Public Works (1897) Department.

G.O., No. 1616 W

DATED 14th June 1897

[Despatch Abstract.]

Chemical Examiner's Report for Pros:

Public Dept reviewing the — for 1896 and requesting the P.W.D. to direct the Consg: Architect to prepare plans & estimates for extending the Chemical Examiner's laboratory & Comp[t] to the Consg: Architect for necessary action

J.

[P.W. 20. 5,000—30-11-96.]

Indexed. 1616

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Public Works (1897) Department

Current Number: 5256

Government {1897} of Madras.

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Enclosures

Spare copies 60.

G.O., &c., Nos. 489, 490, 30th April 1897.

APRIL.

No. 1616 W&I 4.6.97

Communicated to the Consg. Architect for the necessary action, with reference to para 9 of the G.O.

T. H. 14/6/97.

Consd. 2/6/97

C.A. to [illegible] 1/6

Chemical Examiner's Report.

Reviewing the — for 1896, and requesting the Public Works Department to direct the Consulting Architect to prepare plans and estimates for the extension of the Chemical Examiner's laboratory for consideration when the financial outlook will permit. Copy to the Government of India.

12/11/97

O.S. 176/25/6

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

Read—the following papers:—

From Surgeon-Major-General C. SIBTHORPE, F.R.C.P.I., Surgeon-General with the Government of Madras, to the Chief Secretary to Government, dated Madras, 10th April 1897, No. 219.

I have the honour to forward you the annual report for 1896 of the Chemical Examiner to Government, which has been drawn up with great care.

2. I would call attention to his suggestions regarding the extension of his laboratory, with which I concur, and hope that Government will sanction plans and estimates being made out in order that the work may be carried out when funds are available.

3. The point noted by him in paragraph 20 appears an important one and it appears desirable that the facts should be made known to the police and magisterial authorities.

From Surgeon-Major J. L. VanGEYZEL, M.B., F.I.C., F.C.S., Chemical Examiner, to the Chief Secretary to Government (through the Surgeon-General with the Government of Madras), dated Madras, 6th April 1897, No. 393.

I have the honour to submit the annual report of this department for the year 1896.

2. The numerical statement of work done in the past two years is given in the following table:—

Table I.

		Number of cases investigated.		Number of articles examined.	
		1896.	1895.	1896.	1895.
A.—Medico-legal investigations.	I. Cases of suspected human poisoning	104	104	698	620
	II. Blood stains, &c.	32	41	108	155
	III. Seminal stains	12	9	35	26
	IV. Cases of suspected cattle poisoning	51	72	195	247
	Total ..	199	226	1,036	1,048
B.—Miscellaneous analyses.	For Government departments and municipalities ..	959	963	959	963
	For private parties and firms	86	54	86	54
	Total ..	1,045	1,017	1,045	1,017
	Grand Total ..	1,244	1,243	2,081	2,065

3. The total number of investigations and of articles examined was practically alike in the two years, but the medico-legal work has been more expeditiously performed than it has been for several years past. The diminution in the *number* of medico-legal cases has occurred in sections of the work which make comparatively

small demands upon the time and energy of the staff, viz., in cattle cases: but that decrease has been more than counterbalanced by the nature of the work demanded in the examination of an increased number of articles in human-poisoning cases and of articles examined for the Customs department. These latter examinations are not the least important section of the work performed in this laboratory now and they demand a degree of skill and occupy an amount of time which cannot be conveyed by a mere numerical expression of the articles examined. On the whole, the work done has in every way been without exception the heaviest of any year within my experience.

4. In this connection, I wish to mention that the working accommodation in this laboratory has been very severely strained of late, and that portions of work in progress had in several instances to be stopped and postponed on account of the overcrowding which took place with three analysts carrying on work of different sorts in the same room and often perforce on the same counters. On some occasions, in which a large number of articles in medico-legal cases had to be examined, all other work had to be practically stopped for several days, the risk of accidents occuring or of articles getting exchanged and losing their identity during the various steps of their examination being too great to permit of anything else being brought out of their cupboards for examination. In a less degree, the same thing has happened of late in many other instances. The want of a room which can be properly darkened or of a permanent dark room in the laboratory has been felt, and examinations requiring such a room or the use of artificial light have to be carried on at night or in my own dark room at my house, to and from which apparatus have to be conveyed. While I write these remarks a case has been referred to me officially in which photographic methods of investigation are required, and though such demands are not frequent, yet they have been made several times before. Such work cannot be given out for obvious reasons and must be performed personally, of necessity in my house after office hours. A large number of oils and many other substances have required optical methods of examination during the year, and the want of a convenient room suitable for the performance of such work and in which apparatus could be left ready for use has been greatly felt, as much time is lost in setting up and taking down apparatus which are too valuable to be left about. Some of these pieces of expensive and valuable apparatus have to be put right away to prevent damage from laboratory fumes, while others which are in constant use suffer deterioration from this cause at a much greater rate than they would do if suitably accommodated. For the same reason, articles awaiting examination are often crowded out of cupboards and have to be kept unlocked. More working room would also conduce to the health and convenience of the working staff, and for all these various reasons I beg to bring to the notice of Government that the present laboratory accommodation needs expansion, and that this can be effected by an inexpensive extension of the centre room southwards over the flat roof of the Practical Chemistry class-room belonging to the Medical College. The Principal of the Medical College has told me that he would not object to grant this space, and the Consulting Architect, in the course of a visit through the college buildings, said that the indicated extension was feasible. In the interests of the work performed, of apparatus and of articles under examination, which require greater safeguarding, the extension is a necessity which I beg to commend to the notice of Government for as early execution as the present financial pressure will permit.

A.—MEDICO-LEGAL INVESTIGATIONS.

I.—Cases of suspected Human Poisoning.

5. The usual information regarding these cases is furnished in the two following statistical statements:—

TABLE II.—*Human Cases—Class A.*

(Including cases in which viscera or evacuations were examined with or without suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of individuals affected.	Number of deaths.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and realgar.	Arsenious oxide and cinnabar.	Arsenious oxide, mercuric salt and dhatura.	Antimony and mercuric salt.*	Corrosive sublimate and atropine.	Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Ganjah.	Liniment of Camphor, Belladonna, Chloroform and Aconite.	Oleander.	Plumbagin.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Anantapur	2	1	2	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, North	4	2	6	2	35	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, South	4	1	8	3	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Bellary	3	3	3	2	21	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Canara South	2	1	2	2	5	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chingleput	1	..	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore	5	3	7	3	20	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Cuddapah	3	3	3	3	23	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Ganjám	1	1	1	1	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Gódávari	2	1	3	..	7	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	12	10	18	12	107	5	1	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..
Kurnool	8	5	11	5	50	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Madras	6	5	13	3	87	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..
Madura	8	7	12	4	44	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	1	..	..	1	..	..
Malabar	1	..	1	1	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	6	3	11	4	65	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nilgiris	2	2	2	2	14	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Salem	1	1	1	1	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tanjore	5	3	5	5	32	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Trichinopoly	2	2	4	..	29	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tinnevelly	5	4	11	3	28	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Vizagapatam	3	2	3	3	24	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Cochin	1	..	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year. 1896 ..	87	60	129	61	643	30	2	..	..	..	1	..	1	1	1	1	..	3	..	1	1	1	2	3	..	..	3	1	1	1	3	1	1	1	..	..
Total for the year. 1895 ..	82	49	155	60	575	23	8	1	1	1	..	1	..	..	..	..	1	1	1	..	..	..	3	3	1	1	..	..	..	..	..	..	..	..	1	2

* *Vide* case (e) recorded in paragraph 10.

TABLE III.—*Human Cases—Class B.*

(Including cases in which no viscera or evacuations were received for examination, but only suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and dhatura.	Arsenious oxide and realgar.	Arsenious oxide, orpiment and realgar.	Copper salt.	Mercuric salt.	Orpiment.	Organic. Aconite.	Calotropis gigantea.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Arcot, North	1	1	14	..	..	..	..	..	..	..	..	..	..	1	..	..
Arcot, South	1	1	3	..	..	..	..	..	..	..	..	..	1	..	..	..
Bellary	3	2	12	..	..	1	..	..	..	..	..	..	..	1	..	..
Chingleput	1	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	4	3	7	2	..	..	..	..	..	..	..	..	1	..	..	..
Kurnool	2	2	3	..	..	..	2	..	..	..	..	..	..	..	..	..
Madras	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	1	1	2	..	..	..	..	..	..	..	..	..	..	..	1	..
Vizagapatam	2	1	8	1	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year 1896 ..	17	12	55	4	..	1	2	..	..	..	..	..	2	2	1	..
Total for the year 1895 ..	22	15	45	3	1	..	..	1	3	1	1	1	2	1	..	1

6. The percentage of detections to cases examined is compared with that for the previous year in the following table :—

TABLE IV.

—	A. Cases in which viscera or evacuations were examined. Total number of cases.	A. Number of cases in which poison was detected.	A. Percentage of detections.	B. Cases in which only suspected food, &c., was received for examination. Total number of cases.	B. Number of cases in which poison was detected.	B. Percentage of detections.	Total. Total number of cases.	Total. Number of cases in which poison was detected.	Total. Percentage of detections.
1895	82	49	59·75	22	15	68·18	104	64	61·53
1896	87	60	68·96	17	12	70·58	104	72	69·23

7. The ratio of detections to cases examined last year was only 5 per cent. less than in 1894, in which year the highest percentage of detections for a number of years had been recorded. The number of detections has in the year under review surpassed the highest previous record by 3 per cent. A glance at the figures in the margin shows how the detections have risen in the past twelve years, and they bear testimony to the gradually increasing work thrown upon this department by the decline in the number of fictitious cases sent up for examination. Improvements in general methods of work and the gradual extension, in accordance with experience, of checks through the various details of distributed work, may also justly claim a share in the credit of the fewer failures of detection recorded in latter years.

	Percentage of detections.		Percentage of detections.
1884	46·6	1891	52·58
1885	50·0	1892	58·82
1886	56·5	1893	64·75
1887	56·9	1894	66·36
1888	57·48	1895	61·53
1889	66·18	1896	69·23
1890	65·52		

8. In recent annual reports I have endeavoured to review all the known facts in those cases in which chemical examination failed to detect any poison, in order to ascertain how far the failure may have been due to the absence of poison in the articles sent or to other causes outside of the chemical examination. In the year under review there were thirty-two cases in which poison was not detected, which may as usual be dealt with under two headings:—

I.—Eleven cases in which sixteen persons were affected without a fatal result following the circumstances which aroused suspicion of poisoning.

II.—Twenty-one cases in which twenty-one persons died under suspicious circumstances.

Group I.—Of the eleven cases in this group, no persons were affected in three cases. In one of these a black powder was taken from the person of an enemy and turned out to be black ink powder; in the other two some toddy which was suspected on account of its colour, and a substance said to have been given to a female, were found to be free from poison. Four cases have been returned by the magistrates as "false" and the complainants in some have been prosecuted for giving false information. In three cases the magistrates who ordered the chemical examination have not reported the result of their enquiries. From the information at hand, the probability is that these cases were not genuine. The remaining case is one in which five persons suffered from undoubted dhatura poisoning and in which the accused was sentenced to a year's rigorous imprisonment. The purged matter sent for examination did not contain dhatura, and it was not likely to do so.

Group II.—These twenty-one cases fall into three classes:—

Class (a).—Eighteen cases in which the balance of evidence was in favour of death from disease, or from drowning or hanging.

Class (b).—Two cases in which there is not sufficient evidence in favour either of poison or of a natural cause to account for death. In one of these, a byragi was found dead in a choultry, and three days after burial the corpse was exhumed and portions sent here for examination. In the other case, a man was reported to have been seized with vomiting and purging in the fields and died there in a fit. Twenty-five days after burial his corpse was exhumed and the whole contents of the grave were forwarded here. No poison was detected in them; but the preliminary putting together of the parts and their examination in reference to questions of sex, age and identity, &c., proved a very interesting and instructive medico-legal investigation.

Class (c).—One case in which the death has been returned as one of suicide from oleander. No portions of the plant were found in the viscera, nor were any constituents extracted from them which could be identified as those belonging to this plant.

9. Poison was detected in seventy-two cases and the chief statistical information regarding them is summarised below:—

—	Inorganic.	Organic.	Total.
Cases included in Class A	43	17	72
" " in Class B	7	5	
Number of individuals affected in A and B	75	35	110
" of deaths in A and B	30	11	41

Inorganic Poisons.

10. The following are notes of a few of the cases of interest:—

(*a*) Ill-feeling between neighbours ended in the poisoning of two children, of whom one died. An arsenical sweetmeat was the instrument employed. A native quack is reported to have treated the deceased with honey and the "ashes of silk," though silk leaves no ash on ignition. Inevitably the quack's domestic medicine chest was forwarded for chemical examination, and it was found to contain as usual a large number of poisonous pills and powders together with a number of harmless substances such as cinnamon, pepper, chalk, sal-ammoniac, &c. Dried reptilian blood was found to be the contents of one of the packets.

(*b*) A woman put something into her husband's food, at the instigation of her paramour, in order to quench her husband's love. The husband's viscera contained over six grains of white arsenic, and a packet of the love-quenching drug contained over forty-five grains of white arsenic.

(*c*) A man was admitted into a dispensary with multiple injuries, and as he began to get seriously worse, his dying declaration was taken. He, however, rallied and he was then treated with calomel and antimonial powders. On the third day he was suddenly seized with faintness and expired. The relations of the man declared that he died in consequence of "something being wrong about the medicines administered." At the post-mortem examination a penetrating wound was found which extended through the lower part of the left lobe of the liver, and another wound through the chest, penetrating the left auricle of the heart. The serous cavities of the chest and abdomen contained much blood. There could be no doubt that these wounds were sufficient to account for death and must have caused death sooner or later; the wonder was that the man lived so long. But to satisfy the relatives, the viscera were forwarded for chemical examination, but no poison was found in them except in the stomach, which contained small traces of mercury and of antimony. A quantity of excreta also was sent for examination and was found to contain mercury equivalent to a little over one-fifth of a grain of calomel, and antimony equivalent to half a grain of Pulvis Antimonialis of the British Pharmacopœia. Although the death in this case was not due to poison, it has been included among detected poisoning cases in the returns, because there is no other way of returning it; but a foot-note has been added to Table II referring to this record.

(*d*) A child was given some jaggery by a passer-by and narrowly escaped death from mercurial poisoning. The culprit is reported to be still undetected. Nearly a grain of corrosive sublimate was found in a portion of the vomited matter.

(*e*) A man was seized with vomiting and purging soon after eating a meal served as usual by his wife. He continued for six days gradually getting worse. The wife, who was all the time in illicit love with another man, is reported to have "sat on his chest on the seventh day, throttled him with one hand and with the other squeezed the testicles," which were described in the post-mortem notes as in a "pulpy condition." The final injury, no doubt, accelerated the death which was approaching from the effects of arsenical poison. The woman was tried for murder and sentenced to death, but the sentence was, I believe, subsequently reversed on appeal.

(*f*) The proportion of cases in which fatal poisoning by a sulphide of arsenic takes place is very small as compared with the number of cases in which white arsenic is employed. A case occurred in the year under review in which nearly five grains of yellow sulphide of arsenic (orpiment) were found in the stomach and in the vomited matter of a child. When pure, this compound of arsenic is insoluble in water and in hydrochloric acid, and this property always suggests the question as to how such an insoluble compound can be an active poison. The answer is that commercial orpiment contains much arsenious oxide as an impurity, and it is to the presence of this impurity that the poisonous activity of orpiment is attributed.

(*g*) A corpse was found in the bed of a river, and at the post-mortem examination some suspicious particles were observed in the stomach. In the visceral matter sent here I found altogether over 133 grains of white arsenic, some of the partially digested pieces being as large as marbles.

(*h*) In a few cases of arsenical poisoning, the usual irritant symptoms are sometimes absent or only very slight, while nervous symptoms are well marked. Such a case occurred in a child who is reported to have had vomiting in half an hour

after eating some jaggery. It died soon after, evidently in a convulsion, for it is reported that "the eyes rolled upwards and the lips and tongue became blackened". Over thirty-two grains of white arsenic were found in the stomach.

(*i*) A small phial containing some fried Bengal gram was sent for examination, because a person who ate some of this suffered from severe vomiting followed by a metallic taste in the mouth. The gram was found to be intimately mixed with metallic mercury, and over thirty-two grains weight of the metal was mechanically separated from the stuff. Liquid mercury is said not to be a poison, though there are a few recorded cases which show that metallic mercury sometimes does produce poisonous effects, as it undoubtedly did in this case.

(*j*) Two girls are reported to have died from vomiting and purging. Suspicion having arisen, the bodies were disinterred a fortnight after burial. In the pulpy decomposed soft tissue sent from one of the graves, mercury was found equivalent nearly to one-tenth of a grain of corrosive sublimate. In the box of earth from the other grave were found a skull, a lower jaw, and part of a pelvic bone, and from an examination of these it was possible to fix the age of the subject as being between four and seven years. No mercury was found in these bones.

(*k*) In a case of suicide by mercurial poisoning, nearly eight grains of corrosive sublimate were found in the visceral and vomited matters. The unfortunate individual suffered such intolerable agonies from the poison that he rushed into the backyard and jumped into a well from which he was rescued and taken to hospital. He was a photographer by profession, and the chemical examination was extended to every substance found in his dark room, besides the examination of various articles of food and drink, before suspicion which rested upon innocent persons was removed.

(*l*) A novel effect was claimed for arsenic in a case in which a woman narrowly escaped death after drinking milk in which "something" had been mixed, which was said to have "the virtue of imparting a good complexion to her child *in utero*."

Organic Poisons.

11. *Aconite.*—Two cases of poisoning from this cause came under notice, in one of which a native quack poisoned his fiancée's brother because he would not give his consent to their union. The offender in this case was sentenced to death.

Dhatura.—In three cases, parts of the plant were found and identified in the matters examined; and in three, the alkaloid only was detected. Three of the cases were suicidal and proved fatal, which is not a common result of poisoning by this drug. Two cases were accidental, and one was a case in which shepherd boys were drugged in order that their flock might be stolen.

Ganjah.—Only one case of poisoning by this agent was met with in the year.

A liniment (of camphor, belladonna, chloroform and aconite) was drunk by a woman who was in grief for her daughter's death. She soon became profoundly insensible, with pupils almost fully dilated and deep stertor. Prompt treatment with the stomach pump and washing the stomach with Condy's fluid were the means of saving her.

Calotropis Gigantea accounted for three suicidal deaths. In one case a man is reported to have committed the act in a fit of inconsolable grief for the death of a child. The symptoms were reported to be "nausea, tingling of the throat, and a convulsion before death," which took place in three hours.

Plumbagin was detected in three cases in which it had been employed as an abortifacient; and in a fourth case in which it had been so used together with calotropis gigantea.

Colocynth, *Croton*, *Oleander* } was each detected in one case. The two former proved fatal.

Marking Nut.—The juice mixed with gingelly oil was used in one case by a man in order to hurt and disfigure his wife. It is a local irritant and has been used for this purpose in the same way that vitriol is thrown over the body. Fatal results have been recorded where the juice has been externally applied in this way, but happily not in the case under reference.

Opium was detected in two cases only, neither of which ended fatally.

12. The proportion of cases traced to inorganic and organic poisons is shown below:—

Table V.

Year.	Number of cases detected.	Inorganic poison.	Organic poison.	Percentage of column 3 to column 2.
1	2	3	4	5
1896	72	50	22	69·44
1895	64	47	17	73·43
1894	73	56	17	76·71
1893	79	63	16	79·74
1892	80	57	23	71·25

13. The results of the judicial enquiries into the seventy-two cases in which poison was detected may be summarised thus:—

—	Number of cases.	Number affected.	Number died.
(*a*) Without fatal result	33	61	..
(*b*) With fatal result	39	49	41
Total ..	72	110	41

In group (*a*), no results have been communicated in seven cases, eleven have been returned as undetected, struck off and no further proceedings taken; in two the accused are still at large; one is "pending," four were proved to be false; in one the accused was proved to be innocent; one was returned as suicide and another as an accidental death; in one the accused, who were found in possession of over $1\frac{1}{4}$ pounds weight of white arsenic, were bound over for good behaviour; and in four the accused were sentenced to terms of imprisonment up to seven years.

In group (*b*), no results have been communicated in six cases; eight have been returned as suicides, one as false, and six were discharged there being no *primâ facie* case against the accused; in one "the papers were recorded"; one is reported to be "pending"; two ended in imprisonment of three years in each case; in four, death sentence was passed, and two cases ended in sentences of transportation; while eight cases ended in acquittal by a Sessions Court.

II.—Blood Stains.

14. The number of articles examined for blood was less than in the previous year, though the percentage of cases detected to cases received was much higher. Mammalian blood was identified in fifteen out of the twenty-three cases. As usual, identification of human hair, bones, &c., formed a part of the examination in some of the cases. In several of the undetected cases the articles sent for examination had been in a well or had been washed or exposed to rain, and in some the nature of the suspected stains was identified, though no blood was detected in them.

Table VI.—*Blood Cases.*

Districts received from.	Number of cases.	Number of cases in which blood was detected.	Number of examinations.
Anantapur	2	1	6
Arcot, North	2	1	7
Arcot, South	1	1	3
Bellary	6	4	28
Cuddapah	6	6	18
Ganjám	1	1	2
Madras	2	2	6
Madura	2	0	3
Malabar	2	1	3
Nellore	3	1	13
Salem	3	3	7
Tanjore	1	1	3
Vizagapatam	1	1	9
Total for the year { 1896 ..	32	23	108
{ 1895 ..	41	21	155

15. In five cases no judgments have been received, two have been returned as undetected, one as pending; in four the accused were discharged after preliminary enquiry; and in twenty the cases were tried by a Sessions Court, ending in acquittals in twelve cases, death sentences in five, transportation for life in two, and long imprisonment in one case.

III.—Seminal Stains.

Table VII.

Districts received from.	Number of cases.	Number of cases in which semen was detected.	Number of examinations.
Anantapur	1	..	2
Arcot, North	4	1	9
Bellary	1	..	2
Chingleput	2	..	2
Madras	1	..	1
Madura	1	..	3
Nellore	1	..	12
Tanjore	1	1	4
Total for the year { 1896 ..	12	2	35
{ 1895 ..	9	..	26

16. The articles received for examination of suspected seminal stains during the latter portion of the year were, I am glad to report, packed with scrupulous care; and I was able to detect spermatozoa on the stains in two cases received during September. In one of these two cases the offender was sentenced to two years' rigorous imprisonment, and in the other the proof of the offender's identity failed. Of the ten cases in which no sperms were detected, two were in the case of suicidal deaths of women, by strangulation and by hanging, in which stains were found on the clothes; in one case, no judgment has been received; one was a case of suspected sodomy in a jail without any other proof beyond the stains; in three, there was no *primâ facie* case at the preliminary enquiry; one ended in acquittal by a Sessions Court, one ended in imprisonment, and the last ended in a sentence of twenty stripes for a mischievous boy who attempted to deflower a child of six years.

IV.—Cases of suspected Cattle Poisoning.

Table VIII.

Districts received from.	Class A. Number of cases.	Number of deaths.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and metallic mercury.	Calotropis gigantea.	Croton seeds.	Strychnine.	Class B. Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Orpiment.
Anantapur	3	3	1	9	1	..	..	..	..	..	1	1	1	1	..
Arcot, North	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Bellary	3	3	1	10	..	..	..	1	..	..	..	..	..	..	..
Coimbatore	3	3	3	9	3	..	..	..	..	..	1	..	1	..	..
Cuddapah	3	6	3	21	3	..	..	..	..	..	..	..	..	..	..
Ganjám	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gódávari	1	1	..	1	..	..	..	..	..	..	1	1	1	1	..
Kistna	8	10	6	40	6	..	..	..	..	..	1	1	1	1	..
Kurnool	4	4	4	18	4	..	..	..	..	..	3	3	5	3	..
Madras	2	2	1	8	..	..	..	..	1	..	1	1	1	1	..
Madura	1	1	1	4	1	..	..	..	..	..	..	..	..	..	..
Malabar	3	4	1	19	..	..	1	..	..	..	..	..	..	..	..
Nellore	2	3	2	12	2	..	..	..	..	..	1	..	1	..	..
Salem	1	1	1	5	1	..	..	..	..	..	..	..	..	..	..
Tanjore	2	2	2	5	1	..	..	1	..	..	1	1	1	1	..
Trichinopoly	2	4	2	10	2	..	..	..	..	..	..	..	..	..	..
Tinnevelly	2	2	2	11	2	..	..	..	..	..	..	..	..	..	..
Total for the year { 1896 ..	40	49	30	182	26	..	1	2	1	..	11	9	13	9	..
{ 1895 ..	55	69	44	225	42	1	..	..	..	1	17	11	22	10	1

17. The bulk of these cases were, as usual, cases in which arsenic had been employed. In two of them the juice of calotropis gigantea had been introduced on rags into the lower bowel of the animal.

B.—MISCELLANEOUS ANALYSES.

Examinations made for Government Departments, &c.

Received from	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Accountant-General, Madras	One thousand rupees for separate weighment	1	1
Board of Revenue, Madras	Salt	520	615
	Beer	65	
	Porter	1	
	Barks and leaves found in toddy ..	3	
	Arrack	7	
	Sonti soru	1	
	Raisin wine	9	
	Lakhium	2	
	Plantain sap	1	
	Opium	2	
	Spent wash	3	
	Spirit distilled from wash mixed with spent wash	1	
Commissariat Department, Madras	Brown sugar	2	3
	Rum	1	
Collector of Sea Customs, Madras	Blasting gelatine	8	..
	Dynamite	1	
	Petroleum	1	

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of exminations for the year.
Collector of Sea Customs, Madras—*cont.*	Oil, Kerosine	23	149
	,, Turpentine	7	
	,, Raw linseed	4	
	,, Boiled linseed	3	
	,, Double boiled linseed	3	
	,, Pale boiled	1	
	,, Bloomless raw	4	
	,, Rangoon	1	
	,, Ice Factory	1	
	,, Spindle	1	
	,, Special gas	1	
	,, Compressor	1	
	,, Heavy mineral	2	
	,, Olive	7	
	,, Lucca	1	
	,, Amygdal Dulc.	1	
	,, Santal Flav.	1	
	,, Copaiba	1	
	Paint, &c., white zinc	11	
	,, red lead	1	
	,, lemon chrome	5	
	,, best lemon yellow	2	
	,, lemon yellow	1	
	Dye, soluble violet	1	
	,, roccelline	2	
	,, magenta crystals	1	
	,, scarlet R	1	
	,, fast stick lac	1	
	Silver thread	1	
	Gum Copal	1	
	Pepsina Porci	1	
	Pyny Pectoral	1	
	Amer d'or (bitter)	1	
	Extrait d'Absinthe	1	
	China Serravallo ferruginosa	1	
	Essence of ginger ale	1	
	,, Jamaica ginger	1	
	,, lemon	1	
	Coca tonic champagne	1	
	Coca wine	1	
	Quinine tonic	1	
	Syrup Hematic Hypophosphitis	1	
	Ammonium Sulphate	1	
	Superphosphate manure	1	
	Liquor waste	1	
	Kainite	1	
	Caoutchoucine	1	
	Methylated spirits	3	
Collector of Gódávari	Sulphurous earth	29	4
Collector of South Arcot	Mineral earth	3	
Collector of Cuddapah	Caoutchoucine	1	
Commissioner of Police, Madras	Opium	12	12
Civil Surgeon, Cocanada	Kulloy and cooking vessels	1	1
Executive Engineer, Madura Division	Ganjah	6	6
Head Assistant Magistrate, Musiri	Water	1	1
Jail Department. For all Jails	Suspected stupefying drug	1	1
	Standard solutions for water analyses	4	4
Her Majesty's Penitentiary, Madras.	Water	9	55
District Jail, Madura	Do.	2	
Do. Nellore	Do.	7	
Do. Berhampur	Do.	2	
Do. Palamcottah	Do.	3	
Central Jail, Trichinopoly	Do.	1	
Do. Coimbatore	Do.	4	
Do. Rajahmundry	Do.	2	
Do. Bellary	Do.	2	
Hill Jail, Russellkonda	Do.	2	
Do. Párvátipuram	Do.	3	
District Jail, Tanjore	Do.	1	
Do. Vizagapatam	Do.	4	
Central Jail, Vellore	Do.	1	
Do. Cannanore	Do.	8	
Do. Salem	Do.	2	
Medical Officer, Station Hospital, Pallávaram	Do.	2	
Do. do. Ramandrug	Do.	2	
Medical Officer, 6th Regiment, Madras Infantry, Berhampur	Do.	2	2
Medical Officer, 20th Regiment, Madras Infantry, Vizianagram	Do.	3	3
Medical Storekeeper to Government, Madras Command	Do.	2	2
	Carbolic powder	4	4
		1	1

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Municipalities and District Boards. Madras	Sewage	2	23
	Water	4	
Cochin	Do.	1	
Gudiyáttam	Do.	1	
Madura	Do.	2	
Walajapet	Do.	2	
Palamcottah	Do.	1	
Bellary	Do.	3	
Trichinopoly	Do.	2	
Ootacamund	Do.	3	
Guntúr	Do.	1	
Bangalore	Poudrette	1	
Officer in charge of Telegraph Stores, Madras	Disinfecting powder	5	5
Ordnance Officer, Arsenal, Madras	Liquor, Potassium Ferricyanide	1	8
	Sodium bi-carbonate	1	
	Soda crystals	1	
	Bees' wax	1	
	White arsenic	1	
	Borax	1	
	Shellac	1	
	Camphor	1	
Presidency Magistrate, Black Town, Madras	Milk	2	2
Resident Medical Officer, General Hospital, Madras.	Silver wire	1	2
	Urinary gravel	1	
Railway. Bezwada-Madras	Water	11	16
East Coast	Water	5	
Sanitary Commissioner, Madras	Salt found in bed of Hagari river	1	1
Senior Medical Officer, General Hospital, Madras	Antiseptic gauze	1	2
	Pathological fluid	1	
Second Physician, General Hospital, Madras	Ascitic fluid	1	4
	Morphia mixture	1	
	Liquor Morphiæ Hydrochloratis	1	
	Hydrochlorate of Morphia	1	
Stationary Sub-Magistrate, Ernad	Suspected opium	1	1
,, ,, Tindivanam	Suspected explosives	6	6
,, ,, Sáttúr	Suspected intoxicating drug	1	1
Second-class Magistrate, Negapatam	Lakhium	4	4
,, ,, Vanur	Illicit salt	1	1
Superintendent of Stationery, Madras	Inks	12	12
,, of Leper Hospital, Madras	Specific for leprosy	1	1
,, of Government Lunatic Asylum, Madras.	Water	1	1
,, of Central Museum, Madras	Minerals	5	5
Private Parties and Firms	Water	13	86
	Silica	1	
	Cement	4	
	Limestone	1	
	Earth	1	
	Mineral	1	
	Clay	2	
	Jaggery	16	
	Brown sugar	2	
	Molasses	1	
	Kerosine oil gas	1	
	Scotch shale oil gas	1	
	Hydrocarbon deposit from compressed shale oil gas.	1	
	Dynamite	11	
	Stonite	2	
	Carbonite	2	
	Gelignite	2	
	Blasting gelatine	3	
	Fish guano	3	
	Poudrette	1	
	Cuttle-fish shells	1	
	Sulphated salt	1	
	Phosphatic nodules	1	
	Castor poonac	2	
	Ground phosphates	1	
	Gas liquor	1	
	Skin	1	
	Leather washers	1	
	Castor oil	1	
	Beer	2	
	Ragi flour	4	
	Indigo	1	
	Total	1,045	1,045

18. *Analyses for the Board of Revenue*, which have about doubled in the past five years, show again a slight increase over last year's work. The number of assistants granted by the Board is, however, two—the same as when the special staff for salt analyses was first sanctioned. These assistants however not only do salt work, but they also assist in the miscellaneous work of the laboratory generally. The number of malt liquor samples examined was double that of the previous year, and the remaining articles were examined chiefly for adulteration and for alcoholic value.

19. *Mineral Earths.*—A sample of earth obtained from Korukonda Hill, in the Rumpa Agency, and said to be used by the potters there for polishing pots, was found to contain graphite. It contained lumps of impure graphite scattered through the earth and an average sample yielded twenty per cent. by weight of carbon. Three samples of earth from Narsapur taluk (Gódávari) were examined and found to contain natural sulphur, two of the samples having as much as 50 and 56 per cent. of it. With heavy prices to be paid for imported sulphuric acid, and phosphatic nodules awaiting conversion on a paying scale, it might be worth making further enquiries, unless Government have already received a report from the Collector of Gódávari as to the extent of these sulphur deposits and the feasibility of locally manufacturing sulphuric acid.

20. *Incendiarism.*—Six alleged "explosive" substances were forwarded for examination by a Sub-Magistrate under the following circumstances. A thatched building suddenly caught fire, but fortunately the fire was got under. When the grass roof was being dismantled, some small packets were discovered in the thatch and witnesses spoke to having seen a man with similar packets in his waist meddling with the roof. On examination, I found small pellets of moist cowdung enclosed in wet rags. These pellets fumed on exposure to air and were proved to contain phosphorus by their yielding spontaneously inflammable phosphoretted hydrogen, when heated with an alkali. The incendiary evidently knew that phosphorus would not inflame spontaneously when protected from contact with air, and so he judiciously diffused it in wet cowdung and wrapped the whole in damp rags. There can be no doubt that the villain did this to gain time and make his escape, for the phosphorus would not inflame until the coverings had got dry by the heat of the sun. Many village fires, arising from untraced causes and apparently spontaneous, may be explained in the light of this detection.

It is not often that the rule is carefully observed as to giving intimation to the Chemical Examiner whether articles sent to him for examination should be returned or not; but in this case the officer forwarding these "explosives" specially intimated that "none of the articles need be returned after examination."

Analyses for the Customs Department.

21. *Methylated Spirits.*—There were twenty-nine samples examined for the Collector of Sea Customs, and of these sixteen were rejected as insufficiently rendered unfit for consumption. There were also fifteen samples of caoutchoucine examined and found to be of proper strength for spoiling spirits.

In the course of some public comments upon an abkári prosecution it was recently stated that a method of rendering palatable spirit which had been methylated must be known to natives; and statements were made which were evidently based on a misunderstanding of what was meant by "methylated spirit." This expression is correctly applied to spirit which has been spoiled by methyl alcohol, or wood spirit; and confusion has been introduced by applying the expression also to spirit which has been spoiled by "caoutchoucine." It is the latter agent which is employed for spoiling country-made spirit, and such spirit should consistently be called "caoutchoucined spirit," reserving the former expression for imported spirit which has been spoiled, before importation, by methyl alcohol. At any rate it is the spirit spoiled with caoutchoucine which is common in the bazaars and which gives the familiar turbidity on the addition of water to it; and there is certainly no known method of separating the spoiling agent and rendering such spirit palatable, although a case came to my notice in which a native was stated to have drunk caoutchoucined

spirit while in a very drunken fit. Spirit spoiled with "methyl alcohol" is however as a matter of fact not permitted to pass, since the orders of Government are that methylated spirit should have been spoiled with "*crude wood spirit*" but not with the rectified wood spirit known as methyl alcohol. It is the contravention of this rule which has led to the rejection of the sixteen samples referred to and of several other samples in previous years. The "*methylated spirit*" which is passed into consumption has satisfied me as the testing officer; but as I pointed out in my annual report for 1889, even European palates can relish such spirits on a Sunday, when public houses are closed, then why not natives of this country? The spoiling agent has, since I wrote those remarks, been changed in Great Britain, and the introduction of the change here also may be advisable.

22. *Oils, Paints, Colours, &c.*—Excluding 23 samples of kerosine-oil examined under the Petroleum Act, there were 41 samples of other oils examined for the Customs department chiefly under the Merchandise Marks Act. These included 12 samples of lubricating and heavy mineral oil, 7 of turpentine, 11 of linseed oil, 8 of olive oil, and 3 of essential oils. The whole of the seven samples of turpentine were found to be adulterated, with foreign hydrocarbon oil, some to the extent of 75 per cent. Of the eleven samples of linseed oil, six were found to be practically pure and the rest were adulterated with mineral oil, one sample to the extent of 77 per cent. The amendment of the definition of the word "Petroleum" in the Petroleum Act, so as to include such mixtures, has been under the consideration of the Government of India. Of the eight samples of olive oil examined, five were found to be adulterated. Of the three essential oils examined, one declared to be sandalwood oil was grossly adulterated. There were twenty samples of paints and colours examined, chiefly zinc white, red lead, and yellow chromes; and of these only three chromes were found to be practically pure, the rest being all more or less adulterated.

It is impossible to give any idea of the attempts to conceal the sophistications perpetrated, especially in the case of oils. Some of the frauds are well thought out, others again are equally clumsy. While the identification of a pure oil is a matter of comparative ease, the detection of every individual oil, in a mixture of even two oils, is frequently a task of great difficulty. The physical properties of oils, such as their specific gravity, solidifying point, odour, taste, and their general colour reactions and "temperature re-action", do to some extent afford important indications of the purity of the substances under examination; but many of these properties are kept within normal limits by judicious admixture of oils having widely different properties. In fact, the methods of sophistication have developed into a technical art, and the detective chemist must keep himself posted up in the ever increasing methods of testing which are called forth by the discovery of new adulterants and revealed in current literature. These less reliable properties of an oil referred to cannot be totally ignored and must be investigated, and the analyst has, in addition, to split the mixture of oils into their chemical constituents and to endeavour to identify them. The separation and the examination of the fatty acids is compulsory, their melting and solidifying points, the percentage amount of volatile and of insoluble fatty acids, the proportion of such unsaturated acids, the saponification value of the oils, their optical behaviour tested by the spectroscope and the polariscope, and a number of other constants have to be determined for each oil before sufficient data can be obtained for getting an inkling of the direction in which to look for any adulterants which may be present. I particularise these facts here because although the number of samples of oil examined appear small, when expressed by the number 41, yet the actual number of analyses performed upon them could not be much under 400.

In addition to these there were examined for the Customs department several dyes, explosives, various drugs and patent medicines, chemical manures and sundry other imported articles, for purposes of classification and of levying duty.

23. The principal miscellaneous analyses for other departments consisted of the examination of articles for purity on behalf of the Arsenal and Commissariat, minerals for the Central Museum, inks for the Stationery department, opium, ganjah, disinfectants and pathological substances for various other departments, and chiefly manures, cements and sugars for private parties. As usual, a large number of water

analyses were performed on behalf of municipalities and the Jail department, to ascertain the quality of water for drinking purposes. A number of waters was also examined for the East Coast Railway and for the Madras-Bezwada Railway to ascertain their fitness for drinking and for locomotive purposes.

24. The service books of the establishment are up to date, and the inventory of valuable stock has been kept and duly checked in accordance with G.O., No. 920, Financial, dated 18th September 1893.

25. The concluding tabular statement of medico-legal work performed during the year is appended as usual.

[Statement

TABLE IX.—*Tabular Statement for the year.*

Nature of work.	Total number of cases.	Total number of articles received for examination.	Total number of cases in which poison was detected.	Total number of cases in which blood was detected.	Total number of cases in which semen was detected.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, mercuric salt and dhatura.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide, orpiment and realgar.	Arsenious oxide, orpiment and metallic mercury.	Arsenious oxide and cinnabar.	Arsenious oxide and realgar.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Antimony and mercuric salt.	Copper salt.	Corrosive sublimate and atropine.	Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Ganjah.	Liniment of camphor, belladonna, chloroform and aconite.	Oleander.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Human cases. { Class A ..	87	643	60	..	..	30	2	1	1	..	..	..	..	1	..	..	1	..	1	..	3	..	1	1	1	2	3	1	..	5	1	1	1	3	1	1	1	2	2	4
Class B ..	17	56	12	..	..	4	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blood stains, &c. ..	32	108	..	23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Semina stains ..	12	35	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cattle cases. { Class A ..	40	182	30	..	..	26	..	..	..	..	..	1	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Class B ..	11	13	9	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	1	..	2	..	4	..	1	1	1	1	..	..	..	..	..	..	..	..	..	..
Examinations for Government departments	959	959	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Examinations for private parties and firms	86	86	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year 1896	1,244	2,081	111	23	2	69	2	1	1	..	2	1	1	1	..	2	1	1	1	1	4	1	1	2	1	4	3	1	1	5	1	1	2	3	1	1	2	2	2	4
Total for the year 1895	1,243	2,065	119	21	..	78	8	..	1	1	1	..	..	1	2	1	1	..	..	1	3	..	1	..	..	2	1	..	..	1	..	..	..	1	..	..	..	1	..	1	..

Order—No. 489, Public, dated 30th April 1897.

From the statement in paragraph 2 of the report it appears that, while the total number of investigations made and articles examined by the Chemical Examiner in 1896 remained about the same as in the previous year, there was a decrease under medico-legal investigations and an increase under miscellaneous analyses.

2. The total number of cases of suspected human poisoning was the same as in 1895, viz., 104; the percentage of detections, however, reached 69·23, surpassing the highest previous record—that of 1894—by 3 per cent. The large percentage of detections is satisfactory as evincing not only increased efficiency in investigation, but also a decrease in the number of fictitious cases sent up for examination.

The attention of all Judicial officers concerned will, with reference to the orders marginally noted, again be drawn to the failure complained of in paragraph 8 of the Chemical Examiner's report. Individual cases of such failure should in future be specially noted by the Chemical Examiner in his annual report. The attention of that officer will at the same time be directed to paragraph 2 of G.O., No. 2418, Judicial, dated 21st November 1893.

G.O., No. 1478, Public, dated 29th June 1885 (paragraph 3).
G.O., No. 1009, Judicial, dated 13th June 1890.

3. Organic poison was discovered in 50 and inorganic in 22 cases, the corresponding figures in 1895 being 47 and 17. These cases referred to 110 persons, and 41 deaths occurred; the corresponding figures in the previous year were 125 and 39, respectively.

4. There were 32 cases of suspected blood stains, and 108 articles were examined, blood being discovered in 23 cases. In 1895, blood was detected in 21 out of 41 cases, 155 articles being examined.

5. In two out of the twelve suspected cases of seminal stains sent up the investigation was successful. In 1895, nine cases were examined with negative results. The Government is glad to note that the articles transmitted in these cases were packed in a completely satisfactory manner.

6. Fifty-one cases of cattle-poisoning were investigated against 72 in the previous year. Arsenious oxide was the agent employed in 35 out of 39 cases in which poison was detected. The percentage of detection was 76·4—the same as in 1895.

7. Analyses were made in 1,045 miscellaneous cases against 1,017 in 1895. There was an increase in the work done for the Board of Revenue and for the Customs Department, the number of investigations being 615 and 149, respectively, against 595 and 91 of 1895.

8. The attention of the Revenue and Judicial Departments, respectively, will be invited to paragraphs 19 and 20 of the report.

9. With regard to the complaint of the Chemical Examiner as to the insufficiency of accommodation in his laboratory, supported by the Surgeon-General, the Public Works Department will be requested to direct the Consulting Architect to prepare plans and estimates for the necessary additions, which will be considered when the financial outlook will permit.

10. The report constitutes, as usual, an interesting and satisfactory record of good work done by the Chemical Examiner.

(True Extract.)

for Chief Secretary.

To the Surgeon-General.
" Sanitary Commissioner.
" Revenue Department.
" Judicial Department.
" Local and Municipal Department.
" Inspector-General of Police.
" Secretary to the Government of Hongkong (with C.L.).
" District Magistrates.
" Sessions Judges.
" Hon'ble the Chief Justice (with C.L.).
" Director of Government Cinchona Plantations, Nilgiris.
Editors' Table. Public Works Dept

Endorsement—No. 490, Public, dated 30th April 1897.

Copy to the Government of India, Home Department.

J. F. PRICE,
Chief Secretary.

Exd. A. Raitt.

Public Works Department.

Government {1897} of Madras.

PUBLIC.

Recd. } 1897. *Enclosures*

Regd. } *Spare copies*

G.O., &c., Nos. 489, 490, 30th April 1897.

No: 1616 W&H 4.6.97
Communicated to the
Consulting Architect for the
necessary action, with reference
to para 9 of the G.O.
H&C.H.B.B
D.W.

APRIL.

The Consulting Architect to Govt.

Chemical Examiner's Report.

Reviewing the — for 1896, and requesting the Public Works Department to direct the Consulting Architect to prepare plans and estimates for the extension of the Chemical Examiner's laboratory for consideration when the financial outlook will permit. Copy to the Government of India.

Table II.—*Human Cases—Class A.*

(Including cases in which viscera or evacuations were examined with or without suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of individuals affected.	Number of deaths.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and realgar.	Arsenious oxide and cinnabar.	Arsenious oxide, mercuric salt and dhatura.	Antimony and mercuric salt.*	Corrosive sublimate and atropine.	Glass.	Mercuric salt.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Anantapur	2	1	2	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, North	4	2	6	2	35	1	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, South	4	1	8	3	17	..	..	..	..	..	..	..	..	..	..	..	..	..
Bellary	3	3	3	2	21	2	..	..	..	..	..	..	..	..	..	..	..	..
Canara South	2	1	2	2	5	1	..	..	..	..	..	..	..	..	..	..	..	..
Chingleput	1	..	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore	5	3	7	3	20	2	..	..	..	..	..	..	..	..	..	..	..	..
Cuddapah	3	3	3	3	23	2	..	..	..	..	..	..	..	..	..	..	..	..
Ganjám	1	1	1	1	13	..	..	..	..	..	..	..	..	..	..	..	..	..
Gódávari	2	1	3	..	7	1	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	12	10	18	12	107	5	1	..	..	..	..	..	..	..	..	..	..	1
Kurnool	8	5	11	5	50	4	..	..	..	..	..	..	..	..	..	..	..	..
Madras	6	5	13	3	87	2	..	..	..	..	..	..	..	..	..	..	..	1
Madura	8	7	12	4	44	2	..	..	..	..	1	..	..	..	..	..	..	..
Malabar	1	..	1	1	8	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	6	3	11	4	65	3	..	..	..	..	..	..	..	..	..	..	..	..
Nilgiris	2	2	2	2	14	2	..	..	..	..	..	..	..	..	..	..	..	..
Salem	1	1	1	1	3	1	..	..	..	..	..	..	..	..	..	..	..	..
Tanjore	5	3	5	5	32	1	..	..	..	..	..	..	..	1	..	..	..	..
Trichinopoly	2	2	4	..	29	..	..	..	..	..	..	..	..	..	..	1	..	1
Tinnevelly	5	4	11	3	28	1	1	..	..	..	..	..	..	..	1	..	..	..
Vizagapatam	3	2	3	3	24	..	..	..	..	..	..	..	1	..	..	..	..	..
Cochin	1	..	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year. 1896 ..	87	60	129	61	643	30	2	..	..	..	1	..	1	1	1	1	..	3
Total for the year. 1895 ..	82	49	155	60	575	23	8	1	1	1	..	1	..	..	..	..	1	1

Districts received from.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Ganjah.	Liniment of Camphor, Belladonna, Chloroform and Aconite.	Oleander.	Plumbagin.	Strychnine.
1	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Anantapur	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, North	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, South	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Bellary	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Canara South	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chingleput	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Cuddapah	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Ganjám	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Gódávari	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..
Kurnool	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Madras	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..
Madura	..	..	..	..	..	1	..	..	1	..	..	..	1	..	..	1	..	..
Malabar	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nilgiris	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Salem	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tanjore	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Trichinopoly	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tinnevelly	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Vizagapatam	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Cochin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year. 1896 ..	..	1	1	1	2	3	..	..	3	1	1	1	3	1	1	1	..	..
Total for the year. 1895 ..	1	..	..	..	3	3	1	1	..	..	..	..	..	..	..	..	1	2

* *Vide* case (e) recorded in paragraph 10.

Table III.—*Human Cases—Class B.*

(Including cases in which no viscera or evacuations were received for examination, but only suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and dhatura.	Arsenious oxide and realgar.	Arsenious oxide, orpiment and realgar.	Copper salt.	Mercuric salt.	Orpiment.	Organic. Aconite.	Calotropis gigantea.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Arcot, North	1	1	14	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, South	1	1	3	..	..	..	..	..	..	..	..	..	..	1	..	..
Bellary	3	2	12	..	..	1	..	..	..	..	..	..	1	..	..	..
Chingleput	1	1	2	1	..	..	..	..	..	..	..	..	..	1	..	..
Kistna	4	3	7	2	..	..	..	..	..	..	..	..	..	..	..	..
Kurnool	2	2	3	..	..	..	2	..	..	..	..	..	1	..	..	..
Madras	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Vizagapatam	2	1	8	1	..	..	..	..	..	..	..	..	..	..	1	..
Total for the year 1896 ..	17	12	55	4	..	1	2	..	..	..	..	..	2	2	1	..
Total for the year 1895 ..	22	15	45	3	1	..	..	1	3	1	1	1	2	1	..	1

6. The percentage of detections to cases examined is compared with that for the previous year in the following table:—

Table IV.

—	A. Cases in which viscera or evacuations were examined.			B. Cases in which only suspected food, &c., was received for examination.			Total.		
	Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.
1895	82	49	59·75	22	15	68·18	104	64	61·53
1896	87	60	68·96	17	12	70·58	104	72	69·23

7. The ratio of detections to cases examined last year was only 5 per cent. less than in 1894, in which year the highest percentage of detections for a number of years had been recorded. The number of detections has in the year under review surpassed the highest previous record by 3 per cent. A glance at the figures in the margin shows how the detections have risen in the past twelve years, and they bear testimony to the gradually increasing work thrown upon this department by the decline in the number of fictitious cases sent up for examination. Improvements in general methods of work and the gradual extension, in accordance with experience, of checks through the various details of distributed work, may also justly claim a share in the credit of the fewer failures of detection recorded in latter years.

	Percentage of detections.		Percentage of detections.
1884	46·6	1891	52·58
1885	50·0	1892	58·82
1886	56·5	1893	64·75
1887	56·9	1894	66·36
1888	57·48	1895	61·53
1889	66·18	1896	69·23
1890	65·52		

after eating some jaggery. It died soon after, evidently in a convulsion, for it is reported that "the eyes rolled upwards and the lips and tongue became blackened". Over thirty-two grains of white arsenic were found in the stomach.

(*i*) A small phial containing some fried Bengal gram was sent for examination, because a person who ate some of this suffered from severe vomiting followed by a metallic taste in the mouth. The gram was found to be intimately mixed with metallic mercury, and over thirty-two grains weight of the metal was mechanically separated from the stuff. Liquid mercury is said not to be a poison, though there are a few recorded cases which show that metallic mercury sometimes does produce poisonous effects, as it undoubtedly did in this case.

(*j*) Two girls are reported to have died from vomiting and purging. Suspicion having arisen, the bodies were disinterred a fortnight after burial. In the pulpy decomposed soft tissue sent from one of the graves, mercury was found equivalent nearly to one-tenth of a grain of corrosive sublimate. In the box of earth from the other grave were found a skull, a lower jaw, and part of a pelvic bone, and from an examination of these it was possible to fix the age of the subject as being between four and seven years. No mercury was found in these bones.

(*k*) In a case of suicide by mercurial poisoning, nearly eight grains of corrosive sublimate were found in the visceral and vomited matters. The unfortunate individual suffered such intolerable agonies from the poison that he rushed into the backyard and jumped into a well from which he was rescued and taken to hospital. He was a photographer by profession, and the chemical examination was extended to every substance found in his dark room, besides the examination of various articles of food and drink, before suspicion which rested upon innocent persons was removed.

(*l*) A novel effect was claimed for arsenic in a case in which a woman narrowly escaped death after drinking milk in which "something" had been mixed, which was said to have "the virtue of imparting a good complexion to her child *in utero*."

Organic Poisons.

11. *Aconite.*—Two cases of poisoning from this cause came under notice, in one of which a native quack poisoned his fiancée's brother because he would not give his consent to their union. The offender in this case was sentenced to death.

Dhatura.—In three cases, parts of the plant were found and identified in the matters examined; and in three, the alkaloid only was detected. Three of the cases were suicidal and proved fatal, which is not a common result of poisoning by this drug. Two cases were accidental, and one was a case in which shepherd boys were drugged in order that their flock might be stolen.

Ganjah.—Only one case of poisoning by this agent was met with in the year.

A liniment (of camphor, belladonna, chloroform and aconite) was drunk by a woman who was in grief for her daughter's death. She soon became profoundly insensible, with pupils almost fully dilated and deep stertor. Prompt treatment with the stomach pump and washing the stomach with Condy's fluid were the means of saving her.

Calotropis Gigantea accounted for three suicidal deaths. In one case a man is reported to have committed the act in a fit of inconsolable grief for the death of a child. The symptoms were reported to be "nausea, tingling of the throat, and a convulsion before death," which took place in three hours.

Plumbagin was detected in three cases in which it had been employed as an abortifacient; and in a fourth case in which it had been so used together with calotropis gigantea.

Colocynth, *Croton*, *Oleander* } was each detected in one case. The two former proved fatal.

Marking Nut.—The juice mixed with gingelly oil was used in one case by a man in order to hurt and disfigure his wife. It is a local irritant and has been used for this purpose in the same way that vitriol is thrown over the body. Fatal results have been recorded where the juice has been externally applied in this way, but happily not in the case under reference.

Opium was detected in two cases only, neither of which ended fatally.

12. The proportion of cases traced to inorganic and organic poisons is shown below:—

Table V.

Year.	Number of cases detected.	Inorganic poison.	Organic poison.	Percentage of column 3 to column 2.
1	2	3	4	5
1896	72	50	22	69·44
1895	64	47	17	73·43
1894	73	56	17	76·71
1893	79	63	16	79·74
1892	80	57	23	71·25

13. The results of the judicial enquiries into the seventy-two cases in which poison was detected may be summarised thus:—

—	Number of cases.	Number affected.	Number died.
(*a*) Without fatal result	33	61	..
(*b*) With fatal result	39	49	41
Total ..	72	110	41

In group (*a*), no results have been communicated in seven cases, eleven have been returned as undetected, struck off and no further proceedings taken; in two the accused are still at large; one is "pending," four were proved to be false; in one the accused was proved to be innocent; one was returned as suicide and another as an accidental death; in one the accused, who were found in possession of over $1\frac{1}{4}$ pounds weight of white arsenic, were bound over for good behaviour; and in four the accused were sentenced to terms of imprisonment up to seven years.

In group (*b*), no results have been communicated in six cases; eight have been returned as suicides, one as false, and six were discharged there being no *primâ facie* case against the accused; in one "the papers were recorded"; one is reported to be "pending"; two ended in imprisonment of three years in each case; in four, death sentence was passed, and two cases ended in sentences of transportation; while eight cases ended in acquittal by a Sessions Court.

II.—Blood Stains.

14. The number of articles examined for blood was less than in the previous year, though the percentage of cases detected to cases received was much higher. Mammalian blood was identified in fifteen out of the twenty-three cases. As usual, identification of human hair, bones, &c., formed a part of the examination in some of the cases. In several of the undetected cases the articles sent for examination had been in a well or had been washed or exposed to rain, and in some the nature of the suspected stains was identified, though no blood was detected in them.

Table VI.—*Blood Cases.*

Districts received from.	Number of cases.	Number of cases in which blood was detected.	Number of examinations.
Anantapur	2	1	6
Arcot, North	2	1	7
Arcot, South	1	1	3
Bellary	6	4	28
Cuddapah	6	6	18
Ganjám	1	1	2
Madras	2	2	6
Madura	2	0	3
Malabar	2	1	3
Nellore	3	1	13
Salem	3	3	7
Tanjore	1	1	3
Vizagapatam	1	1	9
Total for the year { 1896 ..	32	23	108
Total for the year { 1895 ..	41	21	155

15. In five cases no judgments have been received, two have been returned as undetected, one as pending; in four the accused were discharged after preliminary enquiry; and in twenty the cases were tried by a Sessions Court, ending in acquittals in twelve cases, death sentences in five, transportation for life in two, and long imprisonment in one case.

III.—Seminal Stains.

Table VII.

Districts received from.	Number of cases.	Number of cases in which semen was detected.	Number of examinations.
Anantapur	1	..	2
Arcot, North	4	1	9
Bellary	1	..	2
Chingleput	2	..	2
Madras	1	..	1
Madura	1	..	3
Nellore	1	..	12
Tanjore	1	1	4
Total for the year { 1896 ..	12	2	35
Total for the year { 1895 ..	9	..	26

16. The articles received for examination of suspected seminal stains during the latter portion of the year were, I am glad to report, packed with scrupulous care; and I was able to detect spermatozoa on the stains in two cases received during September. In one of these two cases the offender was sentenced to two years' rigorous imprisonment, and in the other the proof of the offender's identity failed. Of the ten cases in which no sperms were detected, two were in the case of suicidal deaths of women, by strangulation and by hanging, in which stains were found on the clothes; in one case, no judgment has been received; one was a case of suspected sodomy in a jail without any other proof beyond the stains; in three, there was no *primâ facie* case at the preliminary enquiry; one ended in acquittal by a Sessions Court, one ended in imprisonment, and the last ended in a sentence of twenty stripes for a mischievous boy who attempted to deflower a child of six years.

IV.—Cases of suspected Cattle Poisoning.

Table VIII.

Districts received from.	Class A. Number of cases.	Number of deaths.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons: Arsenious oxide.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and metallic mercury.	Calotropis gigantea.	Croton seeds.	Strychnine.	Class B. Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons: Arsenious oxide.	Orpiment.
Anantapur	3	3	1	9	1	..	..	..	..	..	1	1	1	1	..
Arcot, North	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Bellary	3	3	1	10	..	..	..	1	..	..	..	..	..	..	..
Coimbatore	3	3	3	9	3	..	..	..	..	..	1	..	1	..	..
Cuddapah	3	6	3	21	3	..	..	..	..	..	..	..	..	..	..
Ganjám	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Gódávari	1	1	..	1	..	..	..	..	..	..	1	1	1	1	..
Kistna	8	10	6	40	6	..	..	..	..	..	3	3	5	3	..
Kurnool	4	4	4	18	4	..	..	..	..	..	1	1	1	1	..
Madras	2	2	1	8	..	..	..	..	1	..	..	..	..	..	..
Madura	1	1	1	4	1	..	..	..	..	..	..	..	..	..	..
Malabar	3	4	1	19	..	..	1	..	..	..	..	..	..	..	..
Nellore	2	3	2	12	2	..	..	..	..	..	1	..	1	..	..
Salem	1	1	1	5	1	..	..	..	..	..	..	..	..	..	..
Tanjore	2	2	2	5	1	..	..	1	..	..	1	1	1	1	..
Trichinopoly	2	4	2	10	2	..	..	..	..	..	..	..	..	..	..
Tinnevelly	2	2	2	11	2	..	..	..	..	..	..	..	..	..	..
Total for the year { 1896 ..	40	49	30	182	26	..	1	2	1	..	11	9	13	9	..
Total for the year { 1895 ..	55	69	44	225	42	1	..	..	..	1	17	11	22	10	1

17. The bulk of these cases were, as usual, cases in which arsenic had been employed. In two of them the juice of calotropis gigantea had been introduced on rags into the lower bowel of the animal.

B.—MISCELLANEOUS ANALYSES.

Examinations made for Government Departments, &c.

Received from	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Accountant-General, Madras	One thousand rupees for separate weighment	1	1
Board of Revenue, Madras	Salt	520	615
	Beer	65	
	Porter	1	
	Barks and leaves found in toddy ..	3	
	Arrack	7	
	Sonti soru	1	
	Raisin wine	9	
	Lakhium	2	
	Plantain sap	1	
	Opium	2	
	Spent wash	3	
	Spirit distilled from wash mixed with spent wash	1	
Commissariat Department, Madras	Brown sugar	2	3
	Rum	1	
Collector of Sea Customs, Madras	Blasting gelatine	8	..
	Dynamite	1	
	Petroleum	1	

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of exminations for the year.
Collector of Sea Customs, Madras—*cont.*	Oil, Kerosine	23	149
	,, Turpentine	7	
	,, Raw linseed	4	
	,, Boiled linseed	3	
	,, Double boiled linseed	3	
	,, Pale boiled	1	
	,, Bloomless raw	4	
	,, Rangoon	1	
	,, Ice Factory	1	
	,, Spindle	1	
	,, Special gas	1	
	,, Compressor	1	
	,, Heavy mineral	2	
	,, Olive	7	
	,, Lucca	1	
	,, Amygdal Dulc.	1	
	,, Santal Flav.	1	
	,, Copaiba	1	
	Paint, &c., white zinc	11	
	,, red lead	1	
	,, lemon chrome	5	
	,, best lemon yellow	2	
	,, lemon yellow	1	
	Dye, soluble violet	1	
	,, roccelline	2	
	,, magenta crystals	1	
	,, scarlet R	1	
	,, fast stick lac	1	
	Silver thread	1	
	Gum Copal	1	
	Pepsina Porci	1	
	Pyny Pectoral	1	
	Amer d'or (bitter)	1	
	Extrait d'Absinthe	1	
	China Serravallo ferruginosa	1	
	Essence of ginger ale	1	
	,, Jamaica ginger	1	
	,, lemon	1	
	Coca tonic champagne	1	
	Coca wine	1	
	Quinine tonic	1	
	Syrup Hematic Hypophosphitis	1	
	Ammonium Sulphate	1	
	Superphosphate manure	1	
	Liquor waste	1	
	Kainite	1	
	Caoutchoucine	3	
	Methylated spirits	29	
Collector of Gódávari	Sulphurous earth	3	4
Collector of South Arcot	Mineral earth	1	
Collector of Cuddapah	Caoutchoucine	12	12
Commissioner of Police, Madras	Opium	1	1
Civil Surgeon, Cocanada	Kulloy and cooking vessels	6	6
Executive Engineer, Madura Division	Ganjah	1	1
Head Assistant Magistrate, Musiri	Water	1	1
Jail Department. For all Jails	Suspected stupefying drug	4	4
Her Majesty's Penitentiary, Madras.	Standard solutions for water analyses	9	
District Jail, Madura	Water	2	
Do. Nellore	Do.	7	
Do. Berhampur	Do.	2	
Do. Palamcottah	Do.	3	
Central Jail, Trichinopoly	Do.	1	
Do. Coimbatore	Do.	4	
Do. Rajahmundry	Do.	2	
Do. Bellary	Do.	2	55
Hill Jail, Russellkonda	Do.	2	
Do. Párvátipuram	Do.	3	
District Jail, Tanjore	Do.	1	
Do. Vizagapatam	Do.	4	
Central Jail, Vellore	Do.	1	
Do. Cannanore	Do.	8	
Do. Salem	Do.	2	
Medical Officer, Station Hospital, Pallávaram	Do.	2	
Do. do. Ramandrug	Do.	2	2
Medical Officer, 6th Regiment, Madras Infantry, Berhampur	Do.	3	3
Medical Officer, 20th Regiment, Madras Infantry, Vizianagram	Do.	2	2
Medical Storekeeper to Government, Madras Command	Do.	4	4
	Carbolic powder	1	1

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Municipalities and District Boards. Madras	Sewage	2	23
	Water	4	
Cochin	Do.	1	
Gudiyáttam	Do.	1	
Madura	Do.	2	
Walajapet	Do.	2	
Palamcottah	Do.	1	
Bellary	Do.	3	
Trichinopoly	Do.	2	
Ootacamund	Do.	3	
Guntúr	Do.	1	
Bangalore	Pondrette	1	
Officer in charge of Telegraph Stores, Madras	Disinfecting powder	5	5
Ordnance Officer, Arsenal, Madras	Liquor, Potassium Ferricyanide	1	8
	Sodium bi-carbonate	1	
	Soda crystals	1	
	Bees' wax	1	
	White arsenic	1	
	Borax	1	
	Shellac	1	
	Camphor	1	
Presidency Magistrate, Black Town, Madras	Milk	2	2
Resident Medical Officer, General Hospital, Madras.	Silver wire	1	2
	Urinary gravel	1	
Railway. Bezwada-Madras	Water	11	16
East Coast	Water	5	
Sanitary Commissioner, Madras	Salt found in bed of Hagari river	1	1
Senior Medical Officer, General Hospital, Madras	Antiseptic gauze	1	2
	Pathological fluid	1	
Second Physician, General Hospital, Madras	Ascitic fluid	1	4
	Morphia mixture	1	
	Liquor Morphiæ Hydrochloratis	1	
	Hydrochlorate of Morphia	1	
Stationary Sub-Magistrate, Ernad	Suspected opium	1	1
,, ,, Tindivanam	Suspected explosives	6	6
,, ,, Sáttúr	Suspected intoxicating drug	1	1
Second-class Magistrate, Negapatam	Lakhium	4	4
,, ,, Vanur	Illicit salt	1	1
Superintendent of Stationery, Madras	Inks	12	12
,, of Lejer Hospital, Madras	Specific for leprosy	1	1
,, of Government Lunatic Asylum, Madras.	Water	1	1
,, of Central Museum, Madras	Minerals	5	5
Private Parties and Firms	Water	13	86
	Silica	1	
	Cement	4	
	Limestone	1	
	Earth	1	
	Mineral	1	
	Clay	2	
	Jaggery	16	
	Brown sugar	2	
	Molasses	1	
	Kerosine oil gas	1	
	Scotch shale oil gas	1	
	Hydrocarbon deposit from compressed shale oil gas.	1	
	Dynamite	11	
	Stonite	2	
	Carbonite	2	
	Gelignite	2	
	Blasting gelatine	3	
	Fish guano	3	
	Poudrette	1	
	Cuttle-fish shells	1	
	Sulphated salt	1	
	Phosphatic nodules	1	
	Castor poonac	2	
	Ground phosphates	1	
	Gas liquor	1	
	Skin	1	
	Leather washers	1	
	Castor oil	1	
	Beer	2	
	Ragi flour	4	
	Indigo	1	
	Total	1,045	1,045

18. *Analyses for the Board of Revenue*, which have about doubled in the past five years, show again a slight increase over last year's work. The number of assistants granted by the Board is, however, two—the same as when the special staff for salt analyses was first sanctioned. These assistants however not only do salt work, but they also assist in the miscellaneous work of the laboratory generally. The number of malt liquor samples examined was double that of the previous year, and the remaining articles were examined chiefly for adulteration and for alcoholic value.

19. *Mineral Earths.*—A sample of earth obtained from Korukonda Hill, in the Rumpa Agency, and said to be used by the potters there for polishing pots, was found to contain graphite. It contained lumps of impure graphite scattered through the earth and an average sample yielded twenty per cent. by weight of carbon. Three samples of earth from Narsapur taluk (Gódávari) were examined and found to contain natural sulphur, two of the samples having as much as 50 and 56 per cent. of it. With heavy prices to be paid for imported sulphuric acid, and phosphatic nodules awaiting conversion on a paying scale, it might be worth making further enquiries, unless Government have already received a report from the Collector of Gódávari as to the extent of these sulphur deposits and the feasibility of locally manufacturing sulphuric acid.

20. *Incendiarism.*—Six alleged "explosive" substances were forwarded for examination by a Sub-Magistrate under the following circumstances. A thatched building suddenly caught fire, but fortunately the fire was got under. When the grass roof was being dismantled, some small packets were discovered in the thatch and witnesses spoke to having seen a man with similar packets in his waist meddling with the roof. On examination, I found small pellets of moist cowdung enclosed in wet rags. These pellets fumed on exposure to air and were proved to contain phosphorus by their yielding spontaneously inflammable phosphoretted hydrogen, when heated with an alkali. The incendiary evidently knew that phosphorus would not inflame spontaneously when protected from contact with air, and so he judiciously diffused it in wet cowdung and wrapped the whole in damp rags. There can be no doubt that the villain did this to gain time and make his escape, for the phosphorus would not inflame until the coverings had got dry by the heat of the sun. Many village fires, arising from untraced causes and apparently spontaneous, may be explained in the light of this detection.

It is not often that the rule is carefully observed as to giving intimation to the Chemical Examiner whether articles sent to him for examination should be returned or not; but in this case the officer forwarding these "explosives" specially intimated that "none of the articles need be returned after examination."

Analyses for the Customs Department.

21. *Methylated Spirits.*—There were twenty-nine samples examined for the Collector of Sea Customs, and of these sixteen were rejected as insufficiently rendered unfit for consumption. There were also fifteen samples of caoutchoucine examined and found to be of proper strength for spoiling spirits.

In the course of some public comments upon an abkári prosecution it was recently stated that a method of rendering palatable spirit which had been methylated must be known to natives; and statements were made which were evidently based on a misunderstanding of what was meant by "methylated spirit." This expression is correctly applied to spirit which has been spoiled by methyl alcohol, or wood spirit; and confusion has been introduced by applying the expression also to spirit which has been spoiled by "caoutchoucine." It is the latter agent which is employed for spoiling country-made spirit, and such spirit should consistently be called "caoutchoucined spirit," reserving the former expression for imported spirit which has been spoiled, before importation, by methyl alcohol. At any rate it is the spirit spoiled with caoutchoucine which is common in the bazaars and which gives the familiar turbidity on the addition of water to it; and there is certainly no known method of separating the spoiling agent and rendering such spirit palatable, although a case came to my notice in which a native was stated to have drunk caoutchoucined spirit while in a very drunken fit. Spirit spoiled with "methyl alcohol" is however as a matter of fact not permitted to pass, since the orders of Government are that methylated spirit should have been spoiled with "*crude wood spirit*" but not with the rectified wood spirit known as methyl alcohol. It is the contravention of this rule which has led to the rejection of the sixteen samples referred to and of several other samples in previous years. The "*methylated spirit*" which is passed into consumption has satisfied me as the testing officer; but as I pointed out in my annual report for 1889, even European palates can relish such spirits on a Sunday, when public houses are closed, then why not natives of this country? The spoiling agent has, since I wrote those remarks, been changed in Great Britain, and the introduction of the change here also may be advisable.

22. *Oils, Paints, Colours, &c.*—Excluding 23 samples of kerosine-oil examined under the Petroleum Act, there were 41 samples of other oils examined for the Customs department chiefly under the Merchandise Marks Act. These included 12 samples of lubricating and heavy mineral oil, 7 of turpentine, 11 of linseed oil, 8 of olive oil, and 3 of essential oils. The whole of the seven samples of turpentine were found to be adulterated, with foreign hydrocarbon oil, some to the extent of 75 per cent. Of the eleven samples of linseed oil, six were found to be practically pure and the rest were adulterated with mineral oil, one sample to the extent of 77 per cent. The amendment of the definition of the word "Petroleum" in the Petroleum Act, so as to include such mixtures, has been under the consideration of the Government of India. Of the eight samples of olive oil examined, five were found to be adulterated. Of the three essential oils examined, one declared to be sandalwood oil was grossly adulterated. There were twenty samples of paints and colours examined, chiefly zinc white, red lead, and yellow chromes; and of these only three chromes were found to be practically pure, the rest being all more or less adulterated.

It is impossible to give any idea of the attempts to conceal the sophistications perpetrated, especially in the case of oils. Some of the frauds are well thought out, others again are equally clumsy. While the identification of a pure oil is a matter of comparative ease, the detection of every individual oil, in a mixture of even two oils, is frequently a task of great difficulty. The physical properties of oils, such as their specific gravity, solidifying point, odour, taste, and their general colour reactions and "temperature re-action", do to some extent afford important indications of the purity of the substances under examination; but many of these properties are kept within normal limits by judicious admixture of oils having widely different properties. In fact, the methods of sophistication have developed into a technical art, and the detective chemist must keep himself posted up in the ever increasing methods of testing which are called forth by the discovery of new adulterants and revealed in current literature. These less reliable properties of an oil referred to cannot be totally ignored and must be investigated, and the analyst has, in addition, to split the mixture of oils into their chemical constituents and to endeavour to identify them. The separation and the examination of the fatty acids is compulsory, their melting and solidifying points, the percentage amount of volatile and of insoluble fatty acids, the proportion of such unsaturated acids, the saponification value of the oils, their optical behaviour tested by the spectroscope and the polariscope, and a number of other constants have to be determined for each oil before sufficient data can be obtained for getting an inkling of the direction in which to look for any adulterants which may be present. I particularise these facts here because although the number of samples of oil examined appear small, when expressed by the number 41, yet the actual number of analyses performed upon them could not be much under 400.

In addition to these there were examined for the Customs department several dyes, explosives, various drugs and patent medicines, chemical manures and sundry other imported articles, for purposes of classification and of levying duty.

23. The principal miscellaneous analyses for other departments consisted of the examination of articles for purity on behalf of the Arsenal and Commissariat, minerals for the Central Museum, inks for the Stationery department, opium, ganjah, disinfectants and pathological substances for various other departments, and chiefly manures, cements and sugars for private parties. As usual, a large number of water

analyses were performed on behalf of municipalities and the Jail department, to ascertain the quality of water for drinking purposes. A number of waters was also examined for the East Coast Railway and for the Madras-Bezwada Railway to ascertain their fitness for drinking and for locomotive purposes.

24. The service books of the establishment are up to date, and the inventory of valuable stock has been kept and duly checked in accordance with G.O., No. 920, Financial, dated 18th September 1893.

25. The concluding tabular statement of medico-legal work performed during the year is appended as usual.

[Statement

Table IX.—*Tabular Statement for the year.*

Nature of work.	Total number of cases.	Total number of articles received for examination.	Total number of cases in which poison was detected.	Total number of cases in which blood was detected.	Total number of cases in which semen was detected.	Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, mercuric salt and dhatura.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide, orpiment and realgar.	Arsenious oxide, orpiment and metallic mercury.	Arsenious oxide and cinnabar.	Arsenious oxide and realgar.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Antimony and mercuric salt.	Copper salt.	Corrosive sublimate and atropine.	(Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Ganjah.	Liniment of camphor, belladonna, chloroform and aconite.	Oleander.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.	Organic.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
Human cases. { Class A ..	87	643	60	..	..	30	2	1	1	..	..	..	1	..	..	..	1	..	1	..	..	..	..	..	..	..	2	3	..	..	5	1	1	2	3	1	1	..	2	2	1	4	
{ Class B ..	17	55	12	..	..	4	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	4	3	1	1	1	..	..	..	1	..	..	2	..	..	..	..	
Blood stains, &c. ..	32	108	..	23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Semina stains ..	12	35	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Cattle cases. { Class A ..	40	182	30	..	..	26	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	4	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	
{ Class B ..	11	13	9	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Examinations for Government departments ..	959	959	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Examinations for private parties and firms ..	86	86	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	2	3	1	1	1	..	..	1	1	..	1	2	1	..	..	
Total for the year 1896 ..	1,244	2,081	111	23	2	69	2	1	1	..	2	1	1	1	..	..	1	..	1	..	3	1	1	1	1	4	3	1	1	5	1	1	2	3	1	1	..	2	2	1	4	
Total for the year 1895 ..	1,243	2,065	119	21	..	78	8	..	1	1	1	..	1	..	2	1	..	1	..	1	4	1	..	2	..	2	1	1	..	1	..	..	..	1	..	..	..	1	..	..	..	

Order—No. 489, Public, dated 30th April 1897.

From the statement in paragraph 2 of the report it appears that, while the total number of investigations made and articles examined by the Chemical Examiner in 1896 remained about the same as in the previous year, there was a decrease under medico-legal investigations and an increase under miscellaneous analyses.

2. The total number of cases of suspected human poisoning was the same as in 1895, viz., 104; the percentage of detections, however, reached 69·23, surpassing the highest previous record—that of 1894—by 3 per cent. The large percentage of detections is satisfactory as evincing not only increased efficiency in investigation, but also a decrease in the number of fictitious cases sent up for examination.

The attention of all Judicial officers concerned will, with reference to the orders marginally noted, again be drawn to the failure complained of in paragraph 8 of the Chemical Examiner's report. Individual cases of such failure should in future be specially noted by the Chemical Examiner in his annual report. The attention of that officer will at the same time be directed to paragraph 2 of G.O., No. 2418, Judicial, dated 21st November 1893.

G.O., No. 1478, Public, dated 29th June 1885 (paragraph 3).
G.O., No. 1009, Judicial, dated 13th June 1890.

3. Organic poison was discovered in 50 and inorganic in 22 cases, the corresponding figures in 1895 being 47 and 17. These cases referred to 110 persons, and 41 deaths occurred; the corresponding figures in the previous year were 125 and 39, respectively.

4. There were 32 cases of suspected blood stains, and 108 articles were examined, blood being discovered in 23 cases. In 1895, blood was detected in 21 out of 41 cases, 155 articles being examined.

5. In two out of the twelve suspected cases of seminal stains sent up the investigation was successful. In 1895, nine cases were examined with negative results. The Government is glad to note that the articles transmitted in these cases were packed in a completely satisfactory manner.

6. Fifty-one cases of cattle-poisoning were investigated against 72 in the previous year. Arsenious oxide was the agent employed in 35 out of 39 cases in which poison was detected. The percentage of detection was 76·4—the same as in 1895.

7. Analyses were made in 1,045 miscellaneous cases against 1,017 in 1895. There was an increase in the work done for the Board of Revenue and for the Customs Department, the number of investigations being 615 and 149, respectively, against 595 and 91 of 1895.

8. The attention of the Revenue and Judicial Departments, respectively, will be invited to paragraphs 19 and 20 of the report.

9. With regard to the complaint of the Chemical Examiner as to the insufficiency of accommodation in his laboratory, supported by the Surgeon-General, the Public Works Department will be requested to direct the Consulting Architect to prepare plans and estimates for the necessary additions, which will be considered when the financial outlook will permit.

10. The report constitutes, as usual, an interesting and satisfactory record of good work done by the Chemical Examiner.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Surgeon-General.
" Sanitary Commissioner.
" Revenue Department.
" Judicial Department.
" Local and Municipal Department.
" Inspector-General of Police.
" Secretary to the Government of Hongkong (with C.L).
" District Magistrates.
" Sessions Judges.
" Hon'ble the Chief Justice (with C.L).
" Director of Government Cinchona Plantations, Nilgiris.
" Editors' Table. To the Public Works Dept.

Endorsement—No. 490, Public, dated 30th April 1897.

Copy to the Government of India, Home Department.

J. F. PRICE,
Chief Secretary.

Exd. A. Raitt.

Government {1897} of Madras.

PUBLIC.

Recd. } 1897. *Enclosures*

Regd. *Spare copies* 10

G.O., &c., Nos. 489, 490, 30th April 1897.

APRIL.

Chemical Examiner's Report.

Reviewing the — for 1896, and requesting the Public Works Department to direct the Consulting Architect to prepare plans and estimates for the extension of the Chemical Examiner's laboratory for consideration when the financial outlook will permit. Copy to the Government of India.

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

Read—the following papers:—

From Surgeon-Major-General C. SIBTHORPE, F.R.C.P.I., Surgeon-General with the Government of Madras, to the Chief Secretary to Government, dated Madras, 10th April 1897, No. 219.

I have the honour to forward you the annual report for 1896 of the Chemical Examiner to Government, which has been drawn up with great care.

2. I would call attention to his suggestions regarding the extension of his laboratory, with which I concur, and hope that Government will sanction plans and estimates being made out in order that the work may be carried out when funds are available.

3. The point noted by him in paragraph 20 appears an important one and it appears desirable that the facts should be made known to the police and magisterial authorities.

From Surgeon-Major J. L. VANGEYZEL, M.B., F.I.C., F.C.S., Chemical Examiner, to the Chief Secretary to Government (through the Surgeon-General with the Government of Madras), dated Madras, 6th April 1897, No. 393.

I have the honour to submit the annual report of this department for the year 1896.

2. The numerical statement of work done in the past two years is given in the following table:—

Table I.

		Number of cases investigated.		Number of articles examined.	
		1896.	1895.	1896.	1895.
A.—Medico-legal investigations.	I. Cases of suspected human poisoning	104	104	698	620
	II. Blood stains, &c.	32	41	108	155
	III. Seminal stains	12	9	35	26
	IV. Cases of suspected cattle poisoning	51	72	195	247
	Total ..	199	226	1,036	1,048
B.—Miscellaneous analyses.	For Government departments and municipalities ..	959	963	959	963
	For private parties and firms	86	54	86	54
	Total ..	1,045	1,017	1,045	1,017
	Grand Total ..	1,244	1,243	2,081	2,065

3. The total number of investigations and of articles examined was practically alike in the two years, but the medico-legal work has been more expeditiously performed than it has been for several years past. The diminution in the *number* of medico-legal cases has occurred in sections of the work which make comparatively

small demands upon the time and energy of the staff, viz., in cattle cases: but that decrease has been more than counterbalanced by the nature of the work demanded in the examination of an increased number of articles in human-poisoning cases and of articles examined for the Customs department. These latter examinations are not the least important section of the work performed in this laboratory now and they demand a degree of skill and occupy an amount of time which cannot be conveyed by a mere numerical expression of the articles examined. On the whole, the work done has in every way been without exception the heaviest of any year within my experience.

4. In this connection, I wish to mention that the working accommodation in this laboratory has been very severely strained of late, and that portions of work in progress had in several instances to be stopped and postponed on account of the overcrowding which took place with three analysts carrying on work of different sorts in the same room and often perforce on the same counters. On some occasions, in which a large number of articles in medico-legal cases had to be examined, all other work had to be practically stopped for several days, the risk of accidents occuring or of articles getting exchanged and losing their identity during the various steps of their examination being too great to permit of anything else being brought out of their cupboards for examination. In a less degree, the same thing has happened of late in many other instances. The want of a room which can be properly darkened or of a permanent dark room in the laboratory has been felt, and examinations requiring such a room or the use of artificial light have to be carried on at night or in my own dark room at my house, to and from which apparatus have to be conveyed. While I write these remarks a case has been referred to me officially in which photographic methods of investigation are required, and though such demands are not frequent, yet they have been made several times before. Such work cannot be given out for obvious reasons and must be performed personally, of necessity in my house after office hours. A large number of oils and many other substances have required optical methods of examination during the year, and the want of a convenient room suitable for the performance of such work and in which apparatus could be left ready for use has been greatly felt, as much time is lost in setting up and taking down apparatus which are too valuable to be left about. Some of these pieces of expensive and valuable apparatus have to be put right away to prevent damage from laboratory fumes, while others which are in constant use suffer deterioration from this cause at a much greater rate than they would do if suitably accommodated. For the same reason, articles awaiting examination are often crowded out of cupboards and have to be kept unlocked. More working room would also conduce to the health and convenience of the working staff, and for all these various reasons I beg to bring to the notice of Government that the present laboratory accommodation needs expansion, and that this can be effected by an inexpensive extension of the centre room southwards over the flat roof of the Practical Chemistry class-room belonging to the Medical College. The Principal of the Medical College has told me that he would not object to grant this space, and the Consulting Architect, in the course of a visit through the college buildings, said that the indicated extension was feasible. In the interests of the work performed, of apparatus and of articles under examination, which require greater safeguarding, the extension is a necessity which I beg to commend to the notice of Government for as early execution as the present financial pressure will permit.

A.—MEDICO-LEGAL INVESTIGATIONS.

I.—Cases of suspected Human Poisoning.

5. The usual information regarding these cases is furnished in the two following statistical statements:—

TABLE II.—*Human Cases—Class A.*

(Including cases in which viscera or evacuations were examined with or without suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of individuals affected.	Number of deaths.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.*	Arsenious oxide, orpiment and realgar.	Arsenious oxide and orpiment.	Arsenious oxide and oleander.	Arsenious oxide and dhatura.	Arsenious oxide and cinnabar.	Arsenious oxide, mercuric salt and dhatura.	Antimony and mercuric salt.*	Corrosive sublimate and atropine.	Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, gunjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Gunjah.	Liniment of Camphor, Belladonna, Chlorotorm and Aconite.	Oleander.	Plumbagin.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Anantapur	2	1	..	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, North	4	2	..	..	35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arcot, South	3	1	..	..	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bellary	3	3	3	2	21	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Canara South	2	1	1	1	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chingleput	1	1	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore	5	3	7	3	20	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cuddapah	3	3	3	3	23	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ganjam	1	1	1	1	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Godávari	2	1	3	2	7	1	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	12	10	18	12	107	5	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kurnool	8	6	11	5	50	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madras	8	5	13	3	87	4	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madura	6	7	12	4	44	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Malabar	1	1	1	1	8	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	6	8	11	4	65	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nilgiris	2	2	2	2	14	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Salem	1	1	3	1	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tanjore	5	5	5	5	32	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	2	2	4	3	29	..	1	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tinnevelly	5	4	11	3	28	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vizagapatam	3	2	3	2	24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coehin	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year { 1896	87	60	129	61	643	30	2	..	1	..	1	..	..	1	1	1	..	3	1	1	1	1	2	3	1	3	3	1	..	..	3	1	1	1	..
1895	82	49	155	60	575	23	8	1	1	1	1	1	1	..	..	..	1	1	..	..	..	..	3	1	..	..	1	1	..	..	..	..	..	..	..	..

* *Vide* case (*e*) recorded in paragraph 10.

TABLE III.—*Human Cases—Class B.*

(Including cases in which no viscera or evacuations were received for examination, but only suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and dhature.	Arsenious oxide and realgar.	Arsenious oxide, orpiment and realgar.	Copper salt.	Mercuric salt.	Orpiment.	Organic. Aconite.	Calotropis gigantea.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Arcot, North	1	1	14	..	..	..	..	..	..	..	..	..	..	1	..	..
Arcot, South	1	1	3	..	..	..	..	..	..	..	..	..	1	..	..	..
Bellary	3	2	12	..	..	1	..	..	..	..	..	..	..	1	..	..
Chingleput	1	1	2	1	..	..	..	..	..	..	..	..	1	..	..	..
Kistna	4	3	7	2	..	..	..	..	..	..	..	..	..	..	..	..
Kurnool	2	2	3	..	..	..	2	..	..	..	..	..	..	..	..	..
Madras	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	1	1	2	..	..	..	..	..	..	..	..	..	..	..	1	..
Vizagapatam	2	1	8	1	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year { 1896 ..	17	12	55	4	..	1	2	..	..	..	..	..	2	2	1	..
1895 ..	22	15	45	3	1	..	..	1	3	1	1	1	2	1	..	1

6. The percentage of detections to cases examined is compared with that for the previous year in the following table :—

TABLE IV.

—	A. Cases in which viscera or evacuations were examined. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	B. Cases in which only suspected food, &c., was received for examination. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	Total. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.
1895	82	49	59·75	22	15	68·18	104	64	61·53
1896	87	60	68·96	17	12	70·58	104	72	69·23

7. The ratio of detections to cases examined last year was only 5 per cent. less than in 1894, in which year the highest percentage of detections for a number of years had been recorded. The number of detections has in the year under review surpassed the highest previous record by 3 per cent. A glance at the figures in the margin shows how the detections have risen in the past twelve years, and they bear testimony to the gradually increasing work thrown upon this department by the decline in the number of fictitious cases sent up for examination. Improvements in general methods of work and the gradual extension, in accordance with experience, of checks through the various details of distributed work, may also justly claim a share in the credit of the fewer failures of detection recorded in latter years.

	Percentage of detections.		Percentage of detections.
1884	46·6	1891	52·58
1885	50·0	1892	58·82
1886	56·5	1893	64·75
1887	56·9	1894	66·36
1888	57·48	1895	61·53
1889	66·18	1896	69·23
1890	65·52		

8. In recent annual reports I have endeavoured to review all the known facts in those cases in which chemical examination failed to detect any poison, in order to ascertain how far the failure may have been due to the absence of poison in the articles sent or to other causes outside of the chemical examination. In the year under review there were thirty-two cases in which poison was not detected, which may as usual be dealt with under two headings:—

I.—Eleven cases in which sixteen persons were affected without a fatal result following the circumstances which aroused suspicion of poisoning.

II.—Twenty-one cases in which twenty-one persons died under suspicious circumstances.

Group I.—Of the eleven cases in this group, no persons were affected in three cases. In one of these a black powder was taken from the person of an enemy and turned out to be black ink powder; in the other two some toddy which was suspected on account of its colour, and a substance said to have been given to a female, were found to be free from poison. Four cases have been returned by the magistrates as "false" and the complainants in some have been prosecuted for giving false information. In three cases the magistrates who ordered the chemical examination have not reported the result of their enquiries. From the information at hand, the probability is that these cases were not genuine. The remaining case is one in which five persons suffered from undoubted dhatura poisoning and in which the accused was sentenced to a year's rigorous imprisonment. The purged matter sent for examination did not contain dhatura, and it was not likely to do so.

Group II.—These twenty-one cases fall into three classes:—

Class (*a*).—Eighteen cases in which the balance of evidence was in favour of death from disease, or from drowning or hanging.

Class (*b*).—Two cases in which there is not sufficient evidence in favour either of poison or of a natural cause to account for death. In one of these, a byragi was found dead in a choultry, and three days after burial the corpse was exhumed and portions sent here for examination. In the other case, a man was reported to have been seized with vomiting and purging in the fields and died there in a fit. Twenty-five days after burial his corpse was exhumed and the whole contents of the grave were forwarded here. No poison was detected in them; but the preliminary putting together of the parts and their examination in reference to questions of sex, age and identity, &c., proved a very interesting and instructive medico-legal investigation.

Class (*c*).—One case in which the death has been returned as one of suicide from oleander. No portions of the plant were found in the viscera, nor were any constituents extracted from them which could be identified as those belonging to this plant.

9. Poison was detected in seventy-two cases and the chief statistical information regarding them is summarised below:—

—	Inorganic.	Organic.	Total.
Cases included in Class A	43	17	72
,, ,, in Class B	7	5	
Number of individuals affected in A and B	75	35	110
,, of deaths in A and B	30	11	41

Inorganic Poisons.

10. The following are notes of a few of the cases of interest:—

(*a*) Ill-feeling between neighbours ended in the poisoning of two children, of whom one died. An arsenical sweetmeat was the instrument employed. A native quack is reported to have treated the deceased with honey and the "ashes of silk," though silk leaves no ash on ignition. Inevitably the quack's domestic medicine chest was forwarded for chemical examination, and it was found to contain as usual a large number of poisonous pills and powders together with a number of harmless substances such as cinnamon, pepper, chalk, sal-ammoniac, &c. Dried reptilian blood was found to be the contents of one of the packets.

(*b*) A woman put something into her husband's food, at the instigation of her paramour, in order to quench her husband's love. The husband's viscera contained over six grains of white arsenic, and a packet of the love-quenching drug contained over forty-five grains of white arsenic.

(*c*) A man was admitted into a dispensary with multiple injuries, and as he began to get seriously worse, his dying declaration was taken. He, however, rallied and he was then treated with calomel and antimonial powders. On the third day he was suddenly seized with faintness and expired. The relations of the man declared that he died in consequence of "something being wrong about the medicines administered." At the post-mortem examination a penetrating wound was found which extended through the lower part of the left lobe of the liver, and another wound through the chest, penetrating the left auricle of the heart. The serous cavities of the chest and abdomen contained much blood. There could be no doubt that these wounds were sufficient to account for death and must have caused death sooner or later; the wonder was that the man lived so long. But to satisfy the relatives, the viscera were forwarded for chemical examination, but no poison was found in them except in the stomach, which contained small traces of mercury and of antimony. A quantity of excreta also was sent for examination and was found to contain mercury equivalent to a little over one-fifth of a grain of calomel, and antimony equivalent to half a grain of Pulvis Antimonialis of the British Pharmacopœia. Although the death in this case was not due to poison, it has been included among detected poisoning cases in the returns, because there is no other way of returning it; but a foot-note has been added to Table II referring to this record.

(*d*) A child was given some jaggery by a passer-by and narrowly escaped death from mercurial poisoning. The culprit is reported to be still undetected. Nearly a grain of corrosive sublimate was found in a portion of the vomited matter.

(*e*) A man was seized with vomiting and purging soon after eating a meal served as usual by his wife. He continued for six days gradually getting worse. The wife, who was all the time in illicit love with another man, is reported to have "sat on his chest on the seventh day, throttled him with one hand and with the other squeezed the testicles," which were described in the post-mortem notes as in a "pulpy condition." The final injury, no doubt, accelerated the death which was approaching from the effects of arsenical poison. The woman was tried for murder and sentenced to death, but the sentence was, I believe, subsequently reversed on appeal.

(*f*) The proportion of cases in which fatal poisoning by a sulphide of arsenic takes place is very small as compared with the number of cases in which white arsenic is employed. A case occurred in the year under review in which nearly five grains of yellow sulphide of arsenic (orpiment) were found in the stomach and in the vomited matter of a child. When pure, this compound of arsenic is insoluble in water and in hydrochloric acid, and this property always suggests the question as to how such an insoluble compound can be an active poison. The answer is that commercial orpiment contains much arsenious oxide as an impurity, and it is to the presence of this impurity that the poisonous activity of orpiment is attributed.

(*g*) A corpse was found in the bed of a river, and at the post-mortem examination some suspicious particles were observed in the stomach. In the visceral matter sent here I found altogether over 133 grains of white arsenic, some of the partially digested pieces being as large as marbles.

(*h*) In a few cases of arsenical poisoning, the usual irritant symptoms are sometimes absent or only very slight, while nervous symptoms are well marked. Such a case occurred in a child who is reported to have had vomiting in half an hour

after eating some jaggery. It died soon after, evidently in a convulsion, for it is reported that "the eyes rolled upwards and the lips and tongue became blackened". Over thirty-two grains of white arsenic were found in the stomach.

(*i*) A small phial containing some fried Bengal gram was sent for examination, because a person who ate some of this suffered from severe vomiting followed by a metallic taste in the mouth. The gram was found to be intimately mixed with metallic mercury, and over thirty-two grains weight of the metal was mechanically separated from the stuff. Liquid mercury is said not to be a poison, though there are a few recorded cases which show that metallic mercury sometimes does produce poisonous effects, as it undoubtedly did in this case.

(*j*) Two girls are reported to have died from vomiting and purging. Suspicion having arisen, the bodies were disinterred a fortnight after burial. In the pulpy decomposed soft tissue sent from one of the graves, mercury was found equivalent nearly to one-tenth of a grain of corrosive sublimate. In the box of earth from the other grave were found a skull, a lower jaw, and part of a pelvic bone, and from an examination of these it was possible to fix the age of the subject as being between four and seven years. No mercury was found in these bones.

(*k*) In a case of suicide by mercurial poisoning, nearly eight grains of corrosive sublimate were found in the visceral and vomited matters. The unfortunate individual suffered such intolerable agonies from the poison that he rushed into the backyard and jumped into a well from which he was rescued and taken to hospital. He was a photographer by profession, and the chemical examination was extended to every substance found in his dark room, besides the examination of various articles of food and drink, before suspicion which rested upon innocent persons was removed.

(*l*) A novel effect was claimed for arsenic in a case in which a woman narrowly escaped death after drinking milk in which "something" had been mixed, which was said to have "the virtue of imparting a good complexion to her child *in utero*."

Organic Poisons.

11. *Aconite.*—Two cases of poisoning from this cause came under notice, in one of which a native quack poisoned his fiancée's brother because he would not give his consent to their union. The offender in this case was sentenced to death.

Dhatura.—In three cases, parts of the plant were found and identified in the matters examined; and in three, the alkaloid only was detected. Three of the cases were suicidal and proved fatal, which is not a common result of poisoning by this drug. Two cases were accidental, and one was a case in which shepherd boys were drugged in order that their flock might be stolen.

Ganjah.—Only one case of poisoning by this agent was met with in the year.

A liniment (of camphor, belladonna, chloroform and aconite) was drunk by a woman who was in grief for her daughter's death. She soon became profoundly insensible, with pupils almost fully dilated and deep stertor. Prompt treatment with the stomach pump and washing the stomach with Condy's fluid were the means of saving her.

Calotropis Gigantea accounted for three suicidal deaths. In one case a man is reported to have committed the act in a fit of inconsolable grief for the death of a child. The symptoms were reported to be "nausea, tingling of the throat, and a convulsion before death," which took place in three hours.

Plumbagin was detected in three cases in which it had been employed as an abortifacient; and in a fourth case in which it had been so used together with calotropis gigantea.

Colocynth, *Croton*, *Oleander* } was each detected in one case. The two former proved fatal.

Marking Nut.—The juice mixed with gingelly oil was used in one case by a man in order to hurt and disfigure his wife. It is a local irritant and has been used for this purpose in the same way that vitriol is thrown over the body. Fatal results have been recorded where the juice has been externally applied in this way, but happily not in the case under reference.

Opium was detected in two cases only, neither of which ended fatally.

12. The proportion of cases traced to inorganic and organic poisons is shown below:—

Table V.

Year.	Number of cases detected.	Inorganic poison.	Organic poison.	Percentage of column 3 to column 2.
1	2	3	4	5
1896	72	50	22	69·44
1895	64	47	17	73·43
1894	73	56	17	76·71
1893	79	63	16	79·74
1892	80	57	23	71·25

13. The results of the judicial enquiries into the seventy-two cases in which poison was detected may be summarised thus:—

—	Number of cases.	Number affected.	Number died.
(*a*) Without fatal result	33	61	..
(*b*) With fatal result	39	49	41
Total	72	110	41

In group (*a*), no results have been communicated in seven cases, eleven have been returned as undetected, struck off and no further proceedings taken; in two the accused are still at large; one is "pending," four were proved to be false; in one the accused was proved to be innocent; one was returned as suicide and another as an accidental death; in one the accused, who were found in possession of over $1\frac{1}{4}$ pounds weight of white arsenic, were bound over for good behaviour; and in four the accused were sentenced to terms of imprisonment up to seven years.

In group (*b*), no results have been communicated in six cases; eight have been returned as suicides, one as false, and six were discharged there being no *primâ facie* case against the accused; in one "the papers were recorded"; one is reported to be "pending"; two ended in imprisonment of three years in each case; in four, death sentence was passed, and two cases ended in sentences of transportation; while eight cases ended in acquittal by a Sessions Court.

II.—Blood Stains.

14. The number of articles examined for blood was less than in the previous year, though the percentage of cases detected to cases received was much higher. Mammalian blood was identified in fifteen out of the twenty-three cases. As usual, identification of human hair, bones, &c., formed a part of the examination in some of the cases. In several of the undetected cases the articles sent for examination had been in a well or had been washed or exposed to rain, and in some the nature of the suspected stains was identified, though no blood was detected in them.

Table VI.—*Blood Cases.*

Districts received from.		Number of cases.	Number of cases in which blood was detected.	Number of examinations.
Anantapur		2	1	6
Arcot, North		2	1	7
Arcot, South		1	1	3
Bellary		6	4	28
Cuddapah		6	6	18
Ganjám		1	1	2
Madras		2	2	6
Madura		2	0	3
Malabar		2	1	3
Nellore		3	1	13
Salem		3	3	7
Tanjore		1	1	3
Vizagapatam		1	1	9
Total for the year	1896	32	23	108
	1895	41	21	155

15. In five cases no judgments have been received, two have been returned as undetected, one as pending; in four the accused were discharged after preliminary enquiry; and in twenty the cases were tried by a Sessions Court, ending in acquittals in twelve cases, death sentences in five, transportation for life in two, and long imprisonment in one case.

III.—Seminal Stains.

Table VII.

Districts received from.		Number of cases.	Number of cases in which semen was detected.	Number of examinations.
Anantapur		1	..	2
Arcot, North		4	1	9
Bellary		1	..	2
Chingleput		2	..	2
Madras		1	..	1
Madura		1	..	3
Nellore		1	..	12
Tanjore		1	1	4
Total for the year	1896	12	2	35
	1895	9	..	26

16. The articles received for examination of suspected seminal stains during the latter portion of the year were, I am glad to report, packed with scrupulous care; and I was able to detect spermatozoa on the stains in two cases received during September. In one of these two cases the offender was sentenced to two years' rigorous imprisonment, and in the other the proof of the offender's identity failed. Of the ten cases in which no sperms were detected, two were in the case of suicidal deaths of women, by strangulation and by hanging, in which stains were found on the clothes; in one case, no judgment has been received; one was a case of suspected sodomy in a jail without any other proof beyond the stains; in three, there was no *primâ facie* case at the preliminary enquiry; one ended in acquittal by a Sessions Court, one ended in imprisonment, and the last ended in a sentence of twenty stripes for a mischievous boy who attempted to deflower a child of six years.

IV.—Cases of suspected Cattle Poisoning.

Table VIII.

Districts received from.	Class A. Number of cases.	Number of deaths.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and metallic mercury.	Calotropis gigantea.	Croton seeds.	Strychnine.	Class B. Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Orpiment.
Anantapur	3	3	1	9	1	..	..	..	..	..	1	1	1	1	..
Arcot, North	..	..	..	..	..	..	..	1	..	..	1	1	1	1	..
Bellary	3	3	1	10	..	..	..	..	..	..	..	..	..	..	..
Coimbatore	3	3	3	9	3	..	..	..	..	..	1	..	1	..	..
Cuddapah	3	6	3	21	3	..	..	..	..	..	..	..	..	..	..
Ganjám	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Gódávari	1	1	..	1	..	..	..	..	..	..	1	1	1	1	..
Kistna	8	10	6	40	6	..	..	..	..	..	3	3	5	3	..
Kurnool	4	4	4	18	4	..	..	..	..	..	1	1	1	1	..
Madras	2	2	1	8	..	..	..	..	1	..	..	..	..	..	..
Madura	1	1	1	4	1	..	..	..	..	..	..	..	..	..	..
Malabar	3	4	1	19	..	..	1	..	..	..	..	..	..	..	..
Nellore	2	3	2	12	2	..	..	..	..	..	1	..	1	..	..
Salem	1	1	1	5	1	..	..	..	..	..	..	..	..	..	..
Tanjore	2	2	2	5	1	..	..	1	..	..	1	1	1	1	..
Trichinopoly	2	4	2	10	2	..	..	..	..	..	..	..	..	..	..
Tinnevelly	2	2	2	11	2	..	..	..	..	..	..	..	..	..	..
Total for the year 1896	40	49	30	182	26	..	1	2	1	..	11	9	13	9	..
Total for the year 1895	55	69	44	225	42	1	..	..	..	1	17	11	22	10	1

17. The bulk of these cases were, as usual, cases in which arsenic had been employed. In two of them the juice of calotropis gigantea had been introduced on rags into the lower bowel of the animal.

B.—MISCELLANEOUS ANALYSES.

Examinations made for Government Departments, &c.

Received from	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Accountant-General, Madras	One thousand rupees for separate weighment	1	1
Board of Revenue, Madras	Salt	520	615
	Beer	65	
	Porter	1	
	Barks and leaves found in toddy	3	
	Arrack	7	
	Sonti soru	1	
	Raisin wine	9	
	Lakhium	2	
	Plantain sap	1	
	Opium	2	
	Spent wash	3	
	Spirit distilled from wash mixed with spent wash	1	
Commissariat Department, Madras	Brown sugar	2	3
	Rum	1	
Collector of Sea Customs, Madras	Blasting gelatine	8	..
	Dynamite	1	
	Petroleum	1	

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of exminations for the year.
Collector of Sea Customs, Madras—*cont.*	Oil, Kerosine	23	149
	,, Turpentine	7	
	,, Raw linseed	4	
	,, Boiled linseed	3	
	,, Double boiled linseed	3	
	,, Pale boiled	1	
	,, Bloomless raw	4	
	,, Rangoon	1	
	,, Ice Factory	1	
	,, Spindle	1	
	,, Special gas	1	
	,, Compressor	1	
	,, Heavy mineral	2	
	,, Olive	7	
	,, Lucca	1	
	,, Amygdal Dulc.	1	
	,, Santal Flav.	1	
	,, Copaiba	1	
	Paint, &c., white zinc	11	
	,, red lead	1	
	,, lemon chrome	5	
	,, best lemon yellow	2	
	,, lemon yellow	1	
	Dye, soluble violet	1	
	,, roccelline	2	
	,, magenta crystals	1	
	,, scarlet R	1	
	,, fast stick lac	1	
	Silver thread	1	
	Gum Copal	1	
	Pepsina Porci	1	
	Pyny Pectoral	1	
	Amer d'or (bitter)	1	
	Extrait d'Absinthe	1	
	China Serravallo ferruginosa	1	
	Essence of ginger ale	1	
	,, Jamaica ginger	1	
	,, lemon	1	
	Coca tonic champagne	1	
	Coca wine	1	
	Quinine tonic	1	
	Syrup Hematic Hypophosphitis	1	
	Ammonium Sulphate	1	
	Superphosphate manure	1	
	Liquor waste	1	
	Kainite	1	
	Caoutchoucine	1	
	Methylated spirits	3	
Collector of Gódávari	Sulphurous earth	29	
Collector of South Arcot	Mineral earth	3	4
Collector of Cuddapah	Caoutchoucine	1	
Commissioner of Police, Madras	Opium	12	12
Civil Surgeon, Cocanada	Kulloy and cooking vessels	1	1
Executive Engineer, Madura Division	Ganjah	6	6
Head Assistant Magistrate, Musiri	Water	1	1
Jail Department—For all Jails	Suspected stupefying drug	1	1
Her Majesty's Penitentiary, Madras.	Standard solutions for water analyses	4	4
District Jail, Madura	Water	9	55
Do. Nellore	Do.	2	
Do. Berhampur	Do.	7	
Do. Palamcottah	Do.	2	
Central Jail, Trichinopoly	Do.	3	
Do. Coimbatore	Do.	1	
Do. Rajahmundry	Do.	4	
Do. Bellary	Do.	2	
Hill Jail, Russellkonda	Do.	2	
Do. Párvátipuram	Do.	2	
District Jail, Tanjore	Do.	3	
Do. Vizagapatam	Do.	1	
Central Jail, Vellore	Do.	4	
Do. Cannanore	Do.	1	
Do. Salem	Do.	8	
Medical Officer, Station Hospital, Pallávaram	Do.	2	
Do. do. Ramandrug	Do.	2	
Medical Officer, 6th Regiment, Madras Infantry, Berhampur	Do.	2	2
Medical Officer, 20th Regiment, Madras Infantry, Vizianagram	Do.	3	3
Medical Storekeeper to Government, Madras Command	Do.	2	2
	Do.	4	4
	Carbolic powder	1	1

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Municipalities and District Boards—Madras	Sewage	2	23
	Water	4	
Cochin	Do.	1	
Gudiyáttam	Do.	1	
Madura	Do.	2	
Walajapet	Do.	2	
Palamcottah	Do.	1	
Bellary	Do.	3	
Trichinopoly	Do.	2	
Ootacamund	Do.	3	
Guntúr	Do.	1	
Bangalore	Poudrette	1	
Officer in charge of Telegraph Stores, Madras	Disinfecting powder	5	5
Ordnance Officer, Arsenal, Madras	Liquor, Potassium Ferricyanide	1	8
	Sodium bi-carbonate	1	
	Soda crystals	1	
	Bees' wax	1	
	White arsenic	1	
	Borax	1	
	Shellac	1	
	Camphor	1	
Presidency Magistrate, Black Town, Madras	Milk	2	2
Resident Medical Officer, General Hospital, Madras.	Silver wire	1	2
	Urinary gravel	1	
Railway—Bezwada-Madras	Water	11	16
East Coast	Water	5	
Sanitary Commissioner, Madras	Salt found in bed of Hagari river	1	1
Senior Medical Officer, General Hospital, Madras	Antiseptic gauze	1	2
	Pathological fluid	1	
Second Physician, General Hospital, Madras	Ascitic fluid	1	4
	Morphia mixture	1	
	Liquor Morphiæ Hydrochloratis	1	
	Hydrochlorate of Morphia	1	
Stationary Sub-Magistrate, Ernad	Suspected opium	1	1
,, ,, Tindivanam	Suspected explosives	6	6
,, ,, Sáttúr	Suspected intoxicating drug	1	1
Second-class Magistrate, Negapatam	Lakhium	4	4
,, ,, Vanur	Illicit salt	1	1
Superintendent of Stationery, Madras	Inks	12	12
,, of Lepper Hospital, Madras	Specific for leprosy	1	1
,, of Government Lunatic Asylum, Madras.	Water	1	1
,, of Central Museum, Madras	Minerals	5	5
Private Parties and Firms	Water	13	86
	Silica	1	
	Cement	4	
	Limestone	1	
	Earth	1	
	Mineral	1	
	Clay	2	
	Jaggery	16	
	Brown sugar	2	
	Molasses	1	
	Kerosine oil gas	1	
	Scotch shale oil gas	1	
	Hydrocarbon deposit from compressed shale oil gas.	1	
	Dynamite	11	
	Stonite	2	
	Carbonite	2	
	Gelignite	2	
	Blasting gelatine	3	
	Fish guano	3	
	Poudrette	1	
	Cuttle-fish shells	1	
	Sulphated salt	1	
	Phosphatic nodules	1	
	Castor poonac	2	
	Ground phosphates	1	
	Gas liquor	1	
	Skin	1	
	Leather washers	1	
	Castor oil	1	
	Beer	2	
	Ragi flour	4	
	Indigo	1	
	Total	1,045	1,045

18. *Analyses for the Board of Revenue*, which have about doubled in the past five years, show again a slight increase over last year's work. The number of assistants granted by the Board is, however, two—the same as when the special staff for salt analyses was first sanctioned. These assistants however not only do salt work, but they also assist in the miscellaneous work of the laboratory generally. The number of malt liquor samples examined was double that of the previous year, and the remaining articles were examined chiefly for adulteration and for alcoholic value.

19. *Mineral Earths.*—A sample of earth obtained from Korukonda Hill, in the Rumpa Agency, and said to be used by the potters there for polishing pots, was found to contain graphite. It contained lumps of impure graphite scattered through the earth and an average sample yielded twenty per cent. by weight of carbon. Three samples of earth from Narsapur taluk (Gódávari) were examined and found to contain natural sulphur, two of the samples having as much as 50 and 56 per cent. of it. With heavy prices to be paid for imported sulphuric acid, and phosphatic nodules awaiting conversion on a paying scale, it might be worth making further enquiries, unless Government have already received a report from the Collector of Gódávari as to the extent of these sulphur deposits and the feasibility of locally manufacturing sulphuric acid.

20. *Incendiarism.*—Six alleged "explosive" substances were forwarded for examination by a Sub-Magistrate under the following circumstances. A thatched building suddenly caught fire, but fortunately the fire was got under. When the grass roof was being dismantled, some small packets were discovered in the thatch and witnesses spoke to having seen a man with similar packets in his waist meddling with the roof. On examination, I found small pellets of moist cowdung enclosed in wet rags. These pellets fumed on exposure to air and were proved to contain phosphorus by their yielding spontaneously inflammable phosphoretted hydrogen, when heated with an alkali. The incendiary evidently knew that phosphorus would not inflame spontaneously when protected from contact with air, and so he judiciously diffused it in wet cowdung and wrapped the whole in damp rags. There can be no doubt that the villain did this to gain time and make his escape, for the phosphorus would not inflame until the coverings had got dry by the heat of the sun. Many village fires, arising from untraced causes and apparently spontaneous, may be explained in the light of this detection.

It is not often that the rule is carefully observed as to giving intimation to the Chemical Examiner whether articles sent to him for examination should be returned or not; but in this case the officer forwarding these "explosives" specially intimated that "none of the articles need be returned after examination."

Analyses for the Customs Department.

21. *Methylated Spirits.*—There were twenty-nine samples examined for the Collector of Sea Customs, and of these sixteen were rejected as insufficiently rendered unfit for consumption. There were also fifteen samples of caoutchoucine examined and found to be of proper strength for spoiling spirits.

In the course of some public comments upon an abkári prosecution it was recently stated that a method of rendering palatable spirit which had been methylated must be known to natives; and statements were made which were evidently based on a misunderstanding of what was meant by "methylated spirit." This expression is correctly applied to spirit which has been spoiled by methyl alcohol, or wood spirit; and confusion has been introduced by applying the expression also to spirit which has been spoiled by "caoutchoucine." It is the latter agent which is employed for spoiling country-made spirit, and such spirit should consistently be called "caoutchoucined spirit," reserving the former expression for imported spirit which has been spoiled, before importation, by methyl alcohol. At any rate it is the spirit spoiled with caoutchoucine which is common in the bazaars and which gives the familiar turbidity on the addition of water to it; and there is certainly no known method of separating the spoiling agent and rendering such spirit palatable, although a case came to my notice in which a native was stated to have drunk caoutchoucined

spirit while in a very drunken fit. Spirit spoiled with "methyl alcohol" is however as a matter of fact not permitted to pass, since the orders of Government are that methylated spirit should have been spoiled with "*crude wood spirit*" but not with the rectified wood spirit known as methyl alcohol. It is the contravention of this rule which has led to the rejection of the sixteen samples referred to and of several other samples in previous years. The "*methylated spirit*" which is passed into consumption has satisfied me as the testing officer; but as I pointed out in my annual report for 1889, even European palates can relish such spirits on a Sunday, when public houses are closed, then why not natives of this country? The spoiling agent has, since I wrote those remarks, been changed in Great Britain, and the introduction of the change here also may be advisable.

22. *Oils, Paints, Colours, &c.*—Excluding 23 samples of kerosine-oil examined under the Petroleum Act, there were 41 samples of other oils examined for the Customs department chiefly under the Merchandise Marks Act. These included 12 samples of lubricating and heavy mineral oil, 7 of turpentine, 11 of linseed oil, 8 of olive oil, and 3 of essential oils. The whole of the seven samples of turpentine were found to be adulterated, with foreign hydrocarbon oil, some to the extent of 75 per cent. Of the eleven samples of linseed oil, six were found to be practically pure and the rest were adulterated with mineral oil, one sample to the extent of 77 per cent. The amendment of the definition of the word "Petroleum" in the Petroleum Act, so as to include such mixtures, has been under the consideration of the Government of India. Of the eight samples of olive oil examined, five were found to be adulterated. Of the three essential oils examined, one declared to be sandalwood oil was grossly adulterated. There were twenty samples of paints and colours examined, chiefly zinc white, red lead, and yellow chromes; and of these only three chromes were found to be practically pure, the rest being all more or less adulterated.

It is impossible to give any idea of the attempts to conceal the sophistications perpetrated, especially in the case of oils. Some of the frauds are well thought out, others again are equally clumsy. While the identification of a pure oil is a matter of comparative ease, the detection of every individual oil, in a mixture of even two oils, is frequently a task of great difficulty. The physical properties of oils, such as their specific gravity, solidifying point, odour, taste, and their general colour reactions and "temperature re-action", do to some extent afford important indications of the purity of the substances under examination; but many of these properties are kept within normal limits by judicious admixture of oils having widely different properties. In fact, the methods of sophistication have developed into a technical art, and the detective chemist must keep himself posted up in the ever increasing methods of testing which are called forth by the discovery of new adulterants and revealed in current literature. These less reliable properties of an oil referred to cannot be totally ignored and must be investigated, and the analyst has, in addition, to split the mixture of oils into their chemical constituents and to endeavour to identify them. The separation and the examination of the fatty acids is compulsory, their melting and solidifying points, the percentage amount of volatile and of insoluble fatty acids, the proportion of such unsaturated acids, the saponification value of the oils, their optical behaviour tested by the spectroscope and the polariscope, and a number of other constants have to be determined for each oil before sufficient data can be obtained for getting an inkling of the direction in which to look for any adulterants which may be present. I particularise these facts here because although the number of samples of oil examined appear small, when expressed by the number 41, yet the actual number of analyses performed upon them could not be much under 400.

In addition to these there were examined for the Customs department several dyes, explosives, various drugs and patent medicines, chemical manures and sundry other imported articles, for purposes of classification and of levying duty.

23. The principal miscellaneous analyses for other departments consisted of the examination of articles for purity on behalf of the Arsenal and Commissariat, minerals for the Central Museum, inks for the Stationery department, opium, ganjah, disinfectants and pathological substances for various other departments, and chiefly manures, cements and sugars for private parties. As usual, a large number of water

analyses were performed on behalf of municipalities and the Jail department, to ascertain the quality of water for drinking purposes. A number of waters was also examined for the East Coast Railway and for the Madras-Bezwada Railway to ascertain their fitness for drinking and for locomotive purposes.

24. The service books of the establishment are up to date, and the inventory of valuable stock has been kept and duly checked in accordance with G.O., No. 920, Financial, dated 18th September 1893.

25. The concluding tabular statement of medico-legal work performed during the year is appended as usual.

TABLE IX.—*Tabular Statement for the year.*

Nature of work.	Total number of cases.	Total number of articles received for examination.	Total number of cases in which poison was detected.	Total number of cases in which blood was detected.	Total number of cases in which semen was detected.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, mercuric salt and dhatura.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide, orpiment and realgar.	Arsenious oxide, orpiment and metallic mercury.	Arsenious oxide and cinnabar.	Arsenious oxide and realgar.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Antimony and mercuric salt.	Copper salt.	Corrosive sublimate and atropine.	Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	(Ganjah.	Liniment of camphor, belladonna, chloroform and aconite.	Oleander.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Human cases. { Class A ..	87	643	60	..	..	30	2	1	1	..	..	..	1	..	..	..	1	..	1	..	3	..	1	1	1	2	3	..	5	1	..	1	3	1	1	..	2	1	..	4
Class B ..	17	55	12	..	..	4	..	..	..	..	..	..	..	1	..	..	..	..	..	..	4	..	..	..	..	4	3	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Blood stains, &c. ..	32	108	..	23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Semina stains ..	12	35	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cattle cases. { Class A ..	40	182	30	..	..	26	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	1	..	..	2	..	..	..
Class B ..	11	13	9	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Examinations for Government departments ..	959	959	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Examinations for private parties and firms ..	86	86	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year 1896	1,244	2,081	111	23	2	69	2	1	1	..	..	..	1	1	..	2	1	..	1	..	7	1	1	1	2	4	3	1	1	5	1	1	2	1	2	1	2	2	1	2	4
Total for the year 1895	1,243	2,065	119	21	..	78	8	..	1	1	1	..	..	..	2	1	..	1	..	1	4	3	1	..	1	2	4	3	1	1	..	..	1	3	1	1	..	2	1	2	4

5

[Statement

Order—No. 489, Public, dated 30th April 1897.

From the statement in paragraph 2 of the report it appears that, while the total number of investigations made and articles examined by the Chemical Examiner in 1896 remained about the same as in the previous year, there was a decrease under medico-legal investigations and an increase under miscellaneous analyses.

2. The total number of cases of suspected human poisoning was the same as in 1895, viz., 104; the percentage of detections, however, reached 69·23, surpassing the highest previous record—that of 1894—by 3 per cent. The large percentage of detections is satisfactory as evincing not only increased efficiency in investigation, but also a decrease in the number of fictitious cases sent up for examination.

The attention of all Judicial officers concerned will, with reference to the orders marginally noted, again be drawn to the failure complained of in paragraph 8 of the Chemical Examiner's report. Individual cases of such failure should in future be specially noted by the Chemical Examiner in his annual report. The attention of that officer will at the same time be directed to paragraph 2 of G.O., No. 2418, Judicial, dated 21st November 1893.

G.O., No. 1478, Public, dated 29th June 1885 (paragraph 3).
G.O., No. 1009, Judicial, dated 13th June 1890.

3. Organic poison was discovered in 50 and inorganic in 22 cases, the corresponding figures in 1895 being 47 and 17. These cases referred to 110 persons, and 41 deaths occurred; the corresponding figures in the previous year were 125 and 39, respectively.

4. There were 32 cases of suspected blood stains, and 108 articles were examined, blood being discovered in 23 cases. In 1895, blood was detected in 21 out of 41 cases, 155 articles being examined.

5. In two out of the twelve suspected cases of seminal stains sent up the investigation was successful. In 1895, nine cases were examined with negative results. The Government is glad to note that the articles transmitted in these cases were packed in a completely satisfactory manner.

6. Fifty-one cases of cattle-poisoning were investigated against 72 in the previous year. Arsenious oxide was the agent employed in 35 out of 39 cases in which poison was detected. The percentage of detection was 76·4—the same as in 1895.

7. Analyses were made in 1,045 miscellaneous cases against 1,017 in 1895. There was an increase in the work done for the Board of Revenue and for the Customs Department, the number of investigations being 615 and 149, respectively, against 595 and 91 of 1895.

8. The attention of the Revenue and Judicial Departments, respectively, will be invited to paragraphs 19 and 20 of the report.

9. With regard to the complaint of the Chemical Examiner as to the insufficiency of accommodation in his laboratory, supported by the Surgeon-General, the Public Works Department will be requested to direct the Consulting Architect to prepare plans and estimates for the necessary additions, which will be considered when the financial outlook will permit.

10. The report constitutes, as usual, an interesting and satisfactory record of good work done by the Chemical Examiner.

(True Extract.)

Chief Secretary.

To the Surgeon-General.
" Sanitary Commissioner.
" Revenue Department.
" Judicial Department.
" Local and Municipal Department.
" Inspector-General of Police.
" Secretary to the Government of Hongkong (with C.L).
" District Magistrates.
" Sessions Judges.
" Hon'ble the Chief Justice (with C.L).
" Director of Government Cinchona Plantations, Nilgiris.
" Public Works Dept
Editors' Table.

Endorsement—No. 490, Public, dated 30th April 1897.

Copy to the Government of India, Home Department.

J. F. PRICE,
Chief Secretary.

Ext. A. Raitt.

Government {1897} of Madras.

PUBLIC.

Recd. } 1897. *Enclosures*

Regd. } *Spare copies*

G.O., &c., Nos. 489, 490, 30th April 1897.

APRIL.

Chemical Examiner's Report.

Reviewing the — for 1896, and requesting the Public Works Department to direct the Consulting Architect to prepare plans and estimates for the extension of the Chemical Examiner's laboratory for consideration when the financial outlook will permit. Copy to the Government of India.

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

Read—the following papers:—

From Surgeon-Major-General C. SIBTHORPE, F.R.C.P.I., Surgeon-General with the Government of Madras, to the Chief Secretary to Government, dated Madras, 10th April 1897, No. 219.

I have the honour to forward you the annual report for 1896 of the Chemical Examiner to Government, which has been drawn up with great care.

2. I would call attention to his suggestions regarding the extension of his laboratory, with which I concur, and hope that Government will sanction plans and estimates being made out in order that the work may be carried out when funds are available.

3. The point noted by him in paragraph 20 appears an important one and it appears desirable that the facts should be made known to the police and magisterial authorities.

From Surgeon-Major J. L. VanGEYZEL, M.B., F.I.C., F.C.S., Chemical Examiner, to the Chief Secretary to Government (through the Surgeon-General with the Government of Madras), dated Madras, 6th April 1897, No. 393.

I have the honour to submit the annual report of this department for the year 1896.

2. The numerical statement of work done in the past two years is given in the following table:—

Table I.

—	—	Number of cases investigated.		Number of articles examined.	
		1896.	1895.	1896.	1895.
A.—Medico-legal investigations.	I. Cases of suspected human poisoning	104	104	698	620
	II. Blood stains, &c.	32	41	108	155
	III. Seminal stains	12	9	35	26
	IV. Cases of suspected cattle poisoning	51	72	195	247
	Total ..	199	226	1,036	1,048
B.—Miscellaneous analyses.	For Government departments and municipalities ..	959	963	959	963
	For private parties and firms	86	54	86	54
	Total ..	1,045	1,017	1,045	1,017
	Grand Total ..	1,244	1,243	2,081	2,065

3. The total number of investigations and of articles examined was practically alike in the two years, but the medico-legal work has been more expeditiously performed than it has been for several years past. The diminution in the *number* of medico-legal cases has occurred in sections of the work which make comparatively

small demands upon the time and energy of the staff, viz., in cattle cases: but that decrease has been more than counterbalanced by the nature of the work demanded in the examination of an increased number of articles in human-poisoning cases and of articles examined for the Customs department. These latter examinations are not the least important section of the work performed in this laboratory now and they demand a degree of skill and occupy an amount of time which cannot be conveyed by a mere numerical expression of the articles examined. On the whole, the work done has in every way been without exception the heaviest of any year within my experience.

4. In this connection, I wish to mention that the working accommodation in this laboratory has been very severely strained of late, and that portions of work in progress had in several instances to be stopped and postponed on account of the overcrowding which took place with three analysts carrying on work of different sorts in the same room and often perforce on the same counters. On some occasions, in which a large number of articles in medico-legal cases had to be examined, all other work had to be practically stopped for several days, the risk of accidents occuring or of articles getting exchanged and losing their identity during the various steps of their examination being too great to permit of anything else being brought out of their cupboards for examination. In a less degree, the same thing has happened of late in many other instances. The want of a room which can be properly darkened or of a permanent dark room in the laboratory has been felt, and examinations requiring such a room or the use of artificial light have to be carried on at night or in my own dark room at my house, to and from which apparatus have to be conveyed. While I write these remarks a case has been referred to me officially in which photographic methods of investigation are required, and though such demands are not frequent, yet they have been made several times before. Such work cannot be given out for obvious reasons and must be performed personally, of necessity in my house after office hours. A large number of oils and many other substances have required optical methods of examination during the year, and the want of a convenient room suitable for the performance of such work and in which apparatus could be left ready for use has been greatly felt, as much time is lost in setting up and taking down apparatus which are too valuable to be left about. Some of these pieces of expensive and valuable apparatus have to be put right away to prevent damage from laboratory fumes, while others which are in constant use suffer deterioration from this cause at a much greater rate than they would do if suitably accommodated. For the same reason, articles awaiting examination are often crowded out of cupboards and have to be kept unlocked. More working room would also conduce to the health and convenience of the working staff, and for all these various reasons I beg to bring to the notice of Government that the present laboratory accommodation needs expansion, and that this can be effected by an inexpensive extension of the centre room southwards over the flat roof of the Practical Chemistry class-room belonging to the Medical College. The Principal of the Medical College has told me that he would not object to grant this space, and the Consulting Architect, in the course of a visit through the college buildings, said that the indicated extension was feasible. In the interests of the work performed, of apparatus and of articles under examination, which require greater safeguarding, the extension is a necessity which I beg to commend to the notice of Government for as early execution as the present financial pressure will permit.

A.—MEDICO-LEGAL INVESTIGATIONS.

I.—Cases of suspected Human Poisoning.

5. The usual information regarding these cases is furnished in the two following statistical statements:—

TABLE II.—*Human Cases—Class A.*

(Including cases in which viscera or evacuations were examined with or without suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and dhatura.	Arsenious oxide and realgar.	Arsenious oxide, orpiment and realgar.	Copper salt.	Mercuric salt.	Orpiment.	Organic. Aconite.	Calotropis gigantea.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
Arcot, North	1	1	14	..	..	..	..	..	..	..	..	..	..	1	..	..
Arcot, South	1	1	3	..	..	..	..	..	..	..	..	..	1	..	..	..
Bellary	3	2	12	..	..	1	..	..	..	..	..	..	..	1	..	..
Chingleput	1	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	4	3	7	2	..	..	..	..	..	..	..	..	1	..	..	..
Kurnool	2	2	3	..	..	..	2	..	..	..	..	..	..	..	..	..
Madras	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Vizagapatam	2	1	8	1	..	..	..	..	..	..	..	..	..	..	1	..
Total for the year 1896	17	12	55	4	..	1	2	..	..	..	..	..	2	2	1	..
Total for the year 1895	22	15	45	3	1	..	..	1	3	1	1	1	2	1	..	1

* *Vide* case (*e*) recorded in paragraph 10.

TABLE III.—*Human Cases—Class B.*

(Including cases in which no viscera or evacuations were received for examination, but only suspected substances, food, &c.)

Districts received from.	Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and dhatura.	Arsenious oxide and realgar.	Arsenious oxide, orpiment and realgar.	Copper salt.	Mercuric salt.	Orpiment.	Organic. Aconite.	Calotropis gigantea.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
Arcot, North	1	1	14	..	..	..	..	..	..	..	..	..	..	1	..	..
Arcot, South	1	1	3	..	..	..	..	..	..	..	..	..	1	..	..	..
Bellary	3	2	12	..	..	1	..	..	..	..	..	..	..	1	..	..
Chingleput	1	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..
Kistna	4	3	7	2	..	..	..	..	..	..	..	..	1	..	..	..
Kurnool	2	2	3	..	..	..	2	..	..	..	..	..	..	..	..	..
Madras	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Nellore	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly	1	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Vizagapatam	2	1	8	1	..	..	..	..	..	..	..	..	..	..	1	..
Total for the year 1896	17	12	55	4	..	1	2	..	..	..	..	..	2	2	1	..
Total for the year 1895	22	15	45	3	1	..	..	1	3	1	1	1	2	1	..	1

6. The percentage of detections to cases examined is compared with that for the previous year in the following table :—

TABLE IV.

	A. Cases in which viscera or evacuations were examined. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	B. Cases in which only suspected food, &c., was received for examination. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.	Total. Total number of cases.	Number of cases in which poison was detected.	Percentage of detections.
1895	82	49	59·75	22	15	68·18	104	64	61·53
1896	87	60	68·96	17	12	70·58	104	72	69·23

7. The ratio of detections to cases examined last year was only 5 per cent. less than in 1894, in which year the highest percentage of detections for a number of years had been recorded. The number of detections has in the year under review surpassed the highest previous record by 3 per cent. A glance at the figures in the margin shows how the detections have risen in the past twelve years, and they bear testimony to the gradually increasing work thrown upon this department by the decline in the number of fictitious cases sent up for examination. Improvements in general methods of work and the gradual extension, in accordance with experience, of checks through the various details of distributed work, may also justly claim a share in the credit of the fewer failures of detection recorded in latter years.

	Percentage of detections.		Percentage of detections.
1884	46·6	1891	52·58
1885	50·0	1892	58·82
1886	56·5	1893	64·75
1887	56·9	1894	66·36
1888	57·48	1895	61·53
1889	66·18	1896	69·23
1890	65·52		

8. In recent annual reports I have endeavoured to review all the known facts in those cases in which chemical examination failed to detect any poison, in order to ascertain how far the failure may have been due to the absence of poison in the articles sent or to other causes outside of the chemical examination. In the year under review there were thirty-two cases in which poison was not detected, which may as usual be dealt with under two headings:—

I.—Eleven cases in which sixteen persons were affected without a fatal result following the circumstances which aroused suspicion of poisoning.

II.—Twenty-one cases in which twenty-one persons died under suspicious circumstances.

Group I.—Of the eleven cases in this group, no persons were affected in three cases. In one of these a black powder was taken from the person of an enemy and turned out to be black ink powder; in the other two some toddy which was suspected on account of its colour, and a substance said to have been given to a female, were found to be free from poison. Four cases have been returned by the magistrates as "false" and the complainants in some have been prosecuted for giving false information. In three cases the magistrates who ordered the chemical examination have not reported the result of their enquiries. From the information at hand, the probability is that these cases were not genuine. The remaining case is one in which five persons suffered from undoubted dhatura poisoning and in which the accused was sentenced to a year's rigorous imprisonment. The purged matter sent for examination did not contain dhatura, and it was not likely to do so.

Group II.—These twenty-one cases fall into three classes:—

Class (a).—Eighteen cases in which the balance of evidence was in favour of death from disease, or from drowning or hanging.

Class (b).—Two cases in which there is not sufficient evidence in favour either of poison or of a natural cause to account for death. In one of these, a byragi was found dead in a choultry, and three days after burial the corpse was exhumed and portions sent here for examination. In the other case, a man was reported to have been seized with vomiting and purging in the fields and died there in a fit. Twenty-five days after burial his corpse was exhumed and the whole contents of the grave were forwarded here. No poison was detected in them; but the preliminary putting together of the parts and their examination in reference to questions of sex, age and identity, &c., proved a very interesting and instructive medico-legal investigation.

Class (c).—One case in which the death has been returned as one of suicide from oleander. No portions of the plant were found in the viscera, nor were any constituents extracted from them which could be identified as those belonging to this plant.

9. Poison was detected in seventy-two cases and the chief statistical information regarding them is summarised below:—

—	Inorganic.	Organic.	Total.
Cases included in Class A	43	17	72
" " in Class B	7	5	
Number of individuals affected in A and B	75	35	110
" of deaths in A and B	30	11	41

Inorganic Poisons.

10. The following are notes of a few of the cases of interest:—

(*a*) Ill-feeling between neighbours ended in the poisoning of two children, of whom one died. An arsenical sweetmeat was the instrument employed. A native quack is reported to have treated the deceased with honey and the "ashes of silk," though silk leaves no ash on ignition. Inevitably the quack's domestic medicine chest was forwarded for chemical examination, and it was found to contain as usual a large number of poisonous pills and powders together with a number of harmless substances such as cinnamon, pepper, chalk, sal-ammoniac, &c. Dried reptilian blood was found to be the contents of one of the packets.

(*b*) A woman put something into her husband's food, at the instigation of her paramour, in order to quench her husband's love. The husband's viscera contained over six grains of white arsenic, and a packet of the love-quenching drug contained over forty-five grains of white arsenic.

(*c*) A man was admitted into a dispensary with multiple injuries, and as he began to get seriously worse, his dying declaration was taken. He, however, rallied and he was then treated with calomel and antimonial powders. On the third day he was suddenly seized with faintness and expired. The relations of the man declared that he died in consequence of "something being wrong about the medicines administered." At the post-mortem examination a penetrating wound was found which extended through the lower part of the left lobe of the liver, and another wound through the chest, penetrating the left auricle of the heart. The serous cavities of the chest and abdomen contained much blood. There could be no doubt that these wounds were sufficient to account for death and must have caused death sooner or later; the wonder was that the man lived so long. But to satisfy the relatives, the viscera were forwarded for chemical examination, but no poison was found in them except in the stomach, which contained small traces of mercury and of antimony. A quantity of excreta also was sent for examination and was found to contain mercury equivalent to a little over one-fifth of a grain of calomel, and antimony equivalent to half a grain of Pulvis Antimonialis of the British Pharmacopœia. Although the death in this case was not due to poison, it has been included among detected poisoning cases in the returns, because there is no other way of returning it; but a foot-note has been added to Table II referring to this record.

(*d*) A child was given some jaggery by a passer-by and narrowly escaped death from mercurial poisoning. The culprit is reported to be still undetected. Nearly a grain of corrosive sublimate was found in a portion of the vomited matter.

(*e*) A man was seized with vomiting and purging soon after eating a meal served as usual by his wife. He continued for six days gradually getting worse. The wife, who was all the time in illicit love with another man, is reported to have "sat on his chest on the seventh day, throttled him with one hand and with the other squeezed the testicles," which were described in the post-mortem notes as in a "pulpy condition." The final injury, no doubt, accelerated the death which was approaching from the effects of arsenical poison. The woman was tried for murder and sentenced to death, but the sentence was, I believe, subsequently reversed on appeal.

(*f*) The proportion of cases in which fatal poisoning by a sulphide of arsenic takes place is very small as compared with the number of cases in which white arsenic is employed. A case occurred in the year under review in which nearly five grains of yellow sulphide of arsenic (orpiment) were found in the stomach and in the vomited matter of a child. When pure, this compound of arsenic is insoluble in water and in hydrochloric acid, and this property always suggests the question as to how such an insoluble compound can be an active poison. The answer is that commercial orpiment contains much arsenious oxide as an impurity, and it is to the presence of this impurity that the poisonous activity of orpiment is attributed.

(*g*) A corpse was found in the bed of a river, and at the post-mortem examination some suspicious particles were observed in the stomach. In the visceral matter sent here I found altogether over 133 grains of white arsenic, some of the partially digested pieces being as large as marbles.

(*h*) In a few cases of arsenical poisoning, the usual irritant symptoms are sometimes absent or only very slight, while nervous symptoms are well marked. Such a case occurred in a child who is reported to have had vomiting in half an hour

after eating some jaggery. It died soon after, evidently in a convulsion, for it is reported that "the eyes rolled upwards and the lips and tongue became blackened". Over thirty-two grains of white arsenic were found in the stomach.

(*i*) A small phial containing some fried Bengal gram was sent for examination, because a person who ate some of this suffered from severe vomiting followed by a metallic taste in the mouth. The gram was found to be intimately mixed with metallic mercury, and over thirty-two grains weight of the metal was mechanically separated from the stuff. Liquid mercury is said not to be a poison, though there are a few recorded cases which show that metallic mercury sometimes does produce poisonous effects, as it undoubtedly did in this case.

(*j*) Two girls are reported to have died from vomiting and purging. Suspicion having arisen, the bodies were disinterred a fortnight after burial. In the pulpy decomposed soft tissue sent from one of the graves, mercury was found equivalent nearly to one-tenth of a grain of corrosive sublimate. In the box of earth from the other grave were found a skull, a lower jaw, and part of a pelvic bone, and from an examination of these it was possible to fix the age of the subject as being between four and seven years. No mercury was found in these bones.

(*k*) In a case of suicide by mercurial poisoning, nearly eight grains of corrosive sublimate were found in the visceral and vomited matters. The unfortunate individual suffered such intolerable agonies from the poison that he rushed into the backyard and jumped into a well from which he was rescued and taken to hospital. He was a photographer by profession, and the chemical examination was extended to every substance found in his dark room, besides the examination of various articles of food and drink, before suspicion which rested upon innocent persons was removed.

(*l*) A novel effect was claimed for arsenic in a case in which a woman narrowly escaped death after drinking milk in which "something" had been mixed, which was said to have "the virtue of imparting a good complexion to her child *in utero*."

Organic Poisons.

11. *Aconite.*—Two cases of poisoning from this cause came under notice, in one of which a native quack poisoned his fiancée's brother because he would not give his consent to their union. The offender in this case was sentenced to death.

Dhatura.—In three cases, parts of the plant were found and identified in the matters examined; and in three, the alkaloid only was detected. Three of the cases were suicidal and proved fatal, which is not a common result of poisoning by this drug. Two cases were accidental, and one was a case in which shepherd boys were drugged in order that their flock might be stolen.

Ganjah.—Only one case of poisoning by this agent was met with in the year.

A liniment (of camphor, belladonna, chloroform and aconite) was drunk by a woman who was in grief for her daughter's death. She soon became profoundly insensible, with pupils almost fully dilated and deep stertor. Prompt treatment with the stomach pump and washing the stomach with Condy's fluid were the means of saving her.

Calotropis Gigantea accounted for three suicidal deaths. In one case a man is reported to have committed the act in a fit of inconsolable grief for the death of a child. The symptoms were reported to be "nausea, tingling of the throat, and a convulsion before death," which took place in three hours.

Plumbagin was detected in three cases in which it had been employed as an abortifacient; and in a fourth case in which it had been so used together with calotropis gigantea.

Colocynth, *Croton*, *Oleander* } was each detected in one case. The two former proved fatal.

Marking Nut.—The juice mixed with gingelly oil was used in one case by a man in order to hurt and disfigure his wife. It is a local irritant and has been used for this purpose in the same way that vitriol is thrown over the body. Fatal results have been recorded where the juice has been externally applied in this way, but happily not in the case under reference.

Opium was detected in two cases only, neither of which ended fatally.

12. The proportion of cases traced to inorganic and organic poisons is shown below:—

Table V.

Year.	Number of cases detected.	Inorganic poison.	Organic poison.	Percentage of column 3 to column 2.
1	2	3	4	5
1896	72	50	22	69·44
1895	64	47	17	73·43
1894	73	56	17	76·71
1893	79	63	16	79·74
1892	80	57	23	71·25

13. The results of the judicial enquiries into the seventy-two cases in which poison was detected may be summarised thus:—

—	Number of cases.	Number affected.	Number died.
(*a*) Without fatal result	33	61	..
(*b*) With fatal result	39	49	41
Total ..	72	110	41

In group (*a*), no results have been communicated in seven cases, eleven have been returned as undetected, struck off and no further proceedings taken; in two the accused are still at large; one is "pending," four were proved to be false; in one the accused was proved to be innocent; one was returned as suicide and another as an accidental death; in one the accused, who were found in possession of over $1\frac{1}{4}$ pounds weight of white arsenic, were bound over for good behaviour; and in four the accused were sentenced to terms of imprisonment up to seven years.

In group (*b*), no results have been communicated in six cases; eight have been returned as suicides, one as false, and six were discharged there being no *primâ facie* case against the accused; in one "the papers were recorded"; one is reported to be "pending"; two ended in imprisonment of three years in each case; in four, death sentence was passed, and two cases ended in sentences of transportation; while eight cases ended in acquittal by a Sessions Court.

II.—Blood Stains.

14. The number of articles examined for blood was less than in the previous year, though the percentage of cases detected to cases received was much higher. Mammalian blood was identified in fifteen out of the twenty-three cases. As usual, identification of human hair, bones, &c., formed a part of the examination in some of the cases. In several of the undetected cases the articles sent for examination had been in a well or had been washed or exposed to rain, and in some the nature of the suspected stains was identified, though no blood was detected in them.

Table VI.—*Blood Cases.*

Districts received from.	Number of cases.	Number of cases in which blood was detected.	Number of examinations.
Anantapur	2	1	6
Arcot, North	2	1	7
Arcot South	1	1	3
Bellary	6	4	28
Cuddapah	6	6	18
Ganjám	1	1	2
Madras	2	2	6
Madura	2	0	3
Malabar	2	1	3
Nellore	3	1	13
Salem	3	3	7
Tanjore	1	1	3
Vizagapatam	1	1	9
Total for the year { 1896 ..	32	23	108
{ 1895 ..	41	21	155

15. In five cases no judgments have been received, two have been returned as undetected, one as pending; in four the accused were discharged after preliminary enquiry; and in twenty the cases were tried by a Sessions Court, ending in acquittals in twelve cases, death sentences in five, transportation for life in two, and long imprisonment in one case.

III.—Seminal Stains.

Table VII.

Districts received from.	Number of cases.	Number of cases in which semen was detected.	Number of examinations.
Anantapur	1	..	2
Arcot, North	4	1	9
Bellary	1	..	2
Chingleput	2	..	2
Madras	1	..	1
Madura	1	..	3
Nellore	1	..	12
Tanjore	1	1	4
Total for the year { 1896 ..	12	2	35
{ 1895 ..	9	..	26

16. The articles received for examination of suspected seminal stains during the latter portion of the year were, I am glad to report, packed with scrupulous care; and I was able to detect spermatozoa on the stains in two cases received during September. In one of these two cases the offender was sentenced to two years' rigorous imprisonment, and in the other the proof of the offender's identity failed. Of the ten cases in which no sperms were detected, two were in the case of suicidal deaths of women, by strangulation and by hanging, in which stains were found on the clothes; in one case, no judgment has been received; one was a case of suspected sodomy in a jail without any other proof beyond the stains; in three, there was no *primâ facie* case at the preliminary enquiry; one ended in acquittal by a Sessions Court, one ended in imprisonment, and the last ended in a sentence of twenty stripes for a mischievous boy who attempted to deflower a child of six years.

IV.—Cases of suspected Cattle Poisoning.

Table VIII.

Districts received from.	Class A. Number of cases.	Number of deaths.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and metallic mercury.	Calotropis gigantea.	Croton seeds.	Strychnine.	Class B. Number of cases.	Number of cases in which poison was detected.	Number of analyses.	Nature of poisons. Arsenious oxide.	Orpiment.
Anantapur	3	3	1	9	1	..	..	..	..	..	1	1	1	1	..
Arcot, North	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Bellary	3	3	1	10	..	..	..	1	..	..	..	..	..	..	..
Coimbatore	3	3	3	9	3	..	..	..	..	..	1	..	1	..	..
Cuddapah	3	6	3	21	3	..	..	..	..	..	..	..	..	..	..
Ganjám	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..
Gódávari	1	1	..	1	..	..	..	..	..	..	1	1	1	1	..
Kistna	8	10	6	40	6	..	..	..	..	..	3	3	5	3	..
Kurnool	4	4	4	18	4	..	..	..	..	..	..	..	..	..	..
Madras	2	2	1	8	..	..	..	..	1	..	1	1	1	1	..
Madura	1	1	1	4	1	..	..	..	..	..	..	..	..	..	..
Malabar	3	4	1	19	..	..	1	..	..	..	..	..	..	..	..
Nellore	2	3	2	12	2	..	..	..	..	..	1	..	1	..	..
Salem	1	1	1	5	1	..	..	..	..	..	..	..	..	..	..
Tanjore	2	2	2	5	1	..	..	1	..	..	1	1	1	1	..
Trichinopoly	2	4	2	10	2	..	..	..	..	..	..	..	..	..	..
Tinnevelly	2	2	2	11	2	..	..	..	..	..	..	..	..	..	..
Total for the year { 1896 ..	40	49	30	182	26	..	1	2	1	..	11	9	13	9	..
{ 1895 ..	55	69	44	225	42	1	..	..	..	1	17	11	22	10	1

17. The bulk of these cases were, as usual, cases in which arsenic had been employed. In two of them the juice of calotropis gigantea had been introduced on rags into the lower bowel of the animal.

B.—MISCELLANEOUS ANALYSES.

Examinations made for Government Departments, &c.

Received from	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Accountant-General, Madras	One thousand rupees for separate weighment	1	1
Board of Revenue, Madras	Salt	520	615
	Beer	65	
	Porter	1	
	Barks and leaves found in toddy ..	3	
	Arrack	7	
	Sonti soru	1	
	Raisin wine	9	
	Lakhium	2	
	Plantain sap	1	
	Opium	2	
	Spent wash	3	
	Spirit distilled from wash mixed with spent wash	1	
Commissariat Department, Madras	Brown sugar	2	3
	Rum	1	
Collector of Sea Customs, Madras	Blasting gelatine	8	..
	Dynamite	1	
	Petroleum	1	

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of exminations for the year.
Collector of Sea Customs, Madras—*cont.*	Oil, Kerosine	23	149
	,, Turpentine	7	
	,, Raw linseed	4	
	,, Boiled linseed	3	
	,, Double boiled linseed	3	
	,, Pale boiled	1	
	,, Bloomless raw	4	
	,, Rangoon	1	
	,, Ice Factory	1	
	,, Spindle	1	
	,, Special gas	1	
	,, Compressor	1	
	,, Heavy mineral	2	
	,, Olive	7	
	,, Lucca	1	
	,, Amygdal Dulc.	1	
	,, Santal Flav.	1	
	,, Copaiba	1	
	Paint, &c., white zinc	11	
	,, red lead	1	
	,, lemon chrome	5	
	,, best lemon yellow	2	
	,, lemon yellow	1	
	Dye, soluble violet	1	
	,, roccelline	2	
	,, magenta crystals	1	
	,, scarlet R	1	
	,, fast stick lac	1	
	Silver thread	1	
	Gum Copal	1	
	Pepsina Porci	1	
	Pyny Pectoral	1	
	Amer d'or (bitter)	1	
	Extrait d'Absinthe	1	
	China Serravallo ferruginosa	1	
	Essence of ginger ale	1	
	,, Jamaica ginger	1	
	,, lemon	1	
	Coca tonic champagne	1	
	Coca wine	1	
	Quinine tonic	1	
	Syrup Hematic Hypophosphitis	1	
	Ammonium Sulphate	1	
	Superphosphate manure	1	
	Liquor waste	1	
	Kainite	1	
	Caoutchoucine	3	
	Methylated spirits	29	
Collector of Gódávari	Sulphurous earth	3	4
Collector of South Arcot	Mineral earth	1	
Collector of Cuddapah	Caoutchoucine	12	12
Commissioner of Police, Madras	Opium	1	1
Civil Surgeon, Cocanada	Kulloy and cooking vessels	6	6
Executive Engineer, Madura Division	Ganjah	1	1
Head Assistant Magistrate, Musiri	Water	1	1
Jail Department	Suspected stupefying drug	4	4
For all Jails	Standard solutions for water analyses	9	55
Her Majesty's Penitentiary, Madras.	Water	2	
District Jail, Madura	Do.	7	
Do. Nellore	Do.	2	
Do. Berhampur	Do.	3	
Do. Palamcottah	Do.	1	
Central Jail, Trichinopoly	Do.	4	
Do. Coimbatore	Do.	2	
Do. Rajahmundry	Do.	2	
Do. Bellary	Do.	2	
Hill Jail, Russellkonda	Do.	3	
Do. Párvátipuram	Do.	1	
District Jail, Tanjore	Do.	4	
Do. Vizagapatam	Do.	1	
Central Jail, Vellore	Do.	8	
Do. Cannanore	Do.	2	
Do. Salem	Do.	2	
Medical Officer, Station Hospital, Pallávaram	Do.	2	2
Do. do. Ramandrug	Do.	3	3
Medical Officer, 6th Regiment, Madras Infantry, Berhampur	Do.	2	2
Medical Officer, 20th Regiment, Madras Infantry, Vizianagram	Do.	4	4
Medical Storekeeper to Government, Madras Command	Carbolic powder	1	1

Examinations made for Government Departments, &c.—*cont.*

Received from.	Nature of substance.	Number of examinations.	Total number of examinations for the year.
Municipalities and District Boards. Madras	Sewage	2	23
	Water	4	
Cochin	Do.	1	
Gudiyáttam	Do.	1	
Madura	Do.	2	
Walajapet	Do.	2	
Palamcottah	Do.	1	
Bellary	Do.	3	
Trichinopoly	Do.	2	
Ootacamund	Do.	3	
Guntúr	Do.	1	
Bangalore	Poudrette	1	
Officer in charge of Telegraph Stores, Madras	Disinfecting powder	5	5
Ordnance Officer, Arsenal, Madras	Liquor, Potassium Ferricyanide	1	8
	Sodium bi-carbonate	1	
	Soda crystals	1	
	Bees' wax	1	
	White arsenic	1	
	Borax	1	
	Shellac	1	
	Camphor	1	
Presidency Magistrate, Black Town, Madras	Milk	2	2
Resident Medical Officer, General Hospital, Madras.	Silver wire	1	2
	Urinary gravel	1	
Railway. Bezwada-Madras	Water	11	16
East Coast	Water	5	
Sanitary Commissioner, Madras	Salt found in bed of Hagari river	1	1
Senior Medical Officer, General Hospital, Madras	Antiseptic gauze	1	2
	Pathological fluid	1	
Second Physician, General Hospital, Madras	Ascitic fluid	1	4
	Morphia mixture	1	
	Liquor Morphiæ Hydrochloratis	1	
	Hydrochlorate of Morphia	1	
Stationary Sub-Magistrate, Ernad	Suspected opium	1	1
,, ,, Tindivanam	Suspected explosives	6	6
,, ,, Sáttúr	Suspected intoxicating drug	1	1
Second-class Magistrate, Negapatam	Lakhium	4	4
,, ,, Vanur	Illicit salt	1	1
Superintendent of Stationery, Madras	Inks	12	12
,, of Leper Hospital, Madras	Specific for leprosy	1	1
,, of Government Lunatic Asylum, Madras.	Water	1	1
,, of Central Museum, Madras	Minerals	5	5
Private Parties and Firms	Water	13	86
	Silica	1	
	Cement	4	
	Limestone	1	
	Earth	1	
	Mineral	1	
	Clay	2	
	Jaggery	16	
	Brown sugar	2	
	Molasses	1	
	Kerosine oil gas	1	
	Scotch shale oil gas	1	
	Hydrocarbon deposit from compressed shale oil gas.	1	
	Dynamite	11	
	Stonite	2	
	Carbonite	2	
	Gelignite	2	
	Blasting gelatine	3	
	Fish guano	3	
	Poudrette	1	
	Cuttle-fish shells	1	
	Sulphated salt	1	
	Phosphatic nodules	1	
	Castor poonac	2	
	Ground phosphates	1	
	Gas liquor	1	
	Skin	1	
	Leather washers	1	
	Castor oil	1	
	Beer	2	
	Ragi flour	4	
	Indigo	1	
	Total	1,045	1,045

18. *Analyses for the Board of Revenue*, which have about doubled in the past five years, show again a slight increase over last year's work. The number of assistants granted by the Board is, however, two—the same as when the special staff for salt analyses was first sanctioned. These assistants however not only do salt work, but they also assist in the miscellaneous work of the laboratory generally. The number of malt liquor samples examined was double that of the previous year, and the remaining articles were examined chiefly for adulteration and for alcoholic value.

19. *Mineral Earths.*—A sample of earth obtained from Korukonda Hill, in the Rumpa Agency, and said to be used by the potters there for polishing pots, was found to contain graphite. It contained lumps of impure graphite scattered through the earth and an average sample yielded twenty per cent. by weight of carbon. Three samples of earth from Narsapur taluk (Gódávari) were examined and found to contain natural sulphur, two of the samples having as much as 50 and 56 per cent. of it. With heavy prices to be paid for imported sulphuric acid, and phosphatic nodules awaiting conversion on a paying scale, it might be worth making further enquiries, unless Government have already received a report from the Collector of Gódávari as to the extent of these sulphur deposits and the feasibility of locally manufacturing sulphuric acid.

20. *Incendiarism.*—Six alleged "explosive" substances were forwarded for examination by a Sub-Magistrate under the following circumstances. A thatched building suddenly caught fire, but fortunately the fire was got under. When the grass roof was being dismantled, some small packets were discovered in the thatch and witnesses spoke to having seen a man with similar packets in his waist meddling with the roof. On examination, I found small pellets of moist cowdung enclosed in wet rags. These pellets fumed on exposure to air and were proved to contain phosphorus by their yielding spontaneously inflammable phosphoretted hydrogen, when heated with an alkali. The incendiary evidently knew that phosphorus would not inflame spontaneously when protected from contact with air, and so he judiciously diffused it in wet cowdung and wrapped the whole in damp rags. There can be no doubt that the villain did this to gain time and make his escape, for the phosphorus would not inflame until the coverings had got dry by the heat of the sun. Many village fires, arising from untraced causes and apparently spontaneous, may be explained in the light of this detection.

It is not often that the rule is carefully observed as to giving intimation to the Chemical Examiner whether articles sent to him for examination should be returned or not; but in this case the officer forwarding these "explosives" specially intimated that "none of the articles need be returned after examination."

Analyses for the Customs Department.

21. *Methylated Spirits.*—There were twenty-nine samples examined for the Collector of Sea Customs, and of these sixteen were rejected as insufficiently rendered unfit for consumption. There were also fifteen samples of caoutchoucine examined and found to be of proper strength for spoiling spirits.

In the course of some public comments upon an abkári prosecution it was recently stated that a method of rendering palatable spirit which had been methylated must be known to natives; and statements were made which were evidently based on a misunderstanding of what was meant by "methylated spirit." This expression is correctly applied to spirit which has been spoiled by methyl alcohol, or wood spirit; and confusion has been introduced by applying the expression also to spirit which has been spoiled by "caoutchoucine." It is the latter agent which is employed for spoiling country-made spirit, and such spirit should consistently be called "caoutchoucined spirit," reserving the former expression for imported spirit which has been spoiled, before importation, by methyl alcohol. At any rate it is the spirit spoiled with caoutchoucine which is common in the bazaars and which gives the familiar turbidity on the addition of water to it; and there is certainly no known method of separating the spoiling agent and rendering such spirit palatable, although a case came to my notice in which a native was stated to have drunk caoutchoucined spirit while in a very drunken fit. Spirit spoiled with "methyl alcohol" is however as a matter of fact not permitted to pass, since the orders of Government are that methylated spirit should have been spoiled with "*crude wood spirit*" but not with the rectified wood spirit known as methyl alcohol. It is the contravention of this rule which has led to the rejection of the sixteen samples referred to and of several other samples in previous years. The "*methylated spirit*" which is passed into consumption has satisfied me as the testing officer; but as I pointed out in my annual report for 1889, even European palates can relish such spirits on a Sunday, when public houses are closed, then why not natives of this country? The spoiling agent has, since I wrote those remarks, been changed in Great Britain, and the introduction of the change here also may be advisable.

22. *Oils, Paints, Colours, &c.*—Excluding 23 samples of kerosine-oil examined under the Petroleum Act, there were 41 samples of other oils examined for the Customs department chiefly under the Merchandise Marks Act. These included 12 samples of lubricating and heavy mineral oil, 7 of turpentine, 11 of linseed oil, 8 of olive oil, and 3 of essential oils. The whole of the seven samples of turpentine were found to be adulterated, with foreign hydrocarbon oil, some to the extent of 75 per cent. Of the eleven samples of linseed oil, six were found to be practically pure and the rest were adulterated with mineral oil, one sample to the extent of 77 per cent. The amendment of the definition of the word "Petroleum" in the Petroleum Act, so as to include such mixtures, has been under the consideration of the Government of India. Of the eight samples of olive oil examined, five were found to be adulterated. Of the three essential oils examined, one declared to be sandalwood oil was grossly adulterated. There were twenty samples of paints and colours examined, chiefly zinc white, red lead, and yellow chromes; and of these only three chromes were found to be practically pure, the rest being all more or less adulterated.

It is impossible to give any idea of the attempts to conceal the sophistications perpetrated, especially in the case of oils. Some of the frauds are well thought out, others again are equally clumsy. While the identification of a pure oil is a matter of comparative ease, the detection of every individual oil, in a mixture of even two oils, is frequently a task of great difficulty. The physical properties of oils, such as their specific gravity, solidifying point, odour, taste, and their general colour reactions and "temperature re-action", do to some extent afford important indications of the purity of the substances under examination; but many of these properties are kept within normal limits by judicious admixture of oils having widely different properties. In fact, the methods of sophistication have developed into a technical art, and the detective chemist must keep himself posted up in the ever increasing methods of testing which are called forth by the discovery of new adulterants and revealed in current literature. These less reliable properties of an oil referred to cannot be totally ignored and must be investigated, and the analyst has, in addition, to split the mixture of oils into their chemical constituents and to endeavour to identify them. The separation and the examination of the fatty acids is compulsory, their melting and solidifying points, the percentage amount of volatile and of insoluble fatty acids, the proportion of such unsaturated acids, the saponification value of the oils, their optical behaviour tested by the spectroscope and the polariscope, and a number of other constants have to be determined for each oil before sufficient data can be obtained for getting an inkling of the direction in which to look for any adulterants which may be present. I particularise these facts here because although the number of samples of oil examined appear small, when expressed by the number 41, yet the actual number of analyses performed upon them could not be much under 400.

In addition to these there were examined for the Customs department several dyes, explosives, various drugs and patent medicines, chemical manures and sundry other imported articles, for purposes of classification and of levying duty.

23. The principal miscellaneous analyses for other departments consisted of the examination of articles for purity on behalf of the Arsenal and Commissariat, minerals for the Central Museum, inks for the Stationery department, opium, ganjah, disinfectants and pathological substances for various other departments, and chiefly manures, cements and sugars for private parties. As usual, a large number of water

analyses were performed on behalf of municipalities and the Jail department, to ascertain the quality of water for drinking purposes. A number of waters was also examined for the East Coast Railway and for the Madras-Bezwada Railway to ascertain their fitness for drinking and for locomotive purposes.

24. The service books of the establishment are up to date, and the inventory of valuable stock has been kept and duly checked in accordance with G.O., No. 920, Financial, dated 18th September 1893.

25. The concluding tabular statement of medico-legal work performed during the year is appended as usual.

[Statement

TABLE IX.—*Tabular Statement for the year.*

Nature of work.	Total number of cases.	Total number of articles received for examination.	Total number of cases in which poison was detected.	Total number of cases in which blood was detected.	Total number of cases in which semen was detected.	Poisons. Inorganic. Arsenious oxide.	Arsenious oxide and mercuric salt.	Arsenious oxide, mercuric salt and dhatura.	Arsenious oxide and orpiment.	Arsenious oxide, orpiment and Scheele's green.	Arsenious oxide, orpiment and realgar.	Arsenious oxide, orpiment and metallic mercury.	Arsenious oxide and cinnabar.	Arsenious oxide and realgar.	Arsenious oxide and dhatura.	Arsenious oxide and oleander.	Antimony and mercuric salt.	Copper salt.	Corrosive sublimate and atropine.	Glass.	Mercuric salt.	Mercuric salt and aconitine.	Metallic mercury.	Orpiment.	Orpiment and cinnabar.	Poisons. Organic. Aconite.	Atropine.	Atropine and opium.	Atropine, ganjah and opium.	Calotropis gigantea.	Calotropis gigantea and plumbagin.	Colocynthin.	Croton.	Dhatura.	Ganjah.	Liniment of camphor, belladonna, chloroform and aconite.	Oleander.	Opium.	Plumbagin.	Semecarpus anacardium.	Strychnine.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Human cases. { Class A ..	87	643	60	..	..	30	2	1	1	..	..	..	1	..	..	..	1	..	1	..	..	3	..	1	1	1	2	3	1	..	1	1	..	3	1	1	1	2	2	1	2	4
{ Class B ..	17	65	12	..	..	4	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blood stains, &c. ..	32	108	..	23	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Semina stains ..	12	35	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cattle cases. { Class A ..	40	182	30	..	..	26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
{ Class B ..	11	13	9	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Examinations for Government departments	959	959	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Examinations for private parties and firms	86	86	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total for the year 1896	1,244	2,081	111	23	2	69	2	1	1	..	2	1	1	1	..	..	1	..	1	..	1	..	1	1	1	1	3	1	1	1	2	1	1	1	1	2	2	2	1	2	4
Total for the year 1895	1,243	2,065	119	21	..	78	8	..	1	1	1	..	..	..	2	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Order—No. 489, Public, dated 30th April 1897.

From the statement in paragraph 2 of the report it appears that, while the total number of investigations made and articles examined by the Chemical Examiner in 1896 remained about the same as in the previous year, there was a decrease under medico-legal investigations and an increase under miscellaneous analyses.

2. The total number of cases of suspected human poisoning was the same as in 1895, viz., 104; the percentage of detections, however, reached 69·23, surpassing the highest previous record—that of 1894—by 3 per cent. The large percentage of detections is satisfactory as evincing not only increased efficiency in investigation, but also a decrease in the number of fictitious cases sent up for examination.

The attention of all Judicial officers concerned will, with reference to the orders marginally noted, again be drawn to the failure complained of in paragraph 8 of the Chemical Examiner's report. Individual cases of such failure should in future be specially noted by the Chemical Examiner in his annual report. The attention of that officer will at the same time be directed to paragraph 2 of G.O., No. 2418, Judicial, dated 21st November 1893.

G.O., No. 1478, Public, dated 29th June 1885 (paragraph 3).
G.O., No. 1009, Judicial, dated 13th June 1890.

3. Organic poison was discovered in 50 and inorganic in 22 cases, the corresponding figures in 1895 being 47 and 17. These cases referred to 110 persons, and 41 deaths occurred; the corresponding figures in the previous year were 125 and 39, respectively.

4. There were 32 cases of suspected blood stains, and 108 articles were examined, blood being discovered in 23 cases. In 1895, blood was detected in 21 out of 41 cases, 155 articles being examined.

5. In two out of the twelve suspected cases of seminal stains sent up the investigation was successful. In 1895, nine cases were examined with negative results. The Government is glad to note that the articles transmitted in these cases were packed in a completely satisfactory manner.

6. Fifty-one cases of cattle-poisoning were investigated against 72 in the previous year. Arsenious oxide was the agent employed in 35 out of 39 cases in which poison was detected. The percentage of detection was 76·4—the same as in 1895.

7. Analyses were made in 1,045 miscellaneous cases against 1,017 in 1895. There was an increase in the work done for the Board of Revenue and for the Customs Department, the number of investigations being 615 and 149, respectively, against 595 and 91 of 1895.

8. The attention of the Revenue and Judicial Departments, respectively, will be invited to paragraphs 19 and 20 of the report.

9. With regard to the complaint of the Chemical Examiner as to the insufficiency of accommodation in his laboratory, supported by the Surgeon-General, the Public Works Department will be requested to direct the Consulting Architect to prepare plans and estimates for the necessary additions, which will be considered when the financial outlook will permit.

10. The report constitutes, as usual, an interesting and satisfactory record of good work done by the Chemical Examiner.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Surgeon-General.
„ Sanitary Commissioner.
„ Revenue Department.
„ Judicial Department.
„ Local and Municipal Department.
„ Inspector-General of Police.
„ Secretary to the Government of Hongkong (with C.L).
„ District Magistrates.
„ Sessions Judges.
„ Hon'ble the Chief Justice (with C.L).
„ Director of Government Cinchona Plantations, Nilgiris.
Editors' Table. Public Works copy

Endorsement—No. 490, Public, dated 30th April 1897.

Copy to the Government of India, Home Department.

J. F. PRICE,
Chief Secretary.

Exd. A. Raitt.