaps, prove a profitable venture.

3. The Government have already sanctioned the initiation of experimental work in connection with the introduction of machinery for the crushing of oil seeds, but in view of the present exceptionally favourable situation as regards raw material and the necessity for further experiment, they now resolve 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 of Industries will accordingly be requested to state how this sum can best be utilized for the purposes indicated and to consider the feasibility of starting subsidiary industries for the utilization of the

oil

Noted in CB
27.1.15

62-Edw
16-1-15

pages 11 to 17 of cf.

page 15 of cf.

oil in this country.

In his letter of the 6th November 1914 Mr. Tressler has sketched out alternative methods of procedure varying in respect of the financial provision necessary and the extent to which speculative propositions are considered permissible. In the opinion of the Government the desideratum is a combination of the policies of "substitution" and "expansion", and as at present advised, they are in favour of establishing one of the three plants mentioned in para. 14 of Mr. Tressler's letter and some of the smaller plants referred to in para. 15, 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.

Detailed

27P

Detailed estimates will in any case be necessary before work can actually be started, but the Government desire that their preparation should be pushed on with the ~~the~~ utmost expedition in ~~the~~ order that, if possible, a portion of the outlay in issue may be debitable to the revised estimates for the current financial year, thus reducing the allotment atherwise required for 1915-16.

To
The Director of Industries
" Financial Department
" Revenue Department

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