Government of Madras.

EDUCATIONAL DEPARTMENT.

Recd. } 1913. *Enclosures*

Regd. } *Spare copies*

G.O. No. 719, 6th August 1913.

Reports.

Recording the quarterly — of the Tinctorial Expert, Madura, for the period extending from September 1912 to June 1913, forwarded by the Director of Public Instruction.

Government of Madras.

EDUCATIONAL DEPARTMENT.

2

Read. } 1913. *Enclosures*

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G.O. No. 719, 6th August 1913.

Reports.

Recording the quarterly — of the Tinctorial Expert, Madura, for the period extending from September 1912 to June 1913, forwarded by the Director of Public Instruction.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

Read—the following papers :—

I

Letter—from Mr. F. Marsden, M.Sc., Ph.D., Tinctorial Expert, Madura.
To—the Director of Public Instruction (through the Superintendent of Industrial Education, Madras).
Dated—the 19th December 1912.
No.—62.

In connection with the work in the Tinctorial Laboratory, Madura, I beg to submit the following report, covering the period September-December 1912.

2. Having seen that the preliminary training of the students I had obtained was not sufficient to permit of their understanding more detailed instruction in chemistry, I decided as mentioned in mine of September 13th to proceed with the description of the different classes of dyestuffs, hoping that the students would be able to understand the properties in the light of the practical trials.

3. I have been carrying out this idea, giving explanations on the chemistry of the subject in order to explain the principles, whenever suitable occasions arose. The students can follow the explanations and repeat the manipulations, but with the exception of the two young men who had attended school up to the Matriculation standard, they are unable to remember anything of the explanations for any length of time and can only apply the conclusions to the specific case associated with the explanation, but cannot appreciate the applicability of the same reasoning to different observations. I must admit that two of the students are naturally weak and could not be expected to do well in any branch of work, but I look upon them as probably somewhat below the average of what we might expect to get in the future, should the classes be put upon a proper basis.

4. I have visited the Sourashtra High School here and seen the boys at work in the laboratory, and took the opportunity of asking them a few general questions while they were at work. The answers I received were satisfactory and showed that the instruction was proceeding on sound lines and that the boys were being taught to think, and not merely to memorise. The present boys I understand have an advantage over those who passed through the school previous to this year, in that there is now an attempt at a laboratory in which the boys can do a little practical work, whereas before, the instruction was purely oral. The improvement in the effect upon the boys is, I think, pronounced ; they can realise the fundamental laws and do not look upon them as merely abstract propositions.

5. To my present students I have so far explained the nature of—

(1) the direct cotton dyestuffs ;
(2) the after treatment of the same where this results in an improvement in the fastness properties ;
(3) dyes which are diazotised and developed on the fibre ;
(4) mordanting with tannic acid and metallic salts, and the application of the basic dyes ;
(5) the sulphide dyes.

6. The students have made 80–90 dye trials, the results being kept for classification when the time arrives for them to test the fastness properties practically for themselves.

7. So far not many of the dyers have made application to the laboratory for assistance in any direction, but the question is a difficult one as so few of them are able to speak English. I am therefore devoting a little time to acquiring a knowledge of Tamil so that I may have a medium in which it will be possible to converse with them, and thus perhaps gain their confidence. The only applications I have had

have been for information respecting the dyeing of chrome yellow and orange. These are two colours which are in great demand in Southern India owing to their fastness against washing and light, and the imported dyed yarn practically holds the market. The shades are obtained by depositing lead pigments in the fibre and owing to the use of lead salts, and of chromates, this class of dyeing is, in Europe, classed amongst the trades dangerous to health and therefore under special regulations with respect to inspection and medical supervision of the work-people. Unfortunately there is no other yellow dye which possesses the same richness of shade and fastness, and therefore there is little likelihood of its being displaced. Some dyers are however anxious to do this work, but the price at which the European firms, who have specialised in this class of "pigment dyes," can place the yarn on the market does not hold out much hope of the industry being remunerative here.

8. The study of the method of dyeing these dyes however offers a splendid example of the method of investigation by "direct trial" and I intend to take it up with the students at the conclusion of the chapter we are at present engaged upon. In case there should be any extension of the production of these shades, in the town, and the dyeing be permanently carried on, I have drawn the attention of the medical officer to the danger, so that, if necessary, provision may be made for regulating the industry at any early stage, should symptoms of lead or chrome poisoning become evident.

In the case of "red" dyeing one of the substances used is *umari*, obtained by burning certain plants which grow near the sea and fusing the ashes. It is an impure product of variable composition and could be replaced by the ordinary dry carbonate of soda, which would mean a saving of expense. I have been unable to influence the dyers, but Messrs. Parry & Co. being interested in the sale of soda ash have had a representative down here to push the product. I gave him information which would permit of him showing the dyers how to make trials, and I understand that these are now in hand and, if successful, as they ought to be, it will result in a saving to the dyers and may make them agreeable to try to make improvements in other directions.

9. The stores indented for from Europe which were to have been delivered in November have not yet arrived. I have been notified however of the despatch of one small packet, so expect that information respecting the bulk of the indent will soon be received.

No. 1487-*I.*, *dated* 2*nd January* 1913.

Submitted to the Director of Public Instruction, Madras.

K. T. B. Tressler,
Ag. Superintendent of Industrial Education.

N. Ref. on Cur. No. 76, *dated* 6*th January* 1913.

Submitted to Government.

A. G. Bourne, D.Sc., F.R.S., K.C.I.E.,
Director of Public Instruction.

II

Letter—from Mr. F. Marsden, M.Sc., Ph.D., Tinctorial Expert, Madura.
To—the Director of Public Instruction (through the Superintendent of Industrial Education, Madras.)
Dated—the 20th March 1913.
No.—26.

I have the honour to submit herewith a report upon the work of the Dyeing Laboratory for the period December 1912 to March 1913.

2. As I indicated in my last report on 18th December 1912, I was about to enter upon the question of the dyeing of chrome colours with the students, and as this section presents exceptional opportunities for obtaining information upon unknown

points by the method of direct comparative trial, I went into the question very thoroughly and made the students carry out all possible trials to show the effect of variations in the processes at various stages and to train them, if possible to draw conclusions from the differences in the effects obtained. As I have noticed all through the course, the students are handicapped by the absence of any proper grounding, and the value of the explanations which I tried to give them was much diminished by the necessity at almost every stage of having to revert to elementary work which they had forgotten, or never known, and this caused the subject to lose in cohesion and interest.

3. The mental attitude of the pupils was well exemplified at this stage, for the dyeing of these chrome colours is of special interest to them, seeing that almost the whole of the chrome dyed yarn which is used is imported, the country dyers being unable to get the shades required at a competitive price.

4. I naturally laid most stress upon the educational and experimental side of the work showing how the information gained from one set of trials suggested the desirability of information upon some other point, and my desire was for them to be able to devise trials whereby this information could be obtained. They were only keen upon the results, their sole object apparently being to learn how to produce the shades of the same quality and fastness as the standard European "marks" on the market. However I made them go through the trials in the way I desired and since then I understand that one of the students has been trying (with respect to one shade at least with some success) to do some of this class of dyeing in the dye-house with which he is connected.

5. In connection with the chrome colours I have in other reports drawn attention to the danger of lead and chrome poisoning affecting the workers who dye and weave the yarns, but the special fastness properties of the dyed shades, and their brilliance, render it a matter of extreme difficulty to displace them with other harmless colours. Foreseeing a tendency to an increase in the quantity of dyeing of this class I recently took the opportunity of a communication from the District Medical Officer to draw his attention to the question so that steps might be taken if any ill-effects made their appearance. It seems that from other quarters his attention as Superintendent of the Jail has been drawn to this class of dyeing as one which would least interfere with local industry, seeing that so far the local dyers have not been able to compete successfully with the imported dyed yarns, and he proposes, I understand, to take up the question.

6. It would certainly be preferable that in the first instance these dyes should be produced under conditions under which the effect upon the health of the workers can be noted, and I have arranged with the Superintendent of the Jail to give him what assistance I can, and propose to spend some time at the conclusion of the present students' course in visiting the jail and assisting the dyer there to obtain the shades required.

7. To the students I have explained the principles of indigo dyeing and they have made dye-trials with the new fast colours, which are classed with indigo as "vat" colours. Some of these are already being dyed in the town here, and as the shades are fairly bright and exceptionally fast they give satisfaction to the consumers. The only drawback is that the price of the colours is high and only such dyers as value their reputation will use them; taking this into consideration there is a fair amount of dyeing of this class being done for better class cloths and on fine yarns.

8. Finally we turned to the question of red-dyeing and here I went more fully into the question of the mordant colours, and took the opportunity of making clear to the students some of the simpler portions of colour chemistry, the behaviour of mordants, and the chemistry of fats, oils and soaps.

9. They then carried out various trials with the object of obtaining information as to the quantities of different substances which it was necessary to use to get the best results, and I went into the various methods of dyeing employed in the past and at present in the West, and explained the differences in the methods there employed from those prevalent in the East.

10. Taking the course as a whole, I cannot report that I personally am satisfied that I have been able to make that impression upon the students which I would have liked. It is true they represented experimental material, sent to me by some leading members of the Sourashtra community that I might have some idea of the quality of the students available, and although the capacity of the students I obtained differed widely, it was evident that the intelligence of the best students was such as to give every promise of their being able to take full advantage of instruction offered under suitable conditions.

11. Three were distinctly bright, and only with one student did I find it absolutely impossible to place the subject-matter in such a light that it could not be understood and remembered for a short time. My greatest difficulty, and one which necessitated a great deal of repetition was, that facts and explanations which were perfectly understood with respect to one part of the work could not be understood as applying to others, and general laws and statements could never be applied except in the case of the examples given to exemplify them. This defect will no doubt gradually disappear with an improvement in the methods of teaching science in the schools and there would be no difficulty, I think, with well-trained boys, who had been through the full high school course, in giving a complete course in relation to dyeing from which they could learn a great deal of interest and benefit to them. Only two of what I have looked upon as my "good" students had been through the full high school course, the third not having proceeded beyond the third form; he however made up in intelligence what he lacked in preliminary knowledge and, had the others had his practical capacity they could be expected to have learnt a great deal from the course.

12. A great drawback however has been the fact that the three best students were already engaged practically in business, and this has interfered materially with the regularity of their attendance. This is a matter to which more attention would have to be paid in future courses, and only such students admitted as could guarantee to attend regularly and in time. On this account I would suggest taking them immediately they leave the high school and before the habits of regularity have been destroyed by the general "do nothing" kind of life which they lead after leaving school until they are forced by their relatives to consider the question of doing something.

13. With regard to the building which was rented as a laboratory, and in which the classes have been held, this, although the best in the town which we could have obtained, has not proved satisfactory from a teaching point of view, although its defects might not have been so noticeable had we had the appliances and fittings generally in use in schools. One great difficulty has been the question of pure water, for the supplies of condensed water obtained from the mills have not been satisfactory and the non-arrival of the stores indented for from England has delayed the possibility of obtaining even a small supply of distilled water with which alone the work of a laboratory can be carried out. Fortunately the enquiries from the few dyers who have visited me have required the carrying out of but little analytical work and the want has been more felt in the preparation of solution for carrying out the teaching work. We have softened the water available when required but it could only be roughly done as the necessary fine testing solutions could not be prepared.

14. The dyers who have called upon me have done so with the object of getting information upon practical points, but with only one exception, these men have been ignorant of English and of but little education, and knew their business only by rule of thumb. It was impossible to do much for them as they were incapable of understanding an explanation and could only follow (and that in their own faulty manner) the recipes supplied to them.

15. I am more than ever convinced that the best means which can be taken to assist the dyeing industry is to improve the education of those controlling it and with a well equipped dyeing school, if we could get students to take a full course, there can be no doubt that in a few years when young men after passing through the course have attained to controlling positions, we should find that there was a

different spirit among the dyers and an appreciation of the assistance which a school training can give, when the knowledge there obtained is amplified by a study of the literature available, and applied to practice.

No. 1665, *dated 29th March* 1913.

Submitted to the Director of Public Instruction.

K. T. B. Tressler,
Ag. Superintendent of Industrial Education.

N. Ref.|*on*| *Cur. No.* 2633/13, *dated 4th April* 1913.

Submitted to Government in continuation of this office endorsement N. Ref. on Cur. No. 76 dated 6th January 1913.

A. G. Bourne, D.Sc., F.R.S., K C.I.E.,
Director of Public Instruction.

III

Letter—from Mr. F. Marsden, M.Sc., Ph.D., Dyeing Expert, Madura.
To—the Director of Public Instruction, Madras.
Dated—the 24th June 1913
No.—71.

In reporting upon the position with regard to the Dyeing Laboratory, Madura, for the period April-June 1913, there is, with reference to the students who had been attending, little to add to what appeared in the last report. The knowledge of chemistry which they possessed was insufficient to permit of their understanding the principles underlying the methods used in Turkey red dyeing, for instance, and their interest centered in the question of details which would be of immediate practical use. The methods employed in practice for the dyeing of Turkey red, indigo and such like special colours are not suited to laboratory demonstration owing to the factors of time and mass playing such a large part in the processes, and all that can be done in a laboratory is to explain the principles and carry out the trials on a small scale to illustrate the effect of variations in the conditions at the various stages. As above indicated, to understand this required a little more knowledge of organic chemistry than the students had assimilated and seeing that I had gone about as far with them as was possible, I decided to close the class and try in the coming year whether more success could not be obtained with students who had just left school, after obtaining the secondary school-leaving certificate with chemistry as one of their subjects.

2. I have arranged with Mr. L. K. Tulsiram, B.A., B.L., and Mr. Govindaraja Mudaliyar, B.A., L.T., headmaster of the Sourashtra High School, to send four youths with these qualifications to me and I intend to spend a little more time in the coming year, to explaining the relationship to one another of the commonly used so-called organic compounds and thus prepare the students for understanding the changes upon which the usefulness of these compounds depends.

3. The appointments of the laboratory are not yet sufficient to permit of a thoroughly practical course being given in the elementary subjects, but with the materials available we shall be able to give a certain amount of practice in the ordinary methods of manipulation and thus train the students to carry out the practical operations which occur in the later stages of the course, more efficiently and rapidly than the last year's students were capable of.

4. Turning to the general question of dyeing in this district, I consider that my opinion, that the direction in which we can be of most assistance to the dyers is by bringing education in matters relating to their industry within their reach, is well exemplified by the position which has arisen here in connection with Messrs. Parry & Co.'s attempts to introduce soda ash in place of saracutti or *umari*, the country alkalis.

5. *Umari* is a crude sulphide of soda obtained by burning a species of plant (milk hedge) which grows near the sea. The plant itself must contain a large amount of sulphate of soda, which, when the organic matter is burnt off, is reduced to the condition of sulphide, with strongly alkaline properties.

6. The alkali is required for emulsifying the groundnut-oil used in the mordanting of yarn for Madura red, and it has been suggested that pure soda ash, as used for this purpose in the west would be both better and cheaper. Some of the dyers have tried it, but they say that it is not equal to the *umari*, unless very pure water is used. The reason is that from the nature of the hardness in the water here, soda ash produces a precipitate of lime carbonate, whereas *umari*, containing but little or no carbonate, gives only a slight turbidity. To explain to the dyer that, for "oiling," a water from which the lime has been removed is probably better than one with which there is the possibility of forming a solid, greasy lime soap on the yarn was somewhat difficult. for he looked only at the end result, and could not understand that by a little alteration in his arrangements to suit the differences between the two alkalis, the results could be made identical and the cost of production diminished. This question of any alteration in the method of red dyeing is one of extreme delicacy, and has to be treated very carefully to avoid the danger of giving advice which, applied in practice, might not be of advantage and result in damage and loss of prestige. The results the dyers obtain are very good of course, and it is a question whether the introduction of the newer methods would be an advantage. The general opinion is that red, dyed by the old method, is faster than the so-called new "mill red." Although the latter is much more rapidly dyed than the old red, it requires an expensive plant and trained supervision and might if employed by the ordinary dyer prove less satisfactory than the red at present dyed by him.

7. There is no doubt in my mind that although it may be years before the results of our teaching are recognisable the way in which Government can really assist the dyeing industry is to place within the reach of those engaged in directing the dyeing, information upon the materials and processes which are in use, so that they will be able to follow developments in other parts of the world and shape these to meet their own requirements.

I gathered when in Madras in March last, that Government were still awaiting the receipt of definite proposals from me for carrying out my suggestions. I beg to point out that these proposals were mentioned in the report I submitted on October 11th, 1912, through the Superintendent of Industrial Education, in connection with G.O. No. 647, Educational, dated 18th July 1912, and that it was my idea that they could be carried out in connection with the scheme submitted by Mr. Chatterton, B.Sc., C.I.E., for the reorganisation of the Technical Institute, Madura.

8. I have received orders from the Government of Madras to enquire into the question of Madras handkerchiefs shipped from Madras, which, in use in West Africa have not proved satisfactory and have been rejected by the merchants there. I have written to Messrs. Beardsell & Co., Madras. and Messrs. Coles, Son & Co. (Limited), London, and am taking the matter up with them. When my enquiry is finished I hope to be in a position to submit proposals which might result in a lessening of the risk of future complaints, but this can only be done with the co-operation of the merchants and dealers. During my visit to Madras at the end of this month I hope to meet some of the people interested and go into the matter with them.

9. My projected enquiry into the question of chrome yellow dyeing at the Madura Jail could not be undertaken up to the present owing to the Superintendent being so fully occupied in other directions that he could not spare the time to assist me. The matter will be taken up when a favourable opportunity arises.

N. Ref. on C. No. 6173, *dated 4th July* 1913.

Submitted to Government, in continuation of this office endorsement N.R.C. No. 2633, dated 4th April 1913.

2. Dr. Marsden's proposals in connection with G.O. No. 647, Educational, dated 18th July 1912, were embodied in the letter of the Superintendent of Industrial Education, No. 1280 I., dated 4th November 1912, submitted to Government with this office endorsement N.R.C. No. 417 of 1911, dated 5th December 1912.

A. G. Bourne, D.Sc., F.R.S., K.C.I.E.,
Director Public Instruction.

Order—No. 719, Educational, dated 6th August 1913.

Recorded.

(True Extract.)

W. Francis,
Ag. Secretary to Government.

To the Director of Public Instruction.

Educational Department.

NOTES CONNECTED WITH G.O. No. 719, EDUCATIONAL, DATED 6th AUGUST 1913.

[Subject.—*Dr. Marsden's quarterly reports for the period from September 1912 to June 1913.*]

From the Director of Public Instruction, No. 76, *dated 6th January* 1913.

A very discouraging report. Put up with the other file for consideration therewith.

L. Davidson—4-2-13.

From the Director of Public Instruction, No. 2633, *dated 4th April* 1913.

Please see Dr. Marsden's remarks at the end of the report in which he says that an improvement in the dyeing industry can be expected only when a dyeing school is established and educated youths are trained as dyers.

T.K.—12-4-13.

The previous report is in circulation along with the proposals regarding the Madura Technical Institute.

C. Ramanujachari—13-4-13.

Await return from circulation.

T. E. Moir—16-4-13.

Extract from the Secretary's remark, dated 8th May 1913, in the arrears list—

"Send up separately."

The file is accordingly submitted.

B. Gopala Chari—8-5-13.

C. Ramanujachari—9-5-13.

This report should be paragraph-numbered and printed; also print the earlier one; it may be removed from the other file. The proper disposal will, I think, be to record with reference to the Government order ultimately issued on Mr. Tressler's A proposals for weaving and dyeing. I mean the case with a letter from Dr. Marsden as an enclosure.

L. Davidson—11-5-13.

From the Director of Public Instruction, No. 6173, *dated 4th July* 1913.

No orders have yet been passed on the proposals referred to at A above. The papers are now with His Excellency.

2. Another report has been received from Dr. Marsden, and this has been added to the current file. It seems unnecessary to keep these reports pending, till orders are passed on the proposals already referred to. These may, it is submitted, be "recorded" independently after perusal by His Excellency the Governor, who may desire to know the fate of the first attempts at dyeing class as given in Dr. Marsden's third report.

B.G.—23-7-13.

C. Ramanujachari—23-7-13.

His Excellency the Governor—

In his letter forwarded by Mr. Tressler, Dr. Marsden proposed to start a dyeing school at Madura on the lines summarized in paragraph 13 of Mr. Tressler's letter No. 1280-1, dated 4th November 1912.

2. No definite orders were passed on these proposals and the papers are now with His Excellency.

3. Dr. Marsden, in the three letters in the current file, reports the results of a school which he started in anticipation of sanction. In paragraph 10 of his second letter he says he is disappointed—the general education of the boys was insufficient to enable them to appreciate his lectures. In his third letter he says he has closed the school but means to re-open it with four students who have got the secondary school-leaving certificate with chemistry as one of their subjects. He gives his opinion that the best way in which Government can help the dyers is to educate them in dyeing science.

4. These papers may be recorded pending issue of orders about the starting of a dyeing school.

5. What other work Dr. Marsden is doing is not stated in these papers. His duties are set out in G.O. No. 112, Educational, dated 9th February 1912. In his first letter he says his stores and appliances have not arrived, and without them I suppose he could do little. In his third letter he says his laboratory is still incomplete.

It is understood that His Excellency had a talk with Dr. Marsden, about his work, in Madras; orders are solicited whether any enquiry need be made as to what progress he is making. Mr. Tressler is on leave*, and while he is away his department's energies *seem* rather in abeyance.

W. Francis—25-7-13.

* Combined privilege leave and furlough for 6 months and 24 days from 17th April 1913.
B.G.

Seen by His Excellency. Record the reports

W. Francis—1-8-13.

The draft order already passed by the Secretary may now issue with the omission of paragraph 2.

B.G.—4-8-13.

C. Ramanujachari—5-8-13.

Yes.

C. S. Anantarama Ayyar—6-8-13.

[G.O. No. 719, Educational, dated 6th August 1913.]

[E. & L. / 74.]
4,800—7-1-13.

Edl DEPARTMENT.

12

Read again G.O. No. ...., dated .... 191 .
" " " " ...., " .... 191 .

C. No. 50 Ed, From the D.P.I, No. 76, dated 6-1-1913.
" " 1183 Ed " " do , " 2633, " 4-4-1913.
" " 2098 Ed " " do , " 6173, " 4-7-1913.

ORDER.
No. 719 Edl, dated 6-8 1913.

Recorded

~~2. Separate orders will issue on the proposals referred to in para 7 of Dr. Marsden's report No 71 d/ 26-6-13.~~

WG CR
23-7-13 23-7-13

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Current No. 50, 1183 & 2098 Ed of 1913, ~~dated~~ ....19 .

G.O., No. 71 ... Edl, dated 6. 8. 1913.

Number of MS. pages sent { Correspondence including order or orders (b) 12; Notes (b[1]) 6

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(c) Signature copies of letters to the Secretary of State or to the Government of India should be printed on hand-made paper.

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[P.T.O.

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