1896 Govt of India

Department of Revenue & Agriculture

Emigration

(1) பக்கங்களின் எண்ணிக்கை 15 (21)

(2) புதுக்கித் திருப்பிய நாள் _____

(3) ஆதாரங் குறிப்பவர் சுருக்கொப்பம் _____

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

Public துறை

அரசாணை எண். 278
மு. கோப்புத் தாள் எண்.

அச்சகம்
பலவகை

நாள் : 25. 2. 1896

199 ..

மடிக்கவோ கண்டபடி கையாளவோ கூடாது.

அவண. கா. 1—18,006—6-9-90.

FILE No. 7 OF 1896.

SERIAL No. 2.

1896.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

EMIGRATION.

NOTIFICATION.

No. $\frac{170}{7-3}$.

Dated Calcutta, the 1st February 1896.

SUBJECT.

ADDITION of a rule to the Colonial Emigration Rules for testing the presence of poisonous minerals in the drinking-water, lime-juice, etc., supplied for use in emigrant vessels.

G. I. C. P. O.—No. 1029 R. & A.—3 2-96.—132.—R. N. D.

No. $\frac{170}{7\cdot2}$.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

EMIGRATION.

Calcutta, the 1st February 1896.

NOTIFICATION.

In exercise of the powers conferred by section 81 of the Indian Emigration Act, XXI of 1883, the Governor General in Council is pleased to make the following additions to the Rules relating to Colonial Emigration published with Revenue and Agricultural Department Notification No. 94 E., dated the 18th March 1886:—

After Rule 178, Chapter V, Section III, page 72, add the following:—

"178(*a*).—The drinking-water, lime-juice, ghee, flour, rice, meal, etc., shall be frequently tested by the Surgeon Superintendent for the purpose of detecting the presence of lead or copper therein."

Note.—"To test the water, a cup or any small white vessel should be about half-filled with it, and a drop of sulphide of ammonium stirred in with the glass rod. Any iron, lead or copper contained in the water, even to a smaller extent than $\frac{1}{10}$th of a grain per gallon, would be shown by an inky colouration appearing more or less deep according to the quantity. Should such a change occur, then a drop of hydrochloric acid should be stirred in, when the colour will disappear instantly if due to iron, but persist if due to lead or copper. It is unnecessary to distinguish between lead and copper, as both are highly dangerous."

"To test lime-juice for lead or copper, pour two ounces of the juice into a white cup or basin, add ten drops of hydrochloric acid (B. P.—Sp. gr. 1·16), stir with a glass rod, and add five drops of a solution of ammonium sulphide. A darkening indicates lead or copper. If the amount of these metals is small, the darkening will require about ten minutes to attain its maximum intensity."

"To test ghee, flour, rice, meal or any light-coloured food, about 30 minims of sulphide and an equal measure of the acid should be added separately to 2 ounces of water and a portion of the food well stirred with the mixture, lead or copper being indicated by the darkening that occurs."

In scale 3, Schedule G, page 102, make the following changes:—

Against "Acid, hydrochloric, fort:", in columns "Measure", substitute "*6 oz., 4 dr.*" for "*1 oz., 4 dr.*" and "*6 oz., 6 dr.*" for "*6 dr.*"

Between "Ammonia, spirit aromatic" *and* "Antim, tart," *add* "Ammonia, sulphide"; and against it in both columns of "Measure" insert "*1 oz.*"

DENZIL IBBETSON,
Offg. Secretary to the Govt. of India.

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"To test ghee, flour, rice, meal or any light-coloured food, about 30 minims of sulphide and an equal measure of the acid should be added separately to 2 ounces of water and a portion of the food well stirred with the mixture, lead or copper being indicated by the darkening that occurs."

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Note.—"To test the water, a cup or any small white vessel should be about half-filled with it, and a drop of sulphide of ammonium stirred in with the glass rod. Any iron, lead or copper contained in the water, even to a smaller extent than $\frac{1}{10}$th of a grain per gallon, would be shown by an inky colouration appearing more or less deep according to the quantity. Should such a change occur, then a drop of hydrochloric acid should be stirred in, when the colour will disappear instantly if due to iron, but persist if due to lead or copper. It is unnecessary to distinguish between lead and copper, as both are highly dangerous."

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DENZIL IBBETSON,
Offg. Secretary to the Govt. of India.

Pub. p. 278
25-2-96

FILE No. 7 OF 1896.
SERIAL No. 1.

Test prescribed for detecting the presence of poisonous minerals in the lime-juice, etc., supplied for use on emigrant vessels.

No. 119 (Public-Emigration), dated India Office, London, the 19th December 1895.

From—*Her Majesty's Secretary of State for India,*

To—*The Government of India.*

I FORWARD for the consideration of Your Excellency in Council copy of a letter, which has been received from the Colonial Office, giving cover to a correspondence on the subject of the test prescribed for detecting the presence of poisonous minerals in the lime-juice supplied to Indian emigrants.

Colonial Office, to India Office, 26th November 1895. Enclosures.

2. The Rule 178 A was published by a Notification dated 5th August 1890, but it does not appear in the last edition (1892) of the Rules under the Colonial Emigration Act. The test which has now been found defective was suggested in a Report by an Analytical Chemist which seems to have been intended to be printed as a note to that Rule.

F. 12 of 1890. S. 7.

I have, etc.,

GEORGE HAMILTON.

No. 19732—95, dated Colonial Office, Downing Street, London, S.W., the 26th November 1895.

From—EDWARD WINGFIELD, Esq., C.B., *Asst. Under-Secretary of State for the Colonies'*

To—*The Under-Secretary of State for India.*

WITH reference to your letter (No. 1574 J. & P.) of the 13th of September 1890, I am directed by Mr. Secretary Chamberlain to transmit to you copies of the correspondence noted in the margin with regard to the test prescribed for detecting the presence of poisonous minerals in the lime-juice and other stores supplied to East Indian emigrants, and I am to request that you will move Lord G. Hamilton to cause it to be transmitted for the consideration of the Government of India. I am to point out that the Rule 178 A which in 1890 the Government of India proposed to insert in the Indian Emigration Rules is not included in the latest edition of those Rules (1892).

Extracts from Journal of Surgeon Superintendent of *Grecian*, 1894.
Immigration Agent General, to Analytical Chemist, British Guiana, 12th December 1894.
Minute by Analytical, Chemist, 17th December 1894.
Crown Agents, to Colonial Office (Extract), 24th July 1895.
Government, British Guiana, No. 305, to Secretary of State, 14th September 1895.
Colonial Office, to Crown Agents, 12th October 1895.
Crown Agents, to Colonial Office, 16th November 1895.

Extracts from the Journal of the Surgeon Superintendent of the barque "Grecian."

September 5th.—Found on adding Ammon: Sulphide to the non-alcoholic lime-juice supplied that a slight discolouration occurred, so slight as hardly to be noticeable.

November 13th.—I tested according to the printed directions both the alcoholic and non-alcoholic lime-juices to-day. The former which alone has been served out to the immigrants gave a decided reaction for lead or copper. When tested on September 5th, there was only the faintest possible discolouration, in fact so slight that I decided to disregard it after trying the effect of repeated doses on myself. But the sample tested to-day showed considerably more change of colour, and I have decided to discontinue its use altogether. On September 5th I did not test the alcoholic lime-juice, *i. e.*, that which is served out to the crew, but did so to-day and found the reaction for lead or copper with Sol. of Ammon: Sulphide infinitely greater than with that of the lime-juice which I had served out to the coolies. Ghee, etc., was found to be unadulterated by either lead or copper. Water also gave no reaction. I have not the materials on board for a thorough analysis, but am inclined to think that the reaction given by the non-alcoholic lime-juice may possibly be due to iron, as the precipitate is to a considerable extent soluble in H. C. I.

No cases of lead poisoning or anything resembling it have taken place among either the emigrants or crew.

November 14th.—If the precipitate now given (in lime-juice) be due to lead, it is probably a solution made by the acid juice from the glass in the bottle, which has increased in strength with time, as two months ago there was not sufficient reaction to justify me in withholding the non-alcoholic juice from the people as there is now. The addition of strong ammonia does not give the characteristic indication of copper, but I am unable to give any decided opinion on this point as the means at my disposal are very limited, and I have no work on general analysis with me. I am unable to test for iron having no cyanides which are as far as I remember the reagents required.

No. 3131—94, dated 12th December 1894.

From—A. H. ALEXANDER, Esq., *Immigration Agent General, British Guiana,*
To—*The Secretary to the Government of British Guiana.*

I HAVE the honour to forward for the information of the Governor, extracts from the Journal of the Surgeon Superintendent of the ship *Grecian* which arrived with Indian immigrants from Calcutta on the 10th instant in regard to the lime-juice shipped in Calcutta for the use of the immigrants, and as he is of opinion that lead or copper has been made use of in the preparation of this article, I would submit that it is of great importance that an analysis should be made by the Government Analytical Chemist, and I now forward two bottles for that purpose, one of "non-alcoholic" and one "fortified."

Dated 14th December 1894.

Memo from—*The Secretary to the Government of British Guiana,*
To—*The Government Analytical Chemist.*

To the Government Analytical Chemist with the request that the samples may be tested.

Dated 17th December 1894.

From—J. B. HARRISON, Esq., *Government Analytical Chemist,*
To—*The Secretary to the Government of British Guiana.*

NEITHER of the samples contain traces of lead or copper. Traces of iron are present in them. I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it. The bottles used do not contain lead.

Dated Downing Street, London, S. W., the 24th July 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*
To—*The Under-Secretary of State, Colonial Office.*

WITH regard to the remark of the Government Analytical Chemist of British Guiana upon the question raised by the Surgeon Superintendent as to the quality of the lime-juice, *viz.*, "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it," I beg to point out that the tests prescribed are those recommended by the late Government Analytical Chemist of British Guiana in his report for the year 1888 (Governor 312—89), and that this recommendation was adopted by the Government of India and the tests were made a Rule 178 A note for the emigration service in August 1890.

I enclose a copy of a letter from Dr. Oliver, who was Surgeon Superintendent of the *Grecian*, showing that in making his tests he proceeded strictly in accordance with the regulations, and I beg to add that the correspondence having been submitted to the annual Conference of Surgeons Superintendent they express the opinion that "the tests seem to us adequate and are those prescribed by the Government of India as suggested by the Government of British Guiana."

I beg, therefore, to request that the origin of the tests prescribed may be pointed out to the Government of British Guiana.

Circular No. 17, dated Downing Street, London, S. W., the 31st October 1890.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*
To—*All Surgeons Superintendent of Coolie Emigrant Vessels.*

I SUBJOIN, for your information and guidance, the following Rule which has recently been made by the Indian Government:

"After Rule 178, Chapter V, Section III, page 68, add the following:—

"178 A. The drinking-water, lime-juice, ghee, flour, rice, meal, etc., shall be frequently tested by the Surgeon Superintendent for the purpose of detecting the presence of lead or copper therein."

"NOTE.—The following is an extract from the Report of the Government Analytical Chemist of British Guiana for the year 1888:—

"The most noteworthy of the poisoning cases was that of the captain and crew of the East Indian ship . . . who reached this port suffering from chronic lead poisoning. The water on board being suspected, seven samples of it were brought to the laboratory by the Health Officer. No lead being detected, it was determined to examine such of the ship's stores as were used in common by captain and crew. These were tea, lime-juice and ghee. The latter was found to be the cause of the mischief, as it contained 5·12 grains of lead to the

pound. Those attacked recovered under treatment at the Colonial Hospital although some but narrowly escaped death. Had the . . . carried immigrants, the consequences of using such ghee would no doubt have been very disastrous especially if the Medical Superintendent had not possessed the means of detecting lead, and as would be probable, suspected only the water.

"To provide against such a mishap occurring, it might be advisable to include amongst the medical stores a simple and ready test for lead. A small bottle of sulphide of ammonium one of strong hydrochloric acid, and a piece of glass rod would be sufficient.

"To test the water a cup or any small white vessel should be about half filled with it and a drop of sulphide stirred in with the glass rod. Any iron, lead, or copper contained in the water even to a smaller extent than one-tenth of a grain per gallon would be shown by an inky colouration appearing more or less deep according to the quantity. Should such a change occur then a drop of hydrochloric acid should be stirred in, when the colour will disappear instantly if due to iron, but persist if due to lead or copper. It is unnecessary to distinguish between lead and copper, as both are highly dangerous.

"To test lime-juice two or three drops of the sulphide may be added to a small quantity. A darkening indicates lead or copper.

"To test ghee, flour, rice, meal or any light coloured food, about 30 minims of sulphide and an equal measure of the acid should be added separately to two ounces of water and a portion of the food well stirred with the mixture, lead or copper being indicated by the darkening that occurs. Tested in this manner, the ghee from the . . . . . became like boot blacking. The materials for the test cost only a few pence."

In scale 3, schedule G, page 96, make the following changes:—

Against "Acid, Hydrochloric fort:" in columns, "Measure" substitute "6 oz. 4 dr." for "1 oz. 4 dr." and "6 oz 6 dr." for "6 dr."

Between "Ammonia spirit aromatic" *and* Antim, tart," insert "Ammonia, sulphide;" and against it in columns "Measure" insert "1 oz."

From—DR. STUART OLIVER, *Surgeon Superintendent of the barque "Grecian,"*
To—*The Crown Agents for the Colonies.*

I HAVE the honour to acknowledge the receipt of your communication of April 1st, 1895, referring to the suspected presence of either lead or copper in the lime-juice supplied to the barque *Grecian* last year.

I proceeded most strictly, in my analysis, in accordance with the printed directions furnished to me, performing "check" tests on each occasion.

I myself had some suspicion of the inadequacy or fallacy of the tests suggested but had no other chemical, etc., agent but the ammonium sulphide and hydrochloric acid on board. I have none of my papers with me here, so am unable to refer to the text of the directions.

Both samples of lime-juice, especially the alcoholic gave an inky discolouration with the ammonium sulphide which did not clear up on the addition of the acid (except to a slight degree in the case of the non-alcoholic kind), which I still allowed to be issued to the crew after trying considerable quantities on myself, as I suspected the reaction to be due to iron only. The fallacy probably lies therefore in the difficulty which there exists of discriminating between iron and the two poisonous metals by the method prescribed.

This address will be mine until May 20th next.

No. 305, dated Georgetown, Demerara, the 14th September 1895.

From—SIR C. C. LEES, K.C.M.G., *Governor, British Guiana,*
To—THE RIGHT HONOURABLE J. CHAMBERLAIN, M.P.

REFERRING to your despatch of the 2nd ultimo marked "Emigration" with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie emigrants, I have the honour to transmit herewith a minute on the subject by the Government Analyst. Professor Harrison is of opinion that the test should be modified in the manner described in the note prepared by him which forms the second enclosure to this despatch, and I would suggest that the Indian Government be approached with this object in view.

Minute by the Government Analyst.

ALTHOUGH such a high authority as the "annual conference of Surgeons Superintendent" consider that the test laid down for the presence of copper or lead in lime-juice is adequate, I am not prepared to admit the point. If the members of that conference had been acquainted with the results of recent work regarding the detection of traces of lead in organic acids such as citric (lime-juice) and tartaric, I believe that they would have expressed a very guarded opinion.

Dr. Stuart Oliver evidently used the greatest care in the matter and obtained results exactly similar to those which I have obtained with the same lime-juice when using yellow (old) sulphide of ammonium, and adding hydrochloric acid after addition of the sulphide.

Now, when newly prepared sulphide of ammonium was used on the same lime-juice no such reaction occurred, and I, using the most accurate methods of analyses, in addition could not detect any traces of copper or lead. Dr. Oliver's crucial experiment on himself also failed to detect the presence of lead. Surely such facts point to a fallacy underlying the test as at present applied. Mr. Francis in his report of course assumed that such sulphide of ammonia as an analyst would employ would be used. I believe also that he had not an opportunity of personally drawing up the details of the test after the writing of his report.

J. B. HARRISON.

The 3rd September 1895.

Note by Professor Harrison, Government Analyst.

THE test ought to be modified thus:—

Hydrochloric acid is to be added to the lime-juice in small quantity (say 10 per cent.) and a few drops of ammonium sulphide afterwards added. A darkening indicates lead or copper.

The sulphide of ammonium must be light coloured.

No. 17455—95, dated Downing Street, London, S. W., the 12th October 1895.

From—JOHN BRAMSTON, Esq., C.B., *Asst. Under-Secretary of State for the Colonies,*

To—*The Crown Agents for the Colonies.*

WITH reference to your letter of the 24th of July last, I am directed by Mr. Secretary Chamberlain to transmit to you a copy of a despatch from the Governor of British Guiana, forwarding a minute by the Government Analyst with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie immigrants, and I am to request that you will obtain the opinion of an Analytical Chemist on the formula suggested by Mr. Harrison for modifying the test as at present prescribed.

No. 305, dated 14th September.

Dated Downing Street, London, S. W., the 6th November 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—The Assistant Under-Secretary of State for the Colonies.

I HAVE the honour to acknowledge the receipt of your letter of the 12th of October, No. 17455—95, requesting that we would obtain the opinion of an Analytical Chemist on the question of the tests required for detecting the presence of lead or copper in lime-juice supplied for the use of coolie emigrant vessels.

In pursuance of these instructions we have sought the advice of Professor Thorpe, the Principal of the Government Laboratory at Somerset House, and I enclose a copy of the letter in which we submitted the question to him and of his report thereon.

Professor Thorpe's recommendation will entail an alteration of the Rule No. 178 A of the Government of India relating to Colonial Emigration, and I beg to request that a copy of the correspondence may be sent to the Government of India with the suggestion that the necessary notification of the amendment in the rule may be issued as speedily as possible.

Meanwhile the correspondence will be communicated to the next Conference of Surgeons Superintendent for their information and guidance.

Dated Downing Street, London, S. W., the 28th October 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—Prof. T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House.*

I BEG to enclose a copy of a circular which we issued some years since to the Surgeons Superintendent in charge of coolie emigrant vessels from India to the Colonies furnishing certain instructions to enable them readily and easily to detect the presence of lead, iron or copper in the food and water supplied for the use of the emigrants.

31st October 1890.

The text prescribed has been used without question until last year when one of the Surgeons reported that he had suspected the presence of lead or copper in the lime-juice on board his ship but was unable, although strictly adhering to the instructions laid down in the circular, to determine whether he was correct in his assumption.

The test as the circular shows was suggested by the then Government Analyst of British Guiana, but the present Government Analyst in reporting on the Surgeon's remarks stated "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it."

The question having been again referred to the Government Analyst in British Guiana, seeing that the tests were suggested by his predecessor in that office, we have received through the Secretary of State a copy of a minute by the Analyst modifying the original formula.

I enclose a copy of the minute and amended formula, and we should be much obliged if you would favour us with your opinion on the adequacy of the test now proposed.

Dated Somerset House, London, W. C., the 1st November 1895.

From—Prof. T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House,*

To—The Crown Agents for the Colonies.

IN reply to your communication of the 28th ultimo, I beg to say that I have had a number of tests made to determine the most ready means of detecting the presence of lead or copper in lime-juice, and suitable for the use of Surgeons in charge of coolie emigrant vessels.

As a result of these experiments I recommend that the paragraph to replace that in your Circular No. 17, dated 31st October 1890, should be as follows:—

"To test lime-juice for lead or copper:—

"Pour two ounces of the juice into a white cup or basin add ten drops of Hydrochloric Acid (B. P.—Sp. gr. 1·16) stir with a glass rod, and add five drops of a solution of ammonium sulphide. A darkening indicates lead or copper. If the amount of these metals is small, the darkening will require about ten minutes to attain its maximum intensity."

G. I. C. P. O.—No. 1125 E. & A.—10-2-96—100—J. B. K.

Test prescribed for detecting the presence of poisonous minerals in the lime-juice, etc., supplied for use on emigrant vessels.

No. 119 (Public-Emigration), dated India Office, London, the 19th December 1895.

From—*Her Majesty's Secretary of State for India,*

To—*The Government of India.*

I FORWARD for the consideration of Your Excellency in Council copy of a letter, which has been received from the Colonial Office, giving cover to a correspondence on the subject of the test prescribed for detecting the presence of poisonous minerals in the lime-juice supplied to Indian emigrants.

Colonial Office, to India Office, 26th November 1895. Enclosures.

2. The Rule 178 A was published by a Notification dated 5th August 1890, but it does not appear in the last edition (1892) of the Rules under the Colonial Emigration Act. The test which has now been found defective was suggested in a Report by an Analytical Chemist which seems to have been intended to be printed as a note to that Rule.

F. 12 of 1890. S. 7.

I have, etc.,

GEORGE HAMILTON.

No. 19732—95, dated Colonial Office, Downing Street, London, S.W., the 26th November 1895.

From—EDWARD WINGFIELD, Esq., C.B., *Asst. Under-Secretary of State for the Colonies'*

To—*The Under-Secretary of State for India.*

WITH reference to your letter (No. 1574 J. & P.) of the 13th of September 1890, I am directed by Mr. Secretary Chamberlain to transmit to you copies of the correspondence noted in the margin with regard to the test prescribed for detecting the presence of poisonous minerals in the lime-juice and other stores supplied to East Indian emigrants, and I am to request that you will move Lord G. Hamilton to cause it to be transmitted for the consideration of the Government of India. I am to point out that the Rule 178 A which in 1890 the Government of India proposed to insert in the Indian Emigration Rules is not included in the latest edition of those Rules (1892).

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Extracts from the Journal of the Surgeon Superintendent of the barque "Grecian."

September 5th.—Found on adding Ammon: Sulphide to the non-alcoholic lime-juice supplied that a slight discolouration occurred, so slight as hardly to be noticeable.

November 13th.—I tested according to the printed directions both the alcoholic and non-alcoholic lime-juices to-day. The former which alone has been served out to the immigrants gave a decided reaction for lead or copper. When tested on September 5th, there was only the faintest possible discolouration, in fact so slight that I decided to disregard it after trying the effect of repeated doses on myself. But the sample tested to-day showed considerably more change of colour, and I have decided to discontinue its use altogether. On September 5th I did not test the alcoholic lime-juice, *i. e.*, that which is served out to the crew, but did so to-day and found the reaction for lead or copper with Sol. of Ammon: Sulphide infinitely greater than with that of the lime-juice which I had served out to the coolies. Ghee, etc., was found to be unadulterated by either lead or copper. Water also gave no reaction. I have not the materials on board for a thorough analysis, but am inclined to think that the reaction given by the non-alcoholic lime-juice may possibly be due to iron, as the precipitate is to a considerable extent soluble in H. C. I.

No cases of lead poisoning or anything resembling it have taken place among either the emigrants or crew.

November 14th.—If the precipitate now given (in lime-juice) be due to lead, it is probably a solution made by the acid juice from the glass in the bottle, which has increased in strength with time, as two months ago there was not sufficient reaction to justify me in withholding the non-alcoholic juice from the people as there is now. The addition of strong ammonia does not give the characteristic indication of copper, but I am unable to give any decided opinion on this point as the means at my disposal are very limited, and I have no work on general analysis with me. I am unable to test for iron having no cyanides which are as far as I remember the reagents required.

No. 3131—94, dated 12th December 1894.

From—A. H. ALEXANDER, Esq., *Immigration Agent General, British Guiana,*

To—The Secretary to the Government of British Guiana.

I HAVE the honour to forward for the information of the Governor, extracts from the Journal of the Surgeon Superintendent of the ship *Grecian* which arrived with Indian immigrants from Calcutta on the 10th instant in regard to the lime-juice shipped in Calcutta for the use of the immigrants, and as he is of opinion that lead or copper has been made use of in the preparation of this article, I would submit that it is of great importance that an analysis should be made by the Government Analytical Chemist, and I now forward two bottles for that purpose, one of "non-alcoholic" and one "fortified."

Dated 14th December 1894.

Memo from—The Secretary to the Government of British Guiana,

To—The Government Analytical Chemist.

To the Government Analytical Chemist with the request that the samples may be tested.

Dated 17th December 1894.

From—J. B. HARRISON, Esq., *Government Analytical Chemist,*

To—The Secretary to the Government of British Guiana.

NEITHER of the samples contain traces of lead or copper. Traces of iron are present in them. I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it. The bottles used do not contain lead.

Dated Downing Street, London, S. W., the 24th July 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—The Under-Secretary of State, Colonial Office.

WITH regard to the remark of the Government Analytical Chemist of British Guiana upon the question raised by the Surgeon Superintendent as to the quality of the lime-juice, *viz.*, "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it," I beg to point out that the tests prescribed are those recommended by the late Government Analytical Chemist of British Guiana in his report for the year 1888 (Governor 312—89), and that this recommendation was adopted by the Government of India and the tests were made a Rule 178 A note for the emigration service in August 1890.

I enclose a copy of a letter from Dr. Oliver, who was Surgeon Superintendent of the *Grecian*, showing that in making his tests he proceeded strictly in accordance with the regulations, and I beg to add that the correspondence having been submitted to the annual Conference of Surgeons Superintendent they express the opinion that "the tests seem to us adequate and are those prescribed by the Government of India as suggested by the Government of British Guiana."

I beg, therefore, to request that the origin of the tests prescribed may be pointed out to the Government of British Guiana.

Circular No. 17, dated Downing Street, London, S. W., the 31st October 1890.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—All Surgeons Superintendent of Coolie Emigrant Vessels.

I SUBJOIN, for your information and guidance, the following Rule which has recently been made by the Indian Government:

"After Rule 178, Chapter V, Section III, page 68, add the following:—

"178 A. The drinking-water, lime-juice, ghee, flour, rice, meal, etc., shall be frequently tested by the Surgeon Superintendent for the purpose of detecting the presence of lead or copper therein."

"NOTE.—The following is an extract from the Report of the Government Analytical Chemist of British Guiana for the year 1888:—

"The most noteworthy of the poisoning cases was that of the captain and crew of the East Indian ship . . . who reached this port suffering from chronic lead poisoning. The water on board being suspected, seven samples of it were brought to the laboratory by the Health Officer. No lead being detected, it was determined to examine such of the ship's stores as were used in common by captain and crew. These were tea, lime-juice and ghee. The latter was found to be the cause of the mischief, as it contained 5·12 grains of lead to the

pound. Those attacked recovered under treatment at the Colonial Hospital although some but narrowly escaped death. Had the . . . carried immigrants, the consequences of using such ghee would no doubt have been very disastrous especially if the Medical Superintendent had not possessed the means of detecting lead, and as would be probable, suspected only the water.

"To provide against such a mishap occurring, it might be advisable to include amongst the medical stores a simple and ready test for lead. A small bottle of sulphide of ammonium one of strong hydrochloric acid, and a piece of glass rod would be sufficient.

"To test the water a cup or any small white vessel should be about half filled with it and a drop of sulphide stirred in with the glass rod. Any iron, lead, or copper contained in the water even to a smaller extent than one-tenth of a grain per gallon would be shown by an inky colouration appearing more or less deep according to the quantity. Should such a change occur then a drop of hydrochloric acid should be stirred in, when the colour will disappear instantly if due to iron, but persist if due to lead or copper. It is unnecessary to distinguish between lead and copper, as both are highly dangerous.

"To test lime-juice two or three drops of the sulphide may be added to a small quantity. A darkening indicates lead or copper.

"To test ghee, flour, rice, meal or any light coloured food, about 30 minims of sulphide and an equal measure of the acid should be added separately to two ounces of water and a portion of the food well stirred with the mixture, lead or copper being indicated by the darkening that occurs. Tested in this manner, the ghee from the . . . . . became like boot blacking. The materials for the test cost only a few pence."

In scale 8, schedule G, page 96, make the following changes:—

Against "Acid, Hydrochloric fort:" in columns, "Measure" substitute "6 oz. 4 dr." for "1 oz. 4 dr." and "6 oz 6 dr." for "6 dr."

Between "Ammonia spirit aromatic" *and* Antim, tart," insert "Ammonia, sulphide;" and against it in columns "Measure" insert "1 oz."

From—DR. STUART OLIVER, *Surgeon Superintendent of the barque "Grecian,"*

To—The Crown Agents for the Colonies.

I HAVE the honour to acknowledge the receipt of your communication of April 1st, 1895, referring to the suspected presence of either lead or copper in the lime-juice supplied to the barque *Grecian* last year.

I proceeded most strictly, in my analysis, in accordance with the printed directions furnished to me, performing "check" tests on each occasion.

I myself had some suspicion of the inadequacy or fallacy of the tests suggested but had no other chemical, etc., agent but the ammonium sulphide and hydrochloric acid on board. I have none of my papers with me here, so am unable to refer to the text of the directions.

Both samples of lime-juice, especially the alcoholic gave an inky discolouration with the ammonium sulphide which did not clear up on the addition of the acid (except to a slight degree in the case of the non-alcoholic kind), which I still allowed to be issued to the crew after trying considerable quantities on myself, as I suspected the reaction to be due to iron only. The fallacy probably lies therefore in the difficulty which there exists of discriminating between iron and the two poisonous metals by the method prescribed.

This address will be mine until May 20th next.

No. 305, dated Georgetown, Demerara, the 14th September 1895.

From—SIR C. C. LEES, K.C.M.G., *Governor, British Guiana,*

To—THE RIGHT HONOURABLE J. CHAMBERLAIN, M.P.

REFERRING to your despatch of the 2nd ultimo marked "Emigration" with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie emigrants, I have the honour to transmit herewith a minute on the subject by the Government Analyst. Professor Harrison is of opinion that the test should be modified in the manner described in the note prepared by him which forms the second enclosure to this despatch, and I would suggest that the Indian Government be approached with this object in view.

Minute by the Government Analyst.

ALTHOUGH such a high authority as the "annual conference of Surgeons Superintendent" consider that the test laid down for the presence of copper or lead in lime-juice is adequate, I am not prepared to admit the point. If the members of that conference had been acquainted with the results of recent work regarding the detection of traces of lead in organic acids such as citric (lime-juice) and tartaric, I believe that they would have expressed a very guarded opinion.

Dr. Stuart Oliver evidently used the greatest care in the matter and obtained results exactly similar to those which I have obtained with the same lime-juice when using yellow (old) sulphide of ammonium, and adding hydrochloric acid after addition of the sulphide.

Now, when newly prepared sulphide of ammonium was used on the same lime-juice no such reaction occurred, and I, using the most accurate methods of analyses, in addition could not detect any traces of copper or lead. Dr. Oliver's crucial experiment on himself also failed to detect the presence of lead. Surely such facts point to a fallacy underlying the test as at present applied. Mr. Francis in his report of course assumed that such sulphide of ammonia as an analyst would employ would be used. I believe also that he had not an opportunity of personally drawing up the details of the test after the writing of his report.

J. B. HARRISON.

The 3rd September 1895.

Note by Professor Harrison, Government Analyst.

THE test ought to be modified thus:—

Hydrochloric acid is to be added to the lime-juice in small quantity (say 10 per cent.) and a few drops of ammonium sulphide afterwards added. A darkening indicates lead or copper.

The sulphide of ammonium must be light coloured.

No. 17455—95, dated Downing Street, London, S. W., the 12th October 1895.

From—JOHN BRAMSTON, Esq., C.B., *Asst. Under-Secretary of State for the Colonies,*

To—*The Crown Agents for the Colonies.*

WITH reference to your letter of the 24th of July last, I am directed by Mr. Secretary Chamberlain to transmit to you a copy of a despatch from the Governor of British Guiana, forwarding a minute by the Government Analyst with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie immigrants, and I am to request that you will obtain the opinion of an Analytical Chemist on the formula suggested by Mr. Harrison for modifying the test as at present prescribed.

No. 305, dated 14th September.

Dated Downing Street, London, S. W., the 6th November 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—*The Assistant Under-Secretary of State for the Colonies.*

I HAVE the honour to acknowledge the receipt of your letter of the 12th of October, No. 17455—95, requesting that we would obtain the opinion of an Analytical Chemist on the question of the tests required for detecting the presence of lead or copper in lime-juice supplied for the use of coolie emigrant vessels.

In pursuance of these instructions we have sought the advice of Professor Thorpe, the Principal of the Government Laboratory at Somerset House, and I enclose a copy of the letter in which we submitted the question to him and of his report thereon.

Professor Thorpe's recommendation will entail an alteration of the Rule No. 178 A of the Government of India relating to Colonial Emigration, and I beg to request that a copy of the correspondence may be sent to the Government of India with the suggestion that the necessary notification of the amendment in the rule may be issued as speedily as possible.

Meanwhile the correspondence will be communicated to the next Conference of Surgeons Superintendent for their information and guidance.

Dated Downing Street, London, S. W., the 28th October 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—*Prof.* T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House.*

I BEG to enclose a copy of a circular which we issued some years since to the Surgeons Superintendent in charge of coolie emigrant vessels from India to the Colonies furnishing certain instructions to enable them readily and easily to detect the presence of lead, iron or copper in the food and water supplied for the use of the emigrants.

31st October 1890.

The text prescribed has been used without question until last year when one of the Surgeons reported that he had suspected the presence of lead or copper in the lime-juice on board his ship but was unable, although strictly adhering to the instructions laid down in the circular, to determine whether he was correct in his assumption.

The test as the circular shows was suggested by the then Government Analyst of British Guiana, but the present Government Analyst in reporting on the Surgeon's remarks stated "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it."

The question having been again referred to the Government Analyst in British Guiana, seeing that the tests were suggested by his predecessor in that office, we have received through the Secretary of State a copy of a minute by the Analyst modifying the original formula.

I enclose a copy of the minute and amended formula, and we should be much obliged if you would favour us with your opinion on the adequacy of the test now proposed.

Dated Somerset House, London, W. C., the 1st November 1895.

From—*Prof.* T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House,*

To—*The Crown Agents for the Colonies.*

IN reply to your communication of the 28th ultimo, I beg to say that I have had a number of tests made to determine the most ready means of detecting the presence of lead or copper in lime-juice, and suitable for the use of Surgeons in charge of coolie emigrant vessels.

As a result of these experiments I recommend that the paragraph to replace that in your Circular No. 17, dated 31st October 1890, should be as follows:—

"To test lime-juice for lead or copper:—

"Pour two ounces of the juice into a white cup or basin add ten drops of Hydrochloric Acid (B. P.—Sp. gr. 1·16) stir with a glass rod, and add five drops of a solution of ammonium sulphide. A darkening indicates lead or copper. If the amount of these metals is small, the darkening will require about ten minutes to attain its maximum intensity."

G. I. C. P. O.—No. 1125 R. & A.—10-2-96—100—J. B. K.

Test prescribed for detecting the presence of poisonous minerals in the lime-juice, etc., supplied for use on emigrant vessels.

No. 119 (Public-Emigration), dated India Office, London, the 19th December 1895.

From—*Her Majesty's Secretary of State for India,*

To—*The Government of India.*

I FORWARD for the consideration of Your Excellency in Council copy of a letter, which has been received from the Colonial Office, giving cover to a correspondence on the subject of the test prescribed for detecting the presence of poisonous minerals in the lime-juice supplied to Indian emigrants.

Colonial Office, to India Office, 26th November 1895. Enclosures.

2. The Rule 178 A was published by a Notification dated 5th August 1890, but it does not appear in the last edition (1892) of the Rules under the Colonial Emigration Act. The test which has now been found defective was suggested in a Report by an Analytical Chemist which seems to have been intended to be printed as a note to that Rule.

F. 12 of 1890. S. 7.

I have, etc.,

GEORGE HAMILTON.

No. 19732—95, dated Colonial Office, Downing Street, London, S.W., the 26th November 1895.

From—EDWARD WINGFIELD, Esq., C.B., *Asst. Under-Secretary of State for the Colonies'*

To—*The Under-Secretary of State for India.*

WITH reference to your letter (No. 1574 J. & P.) of the 13th of September 1890, I am directed by Mr. Secretary Chamberlain to transmit to you copies of the correspondence noted in the margin with regard to the test prescribed for detecting the presence of poisonous minerals in the lime-juice and other stores supplied to East Indian emigrants, and I am to request that you will move Lord G. Hamilton to cause it to be transmitted for the consideration of the Government of India. I am to point out that the Rule 178 A which in 1890 the Government of India proposed to insert in the Indian Emigration Rules is not included in the latest edition of those Rules (1892).

Extracts from Journal of Surgeon Superintendent of *Grecian*, 1894.
Immigration Agent General, to Analytical Chemist, British Guiana, 12th December 1894.
Minute by Analytical, Chemist, 17th December 1894.
Crown Agents, to Colonial Office (Extract), 24th July 1895.
Government, British Guiana, No. 305, to Secretary of State, 14th September 1895.
Colonial Office, to Crown Agents, 12th October 1895.
Crown Agents, to Colonial Office, 16th November 1895.

Extracts from the Journal of the Surgeon Superintendent of the barque "Grecian."

September 5th.—Found on adding Ammon: Sulphide to the non-alcoholic lime-juice supplied that a slight discolouration occurred, so slight as hardly to be noticeable.

November 13th.—I tested according to the printed directions both the alcoholic and non-alcoholic lime-juices to-day. The former which alone has been served out to the immigrants gave a decided reaction for lead or copper. When tested on September 5th, there was only the faintest possible discolouration, in fact so slight that I decided to disregard it after trying the effect of repeated doses on myself. But the sample tested to-day showed considerably more change of colour, and I have decided to discontinue its use altogether. On September 5th I did not test the alcoholic lime-juice, *i. e.*, that which is served out to the crew, but did so to-day and found the reaction for lead or copper with Sol. of Ammon: Sulphide infinitely greater than with that of the lime-juice which I had served out to the coolies. Ghee, etc., was found to be unadulterated by either lead or copper. Water also gave no reaction. I have not the materials on board for a thorough analysis, but am inclined to think that the reaction given by the non-alcoholic lime-juice may possibly be due to iron, as the precipitate is to a considerable extent soluble in H. C. I.

No cases of lead poisoning or anything resembling it have taken place among either the emigrants or crew.

November 14th.—If the precipitate now given (in lime-juice) be due to lead, it is probably a solution made by the acid juice from the glass in the bottle, which has increased in strength with time, as two months ago there was not sufficient reaction to justify me in withholding the non-alcoholic juice from the people as there is now. The addition of strong ammonia does not give the characteristic indication of copper, but I am unable to give any decided opinion on this point as the means at my disposal are very limited, and I have no work on general analysis with me. I am unable to test for iron having no cyanides which are as far as I remember the reagents required.

No. 3131—94, dated 12th December 1894.

From—A. H. ALEXANDER, Esq., *Immigration Agent General, British Guiana,*
To—*The Secretary to the Government of British Guiana.*

I HAVE the honour to forward for the information of the Governor, extracts from the Journal of the Surgeon Superintendent of the ship *Grecian* which arrived with Indian immigrants from Calcutta on the 10th instant in regard to the lime-juice shipped in Calcutta for the use of the immigrants, and as he is of opinion that lead or copper has been made use of in the preparation of this article, I would submit that it is of great importance that an analysis should be made by the Government Analytical Chemist, and I now forward two bottles for that purpose, one of "non-alcoholic" and one "fortified."

Dated 14th December 1894.

Memo from—*The Secretary to the Government of British Guiana,*
To—*The Government Analytical Chemist.*

To the Government Analytical Chemist with the request that the samples may be tested.

Dated 17th December 1894.

From—J. B. HARRISON, Esq., *Government Analytical Chemist,*
To—*The Secretary to the Government of British Guiana.*

NEITHER of the samples contain traces of lead or copper. Traces of iron are present in them. I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it. The bottles used do not contain lead.

Dated Downing Street, London, S. W., the 24th July 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*
To—*The Under-Secretary of State, Colonial Office.*

WITH regard to the remark of the Government Analytical Chemist of British Guiana upon the question raised by the Surgeon Superintendent as to the quality of the lime-juice, *viz.*, "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it," I beg to point out that the tests prescribed are those recommended by the late Government Analytical Chemist of British Guiana in his report for the year 1888 (Governor 312—89), and that this recommendation was adopted by the Government of India and the tests were made a Rule 178 A note for the emigration service in August 1890.

I enclose a copy of a letter from Dr. Oliver, who was Surgeon Superintendent of the *Grecian*, showing that in making his tests he proceeded strictly in accordance with the regulations, and I beg to add that the correspondence having been submitted to the annual Conference of Surgeons Superintendent they express the opinion that "the tests seem to us adequate and are those prescribed by the Government of India as suggested by the Government of British Guiana."

I beg, therefore, to request that the origin of the tests prescribed may be pointed out to the Government of British Guiana.

Circular No. 17, dated Downing Street, London, S. W., the 31st October 1890.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*
To—*All Surgeons Superintendent of Coolie Emigrant Vessels.*

I SUBJOIN, for your information and guidance, the following Rule which has recently been made by the Indian Government:

"After Rule 178, Chapter V, Section III, page 68, add the following:—

"178 A. The drinking-water, lime-juice, ghee, flour, rice, meal, etc., shall be frequently tested by the Surgeon Superintendent for the purpose of detecting the presence of lead or copper therein."

"NOTE.—The following is an extract from the Report of the Government Analytical Chemist of British Guiana for the year 1888:—

"The most noteworthy of the poisoning cases was that of the captain and crew of the East Indian ship . . . who reached this port suffering from chronic lead poisoning. The water on board being suspected, seven samples of it were brought to the laboratory by the Health Officer. No lead being detected, it was determined to examine such of the ship's stores as were used in common by captain and crew. These were tea, lime-juice and ghee. The latter was found to be the cause of the mischief, as it contained 5·12 grains of lead to the

pound. Those attacked recovered under treatment at the Colonial Hospital although some but narrowly escaped death. Had the . . . carried immigrants, the consequences of using such ghee would no doubt have been very disastrous especially if the Medical Superintendent had not possessed the means of detecting lead, and as would be probable, suspected only the water.

"To provide against such a mishap occurring, it might be advisable to include amongst the medical stores a simple and ready test for lead. A small bottle of sulphide of ammonium one of strong hydrochloric acid, and a piece of glass rod would be sufficient.

"To test the water a cup or any small white vessel should be about half filled with it and a drop of sulphide stirred in with the glass rod. Any iron, lead, or copper contained in the water even to a smaller extent than one-tenth of a grain per gallon would be shown by an inky colouration appearing more or less deep according to the quantity. Should such a change occur then a drop of hydrochloric acid should be stirred in, when the colour will disappear instantly if due to iron, but persist if due to lead or copper. It is unnecessary to distinguish between lead and copper, as both are highly dangerous.

"To test lime-juice two or three drops of the sulphide may be added to a small quantity. A darkening indicates lead or copper.

"To test ghee, flour, rice, meal or any light coloured food, about 30 minims of sulphide and an equal measure of the acid should be added separately to two ounces of water and a portion of the food well stirred with the mixture, lead or copper being indicated by the darkening that occurs. Tested in this manner, the ghee from the . . . . . became like boot blacking. The materials for the test cost only a few pence."

In scale 3, schedule G, page 96, make the following changes:—

Against "Acid, Hydrochloric fort:" in columns, "Measure" substitute "6 oz. 4 dr." for "1 oz. 4 dr." and "6 oz 6 dr." for "6 dr."

Between "Ammonia spirit aromatic" *and* Antim, tart," insert "Ammonia, sulphide;" and against it in columns "Measure" insert "1 oz."

From—DR. STUART OLIVER, *Surgeon Superintendent of the barque "Grecian,"*
To—*The Crown Agents for the Colonies.*

I HAVE the honour to acknowledge the receipt of your communication of April 1st, 1895, referring to the suspected presence of either lead or copper in the lime-juice supplied to the barque *Grecian* last year.

I proceeded most strictly, in my analysis, in accordance with the printed directions furnished to me, performing "check" tests on each occasion.

I myself had some suspicion of the inadequacy or fallacy of the tests suggested but had no other chemical, etc., agent but the ammonium sulphide and hydrochloric acid on board. I have none of my papers with me here, so am unable to refer to the text of the directions.

Both samples of lime-juice, especially the alcoholic gave an inky discolouration with the ammonium sulphide which did not clear up on the addition of the acid (except to a slight degree in the case of the non-alcoholic kind), which I still allowed to be issued to the crew after trying considerable quantities on myself, as I suspected the reaction to be due to iron only. The fallacy probably lies therefore in the difficulty which there exists of discriminating between iron and the two poisonous metals by the method prescribed.

This address will be mine until May 20th next.

No. 305, dated Georgetown, Demerara, the 14th September 1895.

From—SIR C. C. LEES, K.C.M.G., *Governor, British Guiana,*
To—THE RIGHT HONOURABLE J. CHAMBERLAIN, M.P.

REFERRING to your despatch of the 2nd ultimo marked "Emigration" with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie emigrants, I have the honour to transmit herewith a minute on the subject by the Government Analyst. Professor Harrison is of opinion that the test should be modified in the manner described in the note prepared by him which forms the second enclosure to this despatch, and I would suggest that the Indian Government be approached with this object in view.

Minute by the Government Analyst.

ALTHOUGH such a high authority as the "annual conference of Surgeons Superintendent" consider that the test laid down for the presence of copper or lead in lime-juice is adequate, I am not prepared to admit the point. If the members of that conference had been acquainted with the results of recent work regarding the detection of traces of lead in organic acids such as citric (lime-juice) and tartaric, I believe that they would have expressed a very guarded opinion.

Dr. Stuart Oliver evidently used the greatest care in the matter and obtained results exactly similar to those which I have obtained with the same lime-juice when using yellow (old) sulphide of ammonium, and adding hydrochloric acid after addition of the sulphide.

Now, when newly prepared sulphide of ammonium was used on the same lime-juice no such reaction occurred, and I, using the most accurate methods of analyses, in addition could not detect any traces of copper or lead. Dr. Oliver's crucial experiment on himself also failed to detect the presence of lead. Surely such facts point to a fallacy underlying the test as at present applied. Mr. Francis in his report of course assumed that such sulphide of ammonia as an analyst would employ would be used. I believe also that he had not an opportunity of personally drawing up the details of the test after the writing of his report.

J. B. HARRISON.

The 3rd September 1895.

Note by Professor Harrison, Government Analyst.

THE test ought to be modified thus:—

Hydrochloric acid is to be added to the lime-juice in small quantity (say 10 per cent.) and a few drops of ammonium sulphide afterwards added. A darkening indicates lead or copper.

The sulphide of ammonium must be light coloured.

No. 17455—95, dated Downing Street, London, S. W., the 12th October 1895.

From—JOHN BRAMSTON, Esq., C.B., *Asst. Under-Secretary of State for the Colonies,*

To—*The Crown Agents for the Colonies.*

WITH reference to your letter of the 24th of July last, I am directed by Mr. Secretary Chamberlain to transmit to you a copy of a despatch from the Governor of British Guiana, forwarding a minute by the Government Analyst with regard to the test prescribed for detecting the presence of poisonous minerals in stores supplied to coolie immigrants, and I am to request that you will obtain the opinion of an Analytical Chemist on the formula suggested by Mr. Harrison for modifying the test as at present prescribed.

No. 305, dated 14th September.

Dated Downing Street, London, S. W., the 6th November 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—The Assistant Under-Secretary of State for the Colonies.

I HAVE the honour to acknowledge the receipt of your letter of the 12th of October, No. 17455—95, requesting that we would obtain the opinion of an Analytical Chemist on the question of the tests required for detecting the presence of lead or copper in lime-juice supplied for the use of coolie emigrant vessels.

In pursuance of these instructions we have sought the advice of Professor Thorpe, the Principal of the Government Laboratory at Somerset House, and I enclose a copy of the letter in which we submitted the question to him and of his report thereon.

Professor Thorpe's recommendation will entail an alteration of the Rule No. 178 A of the Government of India relating to Colonial Emigration, and I beg to request that a copy of the correspondence may be sent to the Government of India with the suggestion that the necessary notification of the amendment in the rule may be issued as speedily as possible.

Meanwhile the correspondence will be communicated to the next Conference of Surgeons Superintendent for their information and guidance.

Dated Downing Street, London, S. W., the 28th October 1895.

From—E. E. BLAKE, Esq., *Crown Agent for the Colonies,*

To—Prof. T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House.*

I BEG to enclose a copy of a circular which we issued some years since to the Surgeons Superintendent in charge of coolie emigrant vessels from India to the Colonies furnishing certain instructions to enable them readily and easily to detect the presence of lead, iron or copper in the food and water supplied for the use of the emigrants.

31st October 1890.

The text prescribed has been used without question until last year when one of the Surgeons reported that he had suspected the presence of lead or copper in the lime-juice on board his ship but was unable, although strictly adhering to the instructions laid down in the circular, to determine whether he was correct in his assumption.

The test as the circular shows was suggested by the then Government Analyst of British Guiana, but the present Government Analyst in reporting on the Surgeon's remarks stated "I am not aware what test is laid down by the Crown Agents, but it is one evidently with a fallacy underlying it."

The question having been again referred to the Government Analyst in British Guiana, seeing that the tests were suggested by his predecessor in that office, we have received through the Secretary of State a copy of a minute by the Analyst modifying the original formula.

I enclose a copy of the minute and amended formula, and we should be much obliged if you would favour us with your opinion on the adequacy of the test now proposed.

Dated Somerset House, London, W. C., the 1st November 1895.

From—Prof. T. E. THORPE, F.R.S., *Principal of the Govt. Laboratory, Somerset House,*

To—The Crown Agents for the Colonies.

IN reply to your communication of the 28th ultimo, I beg to say that I have had a number of tests made to determine the most ready means of detecting the presence of lead or copper in lime-juice, and suitable for the use of Surgeons in charge of coolie emigrant vessels.

As a result of these experiments I recommend that the paragraph to replace that in your Circular No. 17, dated 31st October 1890, should be as follows:—

"To test lime-juice for lead or copper:—

"Pour two ounces of the juice into a white cup or basin add ten drops of Hydrochloric Acid (B. P.—Sp. gr. 1·16) stir with a glass rod, and add five drops of a solution of ammonium sulphide. A darkening indicates lead or copper. If the amount of these metals is small, the darkening will require about ten minutes to attain its maximum intensity."

G. I. C. P. O.—No. 1125 R. & A.—10-2-96—100—J. B. K.