Formula $C^{34}H^{34}O^4$ (old notation). From *Répert. de Pharm.*, Sept. 10, 1890, in *Amer. Journ. Pharm.*, Oct. 1890. The air-dried seeds of *D. fastuosa* (purple var.) reduced to powder lost 7·828 per cent. of moisture when heated to 100° C. The ash calculated on the air-dried seeds amounted to 4·830 per cent., and was of a brick-red colour.

On proximate analysis the following results were obtained, calculated on the seeds containing 7·828 per cent. of moisture:—

Petroleum ether extract	11·654 per cent.
Ether extract, containing ·296 per cent. of oil soluble in petroleum ether	0·340 „ „
Absolute alcohol extract	1·382 „ „

The oil extracted by petroleum ether was of a pale straw colour, and had a slight odour of valeric acid. Exposed to a temperature of about 90—95° C. for several days, it slowly thickened. The oil extracted by ether was of a darker colour, and had a distinct fluorescence. After agitation with dilute sulphuric acid to dissolve any trace of alkaloid, and filtration through paper, it had a specific gravity at 15·5 C. of 9167. It thickened below 10° C. The ether extract contained oily matter soluble in petroleum ether, the insoluble residue was only partly soluble in dilute sulphuric acid, and the acid solution afforded marked evidence of the presence of an alkaloidal principle, which caused marked dilatation of the pupil when introduced into the eye. The alcoholic extractive contained a substance exhibiting a marked greenish fluorescence, a dark resin and an alkaloidal body. The gold salt of this alkaloid examined microscopically closely resembled the aurochloride of atropine. The total alkaloid extracted from the seeds amounted to ·088 per cent. Dragendorff states that the aurochloride of atropine dried at 100° C. contains 31·37 per cent. of gold; a salt having the formula $C^{17}H^{23}NO^3HAuCl^4$ would contain 31·31 per cent. of gold. We made two determinations of gold in the gold salt, prepared with alkaloid, after repeated purification; after drying first over sulphuric acid and

then at 100° C., we found the gold content to be 30·513 per cent. The melting point of our gold salt was above 170° C. when heated in the dry state. The amount of alkaloid at our disposal was too small to admit of any attempt at fractionation.

Toxicology.—Datura poisoning is common in India, the seeds being usually employed; a few cases of poisoning by the leaves and root have, however, been reported. In the great majority of cases the motive for its administration is facilitation of theft, and when in India an individual has been first drugged and then robbed, it will usually be found that datura has been employed. A common form of theft by aid of this poison is road robbery, and Dr. W. Center mentions the use in such cases of a hollow pestle, the cavity containing the seeds. Inversion of this while pounding the *masaleh* or spices always used in Indian cookery, introduces the poison into the food without exciting suspicion. It rarely happens that there is any ground for suspecting homicidal intent in cases of datura poisoning; in fact, there seems to be a popular belief in this country that the drug is simply an intoxicant. As Harvey remarks, road poisoners sometimes partake with their victims of the drugged food, which they would hardly do if aware of the danger. Commonly, when datura is used for criminal purposes in India, the poison is mixed with sweetmeats or food, but in exceptional cases it has been mixed with tobacco given to the victim to smoke. Datura is said to be used by vendors of native liquor, for the purpose of increasing its intoxicating power, the liquor being poured into a vessel which has been first filled with the smoke of the burning seeds. Suicidal poisoning by datura, if it occurs at all, is extremely rare. Accidental poisoning among children is occasionally met with. (*Lyon, Med. Juris. for India.*)

For the symptoms of poisoning by this plant the reader is referred to the article upon Belladonna.

In a country where the habitual use of opium is so common it is difficult to say what may be a fatal dose of datura. Dr.

Giraud in 1843 met with only one death in fifty-one cases admitted into the Jamsetjee Jeejeebhoy Hospital, Bombay; and in the ten years ending 1885, of fifty-nine cases admitted into the same hospital, only two died. This, however, is an exceptionally low death-rate. Dr. Burton Brown, of Lahore, records twenty-one deaths in ninety-two cases. In Harvey's one hundred and twenty-three Bengal cases, twenty deaths were reported; and of the Bombay Analyser's one hundred and thirty-eight cases, twenty-four died. Here there is a marked difference in the fatality among cases treated in hospital and the last three sets of figures which represent cases referred to the Chemical Analysers from different part of the country, many of which would probably have recovered under medical treatment.

From the Reports of the Chemical Examiner, N.-W. Provinces and Oude, for the years 1879 to 1887, it appears that out of 110 cases referred to him, 9 were fatal. His report also shows a remarkable decrease in the number of cases in which Datura was detected in the various substances sent to him for examination. In 1879 and 1880, 20 and 25 per cent. of them contained this poison, in 1881 the percentage fell to 9 and remained at about that figure during the remaining 6 years.

In Bengal fatal cases of datura-poisoning are now very rare, as will be seen from the following table :—

Year.	Number of viscera examined.	Percentage of Datura detections.
1880-81	270	0·7
1881-82	210	0·4
1882-83	210	None.
Nine months of 1883	126	,,
1884	217	,,
1885	234	,,
1886	266	0·4
1887	233	None.

In the Punjab fatal cases are more frequent, but their number appears to be declining, as will be seen from the following figures :—

Year.	Number of viscera examined.	Percentage of Datura detections.
1879	162	1·8
1880	194	2·0
1881	186	6·3
1882	201	0·9
1883	194	1·5
1884	200	0·5
1885	234	0·8
1886	272	0·7
1887	228	0·8
Madras—		
1882	152	·6
1883	123	1·6
1884	85	8·2
1885	81	4·9
1886	84	2·3
1887	76	None.
1888	91	1·1
1889	101	1·9

A case is reported by Taylor (*Poisons*, p. 774) in which a decoction of 125 seeds of *D. Stramonium* caused the death of an adult in seven hours : on the other hand, in Dr. E. Lawrie's case (see Belladonna), the patient, an adult, recovered under suitable treatment, after taking four grains of Atropine.

The following table, compiled by Assistant-Surgeon C. L. Bose, Assistant Chemical Examiner to the Government of Bengal, shows the particulars of poisoning by Datura in India :—

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle poisoning cases.	Remarks.
Bengal	1873	.....	6	.....	
Do.	1874	1	15	.....	
Do.	1876	1	.....	.....	
Do.	1877	3	.....	.....	
Do.	1878	.....	29	.....	
Do.	1879	1	.....	.....	
Do.	1880	2	16 (Seeds) 1 (Root). 2 (Fruit)	.....	
Do.	1881	1	14 (Daturine and Datura.)	.....	
Do.	1882	1	17 (Datura seeds and Daturine.)	.....	
Do.	1883	.....	7 (Datura seeds and Daturine.) 1 (Datura root).	.....	

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
Bengal—*(contd.)*	1884	.....	7 (Datura) 1 (Datura and Asafœtida).	.....	"Datura was not detected in any of the viscera examined during 1884. In the years commencing 1876-77 and ending 1882-83, datura was detected in one, three, none, one, two, one and one cases, respectively. Although not found in the viscera examined, datura was found in seven of the suspected substances and in three (?) other cases mixed with other poisons. From Satkhira, a female was reported to have been severely burnt and afterwards robbed by two persons who had been her guests for the night. It was suspected that these individuals poisoned the food of which she had eaten. Part of the remaining rice and meat were forwarded for chemical examination, and datura was detected in the meat." "Another of the cases was reported from Howrah. This case also was an attempt to drug a woman. One Ramnath Sircar and another person, name not yet known, poured a quantity of liquor from a bottle into a wineglass and offered it to the woman, who had no sooner taken the drink than she complained of a burning sensation in her throat, gullet and stomach, and immediately commenced to vomit. No poison was detected in the liquor or vomit, but datura was detected in the powder which was adhering to the interior of the wineglass."

Do.	1885	.....	1	.....
Do.	1886	1	6	.....
Do.	1887	.....	8	1
Do.	1888	.....	13	.....
Do.	1889	1	25	.....

In a paper contributed by me to the *Indian Medical Gazette* for October, 1890, recording medico-legal work in the Chemical Examiner's Department, Calcutta, during 6 months in 1889, the following cases were cited as cases of Datura poisoning that came under observation during the period.

"In the case of an up-country boy reported from Hoogly, the following history was forwarded:—

"The nephew states that he and his uncle and his uncle's son were travelling together; they met two men who gave them a mid-day meal and soon after left them. Some hours afterwards the son went to sleep and died in his sleep. The nephew was sick and drowsy. The father states that he was robbed by the men.

"On examining the viscera, the active principle of datura was detected."

"Of the cases of drugging by datura, the most important one occurred in Calcutta, in which one man in the course of a fortnight succeeded in non-fatally poisoning and robbing three persons. The victims were lying insensible on the roadside and were taken to the Campbell Hospital, their stomachs washed out, and the washings sent to the Chemical Examiner's Department for analysis. In one of these cases 46, in another 8, and in the third 11 entire and some broken fragments of seeds of datura possessing the physiological action of the active principle of the drug were detected in the washings of the stomach. In connection with this case, two packets of powder, found with the accused, were also sent for examination, and the active principle of datura was detected in them. The man feigned insanity at his trial in the Sessions Court, but he was sen-

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					tenced to 7 years' imprisonment with hard labour. The man turned out to be a professional poisoner, and had been convicted of a similar offence in 1882 and sentenced to 5 years' imprisonment."
					"In three other cases of datura poisoning, no history was given, but in the rest the usual history of strangers taken into confidence, poisoning of the food and robbing of the victims was recorded."
Bengal—*(contd.)*.....	1890	1	8	.....	.....
N.-W. P. and Oudh.	1865	.....	1	.....	"By the assistance of Major Manning, I have received from a professional poisoner retained at Benares under sentence of transportation as an approver, several specimens of datura in the proportions and in the forms usually administered. None of the doses of the powdered seed sent me exceeded in weight 25 grains, and this was asserted to be the amount usually given to produce insensibility in a full-grown man, mixed with one quarter of a seer of *suttoo* (grain parched or ground), the usual vehicle, the seed (reduced to the finest powder) is quite unrecognisable, by taste or by the microscope; the proportion in fact being 25 grains to 3,500."
Do.	1866	1	3	.....	"Five cases of poisoning by datura were referred. In 4 of these I was able to detect the poison. The cases were briefly :—

"No 135. A case of domestic poisoning, in which a woman administered datura to a man and a boy in some *chapatees* (cakes); both individuals recovered, having been taken early to hospital. The poison was detected in the *chapatees* of which they had partaken. The case occurred at Lucknow."

"No 183. Is curious in the apparent absence of all object for the crime. A man, his wife and his daughter attended a *mela* (fair) in the Allahabad District. They accepted from a stranger about half a seer of *atta* (flour) in exchange for some tobacco. Three days after, on their return home, the *atta* was cooked and partaken of by the mother and daughter. Both became insensible and the daughter died. I detected datura in the *chapatees* made from the *atta*, as also in the contents of the girl's stomach."

"No 193. This case and the one following were the only two cases of gang or road poisoning referred during the year. The victim in this case was a *sowar* (trooper), by name Ghupli, who was returning from Saugor to his home at Lallutpur with a well-filled purse containing Rupees 310; falling in with a party of 5 men, they journeyed together until his companions found an opportunity of giving him datura mixed in sugar, to eat with his *suttoo*. He became insensible and lay thus for eight hours. When he came to himself, his purse and companions were gone; but he had sufficient strength to drag himself to the nearest police post and give information. The poisoners were pursued and apprehended, and luckily for justice, the sowar had retained, tied up in a piece of cloth, a small quantity of the sugar which had been given him. This contained datura in a state of fine division."

"No 194. This case occurred in the Futtehpore District. Six men belonging to a marriage party returning from Lallutpore were drugged by a professional poisoner in an encampment on the Grand Trunk Road. The drug was given in 'sherbet.' Two of the men died. I failed to

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					detect datura by analysis, but the poisoner confessed that he had given that poison mixed in the sherbet."
					"No 223. Was a domestic case which occurred at Fyzabad. Three persons were affected, but recovered, having been taken early to hospital. Datura was found in the *chapatees* of which they had partaken."
N.W.P. and Oudh—(*contd.*)	1867	.....	.....	.....	Datura was detected in 5 cases, but whether in human viscera or among suspected articles, is not mentioned in the report.
Do.	1868	.....	.....	.....	"Datura was detected as having been used for a criminal purpose in 12 cases.
					"Datura seems to be used in two classes of cases,—by the regular gang poisoners, and by men to produce a temporary insensibility in women with a criminal purpose in view. In the former class the poison is so carefully triturated by the practised hands who administer it, and the dose is so nearly proportioned to the effects intended to be produced, that rarely any evidence of the presence of the poison is obtained. In the 2nd class, the carelessness and ignorance of the operator generally leave satisfactory evidence of the instrument used to effect his ends."
Do.	1869	22	.....	.....	"In 22 cases of poisoning, datura was found to be the cause of death. Two of the datura cases were perfect examples of the cold-blooded and heartless system pursued by the regular professional poisoner."
					1. "Three men and a boy were travelling last May, from Bombay towards the N.-W. Provinces. They were joined

Do.	1870	.....	.....	.....	
Do.	1871	.....	.....	.....	
Do.	1872	.....	4	.....	

at Hurdah by a man, who ingratiated himself by pleasant companionship, and every day, as they travelled, evinced his good fellowship by making sherbet for the whole party during their midday rest. At length, at a solitary spot on the banks of a stream near Bansa, in the Damoh District, they drank his sherbet for the last time; the three men were found dead and the boy roaming about close to their bodies in the restless delirium caused by datura. A man said to have been the poisoner was apprehended soon after in the Hosungabad District, and with him was found a carefully made powder of datura seeds, mixed with a little flour and sugar. I detected datura in the stomachs of all three victims of his heartless treachery.

"In the other case, six men were seen to encamp near a village in the Moozuffernuggur District. After a time three of the men were found lying dead on the spot where they had encamped, their companions having disappeared. I found datura to have been the cause of death in all the three victims."

Datura was detected in 20 instances, but whether in human viscera or among suspected articles, is not mentioned.

Do. in 9 instances do.

"The detection of datura is far from being on a satisfactory basis. In 3 out of the 4 cases in which it was detected the seeds or parts thereof were appreciable to the eye or to the microscope, but in the 4th case (No. 149) I discovered the datura by its physiological test, dilatation of the pupil. It was a case which had come from Sultanpore in Oudh, and the substance to be examined was a *chapatee*, and it was from an extract of it that I obtained the test in a very characteristic way. I have not yet succeeded in getting this test from the extract of a stomach or its contents, although it has been tried in almost every case of Datura poisoning which has been reported to me."

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
N. W. P. and Oudh—*(contd.)*	1873	.....	.....	.....	Datura was detected in 26 instances; "in all these 26 instances in which it was found, it was in the contents of the stomach, in vomited matter, or in food."
Do.	1874	.....	.....	.....	Datura was detected in 27 instances, but no mention is made whether the poison was detected in human viscera or among suspected articles.
Do.	1875	.....	.....	.....	Do. in 23 instances do.
Do.	1876	.....	.....	.....	Do. in 23 instances do.
Do.	1877	.....	.....	.....	Do. in 28 instances do.
Do.	1878	.....	.....	.....	Do. in 18 instances do.
Do.	1879	.....	.....	.....	Do. in 20 instances do.
Do.	1880	.....	.....	.....	Do. in 25 instances do.
Do.	1881	.....	.....	.....	Do. in 9 instances do.
					In connection with one of these cases, "the Sessions Judge of Saharanpore sent a small parcel containing 150 datura seeds. I was asked first, if I could tell if these had been in a human stomach, and if so, how long; and, secondly, if instead of having been rejected by vomiting, they had been retained in the stomach of a woman, would they have caused death. To the first question, I could only answer that I did not know. To the second, I ventured to state that as the seeds were whole and also dry and hard, they would most probably not bring about a fatal issue, even if they had been retained in the woman's stomach."

N.-W. P. and Oudh—(*contd.*)	1882	.....	.....	.....
Do.	1885	.....	.....	.....
Do.	1886	.....	.....	.....
Do.	1887	.....	.....	.....
Bombay	1871	1	6	.....
Do.	1872	.....	5	.....

Datura was detected in 11 instances, but no mention is made as to whether the poison was detected in human viscera or among suspected articles.

Do. in 16 instances do.

Do. in 21 instances do.

Case "No 160 referred from **Muttra**. The substance examined was 5 sweetmeat balls, and they were suspected to contain datura. I found datura seeds, but that they were very small unripe seeds, and were so distorted in shape that their identity could only be made certain by preparing an extract from them and dropping it into the eye of a kid. The extract produced in a few minutes full dilatation of the pupil."

Datura was detected in 14 instances, but no mention is made as to whether the poison was detected in human viscera or among suspected articles.

"The seven cases of poisoning in which portions of the datura plant, or of its alkaloid, were detected, include two deaths. In one of the fatal cases over 70 datura seeds were picked out of a piece of jowari cake, the remainder of which had been given to a man by his wife. In the other fatal case (circumstances not stated) the alkaloid was detected in the food given, in the matter vomited, and in the contents of the stomach. In two out of the five non-fatal cases, several persons were affected with symptoms of poisoning; in one of these cases the number of persons affected was stated to be 4, in the other the number is not given. Only one of the 18 cases of datura poisoning admitted into the Jamsetjee Jejeebhoy Hospital during the year under report is included in the 7 cases above mentioned."

"Of the 5 cases in which datura was detected, in two the poison was contained in native bread, in two others the datura was detected in powders sent for examination, and in one case, the only fatal one of the five, the poison was found in the vomited matter of a patient in the Jamsetjee Jejeebhoy Hospital, who was admitted with marked

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					symptoms of datura poisoning, recovered and was discharged from hospital, but died 2 or 3 days afterwards. Cases of datura poisoning occurring in Bombay so rarely prove fatal that special interest attaches to this case, the symptoms, etc., of which are remarkable enough to be worth recording. While under treatment in hospital, the patient, an old woman, suffered from great tympanitic distension of the abdomen; this however was completely relieved before her discharge from hospital. She was dismissed from hospital seven days after admission, apparently quite well. Three days afterwards, or ten days after the administration of the poison, her death was reported. A *post-mortem* examination of the body was made, and from the notes of Dr. Anderson, House Surgeon, Jamsetjee Jejeebhoy Hospital, I gather that the following remarkable condition of parts was observed:—The abdomen was very greatly distended; on opening it the distension was found to be due to an enormously large stomach filled with fluid. No less than 4 gallons of fluid were contained in the viscus. At the lower part of the intestines three intussusceptions were found, but from the absence of any sign of inflammation in their neighbourhood, it was doubtful whether they were *ante-mortem* or *post-mortem* intussusceptions. As the intestines between the stomach and the seat of the intussusceptions were completely empty, it is very doubtful whether the dis-

Bombay	1873	1	
Do.	1874	9	

tension of the stomach was in any way connected with the intussusceptions. Their presence however, taken in connection with the tympanitic state of the abdomen noticed during the time the patient remained in hospital, and with the distension of the stomach found at the *post-mortem* examination, makes the case a very remarkable one."

Dr Giraud, in his account of Datura poisoning, quoted by Chevers (*Indian Medical Jurisprudence*, page 839) states,—"In four cases (of datura poisoning) I have met with deep coma, with insensibility, stertorous breathing, and in two of these there was a remarkable tympanitic state of the abdomen."

.....

"In most of the cases it seems to have been given with the object of producing stupefaction for purposes of robbery, and in one case, from what I could learn, it was placed in food with the design of getting up a false charge of drugging. In none of the suspected cases could I succeed in detecting it in the viscera." * * * This leads me to notice the fact mentioned in the last report of the Chemical Examiner at Calcutta, that the testa of a datura seed resembles that of capsicum so closely that it is in most cases impossible to distinguish them. This is quite true. A good deal has been said in favour of what was called the peculiar appearance of the testa of datura seeds under the microscope as reliable evidence of their presence. Knowing that capsicum, a member of a closely-allied genus, was a common constituent of native food, I took the trouble to compare it microscopically with datura, and finding the testa or outer covering of both seeds so nearly similar in appearance, I long since discarded the microscopic test for datura, preferring in all cases to rely only on its physiological action as the proof of greatest value."

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
Bombay—*(contd.)* ...	1875	1	8	.....	"The poison was detected in 9 cases, or the same number as last year; four of these nine cases came from the Central Provinces and Berars. The nine cases included the poisoning of no less than twenty individuals; only one death from the effects of the poison is however recorded. In all nine cases the poison seems to have been administered in food or sweetmeat, but with what object is not stated. In most of the cases, apparently, robbery was the object in view. In one however from Akola, in which the alkaloid was extracted from some food which had been partaken of by a man, who thereafter suffered from symptoms of datura poisoning, it is reported that the food in question was prepared by his wife. The following is the history of the single fatal case of poisoning by this drug above alluded to:—A family consisting of two men, their wives, and an old woman, their mother,—in all five persons,—lived in a hut in a lonely part of the Thar and Parkar District in Sind. One evening a man brought them some sweetmeat, of which all five proceeded to partake, but noticing that it had a bitterish taste, desisted after eating a small quantity. Twelve hours afterwards four of the five persons were found delirious, and suffering from the usual symptoms of datura poisoning, and the old woman was found dead. The alkaloid was eliminated from the contents of the stomach of the deceased. An attempt also was made to extract it from the liver, but without success"

Do.	1876	1	13	...

"Out of twenty persons, therefore, who suffered from symptoms of datura poisoning, only one died, and this was an old woman with a constitution probably weakened by age, and less capable of withstanding the effects of the drug. This seems to be the usual experience as to the mortality from datura poisoning among the cases before the Bombay Chemical Analyser. As a rule, the cases are not fatal. Every now and then, a fatal case occurs, and then it is found that the individual is either very young or advanced in years, or suffering from some disease. Fatal cases in healthy adults seldom occur. Possibly one reason of this small mortality among cases of datura poisoning may be due to the fact that the poison is generally given to facilitate robbery and not with any idea of causing death. It is curious, however, that the experience of datura poisoning in some other parts of India should show a far greater mortality than this. Dr. Burton Brown, of Lahore, quoted by Taylor and Chevers, speaks of a mortality of twenty-one cases out of ninety-two, or 22·8 per cent. On the other hand, Dr. Giraud records 51 cases of datura poisoning admitted into the Jamsetjee Jejeebhoy Hospital, Bombay, in 1848, without a single death."

"The poison was detected in 14 cases as compared with 9 in each of the two previous years. The reports sent, record only that 5 persons were attacked with symptoms of datura poisoning; probably a much larger number of persons than this suffered, the reports sent with many of the cases being silent as to whether any individuals were poisoned or not. Two deaths from datura are included in the 14 cases. One of these was a case from Baroda; in this case, although the alkaloid was not detected in the viscera of the deceased, a powder of which the deceased made some pills and swallowed them some hours before death, was found to consist of powdered datura seeds. The other fatal case was that of a child poisoned by the

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					alkaloid. In this case, a child two years old, got hold of a small pill box in which a small quantity had been kept for use in ophthlamic practice by its father. Shortly afterwards it became insensible and convulsed, the pupils became widely dilated, and death took place with well-marked symptoms of datura poisoning. Another case which may be specially mentioned was the subject of a trial before the High Court, Bombay; this was a case of dragging in order to facilitate theft. A man while travelling by rail to Bombay, got into conversation with some fellow travellers, and accepted *pan-supari* from them; they on arrival took him to a house where he became insensible and was robbed; a portion of a powder said to have been given to complainant with the *pan-supari* was found to consist of powdered datura seeds. In 7 of the 14 cases, the identification of the poison depended on the extraction of the alkaloid; in the remaining 7 cases, the extraction of the alkaloid was not required, whole datura seeds, sufficiently perfect for identification, being present in the matter vomited and submitted for examination."
Bombay—(*contd.*) ...	1877	2	12	.....	In seven cases the seeds were found, and in seven the poison was identified by its physiological action.
Do.	1878	.....	.....	.....	"Twelve cases in which datura was detected were referred during the year. These 12 cases included the poisoning of 17 persons, of whom eight died. In many of the cases

the drug seems as usual to have been administered in order to facilitate the commission of theft. Thus in a case from Gadag, the history is as follows:—Two merchants started with a *tattoo walla* (pony man) from Hubli to buy cotton in the neighbouring villages. As they were starting a man and a woman offered themselves as guides, stating that they would show them the villages where cotton was to be had. At a halt, food was prepared by the woman, of which the merchants and the *tattoo walla* partook. All these became insensible and were robbed. One of the three died. Again in a case from Dhulka, two women were poisoned with datura in sweetmeat; both died. The motive, in this case also, it was stated, was the facilitation of theft. The third case from Karmala was a case in which some thieves gave a powder, afterwards found to contain powdered datura seeds, to a cartman, and while he was insensible, robbed him. This case also terminated fatally. Probably, also, facilitation of theft was the motive in a case from Bhusaval, where a man was taken in a state of insensibility out of the Jubbulpore down mail. It was stated that he had been insensible for 16 hours. He died shortly after admission into hospital. A fellow-traveller of deceased confessed to having administered datura to him in some *gram* (chickpeas) and *dhall* (pulse) which he had given him to eat. In four other cases, where persons were poisoned with datura, the motive for the crime is not stated in the history of the case. In each of these cases, three persons were poisoned. In two of the cases the victims recovered, in the third all died. In the fourth case one individual was poisoned and recovered. In the remaining four cases possibly, also, persons were poisoned, but no statement to that effect accompanied the matters sent for examination. In two of these cases the substances forwarded were powders containing datura seeds. In a third case the alkaloid was found in some sweetmeat, and in the fourth case some sediment left in a

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					bottle, sent by the Poona City Magistrate, was found to contain the alkaloid. Although in the great majority of cases of poisoning by datura, the motive, as already stated, is to facilitate robbery, every now and then cases come under notice, where, from the poverty of the victims, it seems impossible that this could have been the case. In the town of Bombay, for example, some few years ago, beggars used constantly to be brought to the Jamsetjee Jejeebhoy Hospital, suffering from the symptoms of datura poisoning. It is possible that such cases may be explained in this way. I am informed that it is a popular belief that the utterances of persons, under the influence of datura, are oracular, and may be depended on as a guide to the success of undertakings, &c. It may be, therefore, that this is the solution of cases in which from the poverty of the persons poisoned, it is impossible that theft could have been the motive for administration of the drug."
Bombay—*(contd.)* ...	1879	.....	.....	.....	"Nine cases of poisoning by datura were referred during the year. These 9 cases embraced the poisoning of 19 persons, of whom 3 died. In 5 of the 9 cases more than one individual was poisoned. Of these 5 cases, one came from Gadak; in this case 4 men were poisoned, and a second case in which two men, both of whom died, came from Kaira. The other three cases were sent up by the Bombay Police, and appear all to have been cases of drugging for the purpose of facilitating commission of theft. In one of

Do.	1880	2	6	.....	

these three cases, two persons—a man and a woman,—were poisoned, and in the third case, 4 men were poisoned. In the second of these Bombay cases, the only one of the three in which a death occurred, the amount of property stolen was considerable, its value being estimated at Rs. 2,500. The persons poisoned were two Punjabee merchants and their servant, and the individual suspected was a man whom they had engaged as a servant, and whom they had met while on their journey to Bombay. The third case occurred on the board the *P* and *O. S. S. Surat*, the individuals poisoned being two native passengers and two of the native crew. Of the 4 cases in which one person only was poisoned, one was also a Bombay case, and was a case, in which a prostitute, it was alleged, was drugged with datura, and then robbed of her ornaments by some men. A second case came from Kaira, and was one in which a man was poisoned by datura, his wife being the party suspected to have administered the poison. A third case was forwarded from Kaladgi; in this case a man was poisoned, datura seeds being found in the food which he had eaten, and also in a packet discovered in the house of the person accused. And the fourth and last case was forwarded by the Civil Surgeon of Satara; in this case a child was poisoned, the poison having been given in *goor* (coarse sugar)."

"Eight cases in which datura was detected came under notice during the year, embracing the poisoning of 22 individuals, of whom two died. Enumerating these cases in the order in which they were received, the first case in the list was one from Sukkur, where 7 Mahomedans were, it is alleged, poisoned with datura at a Holi feast by some Hindus. Next we have a case from Shripur, where three men were poisoned by datura given to them in bread. The third case came from Ling Saugor, Hydrabad Assigned Districts, and was one in which two sweepers, of whom one died, belonging to a native regiment, were

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					poisoned by datura. The man who died, only lived, it is said, for 2 hours after taking the poison. The fourth case came from Borsad; in this case two men and a girl were poisoned, one of the men died 7 hours after taking the poison; the other two individuals recovered. In the fifth case from Poona, several boys were poisoned by some sugar given to them, which, on examination, was found to contain powdered datura seeds. In the sixth case from Karachi, the active principle of datura was detected in some cooked food forwarded for analysis. No history of this case was furnished to this office. The seventh case was from Jacobabad; in this case, two men were poisoned by datura, it was alleged, by a third, who afterwards robbed them; and lastly, the eighth was one from Borsad, in which a man complained to the Police that some one had put datura into his food; a portion of the food in question sent for examination was found to contain datura seeds."
Bombay—*(contd.)* ...	1881	......	2	.....	"The two cases in which datura was detected during the year under report were as follows:—1. A case from Poona, in which a quantity of datura seeds were found in the possession of a man charged with the offence of drugging with a view to facilitate the commission of theft; and 2. A case from Sukkur, in which the active principle of datura was detected in some food which had been partaken of by three men, who thereafter suffered from symptoms of poisoning by datura."

Do.	1882	.....	4	.....	(*a*) Poisoned at a feast; (*b*) Poisoned by his wife; (*c and d*) No particulars forwarded with the poisoned food.
Do.	1883	1	5	.....	"This poison was detected in 5 cases: in two, from the history, the poison appears to have been given for the purpose of facilitating the commission of theft. One of the cases was forwarded from Sorath in Kathiawar, and was a case in which 3 persons were drugged and all their valuables robbed,—all three recovered. The other case occurred in Bombay, and was as follows:—The body of a man was found in a tank on the Esplanade with the feet tied together. *Post-mortem* examination of the body of the deceased indicated drowning to be the cause of death. Ornaments which deceased had been wearing a few hours before death were missing, and subsequently traced to the possession of two men in the company of whom deceased had been seen on the evening of his disappearance. On analysis atropine was found in the contents of the deceased's stomach, and one of the two accused is alleged to have stated that he had seen his companion put a powder into some liquor which he gave to the deceased. In 2 other cases, respectively, 6 and 5 persons appear to have been poisoned; in the first mentioned of these 2 cases (from Wadhwan) 3 of the 6 persons poisoned died. The history of these two cases is silent as to the motive for the crime. Lastly, in a case from Karachi, 18 Fakirs, all of whom recovered, were poisoned by datura given to them in sweetmeats. In this case also the history of the case does not throw any light on the motive for the crime."
Do.	1884	.....	4	.....	Involving ten persons—(*a*) Two, both recovered; (*b*) Do. (*c*) Three, all recovered; (*d*) Three, two recovered and one died.
Do.	1885	.....	5	.....	"The following is a summary of the five cases—all non-fatal, in which this poison was detected during the past year:—(1) In a case from Belgaum several persons—precise number not stated—suffered from symptoms of datura poisoning after eating food prepared from flour found, on examination, to contain the alkaloid of datura.

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					The accused in this case confessed to having mixed powdered datura seeds with the flour. (2) In a case from Bagevadi (Kaladgi District), the alkaloid was found in some sweetmeat given by one man to another, who, after partaking of it, was attacked by the usual symptoms of datura poisoning. The motive in this case was stated to be to make the poisoned individual 'mad on account of kept woman.' (3) In a case from Broach, a woman confessed to having put powdered datura seeds in her husband's food. The husband and 'others' who ate of the poisoned food were attacked. Datura seeds were found in accused's possession and identified. (4) In a case from Satara, in which five persons—two of them children—were poisoned, the alkaloid *daturine* was found in some fragments of breadcakes, some flour sent at the same time and said to be a portion of the flour from which the bread in question was made, was found to be free from poison. (5) Lastly, in a case from Hubli (Dharwar District), three children were poisoned, and datura seeds, whole and in powder, were found in possession of the accused. Some powder scraped from a grinding stone belonging to the accused was also found to contain the alkaloid.
Bombay—*(contd.)* ...	1886	.....	4	.....	All non-fatal, seeds identified.
Do.	1887	2	4	.....	"The poison was detected in 5 cases during the year. In each of the 5, individuals were poisoned, and in 1 case there were two deaths. A summary of the 5 cases is as

Do.	188	5	

follows:—(1) A case from Sanand (Ahmedabad District), in which datura seeds were found in the contents of the stomach of each of two men, who suffered before death from symptoms of datura poisoning. (2) A case from Jalgaon (Khandesh District), in which some seeds found in the possession of a woman accused of poisoning 4 men with datura, proved, on examination, to be datura, seeds. (3) A case from Dakor (Kaira District), in which the active principle of datura was detected in some food. A portion of this food had been eaten by 4 persons, who, thereafter, were attacked with symptoms of datura poisoning—all recovered. The sufferers in this case were a man, his brother's wife and two servants. (4) A case from Belgaum in which some dregs taken out of a coffee-pot were found to contain atropine. In this case it was reported that a man and his family—number not stated—suffered from symptoms of datura poisoning after drinking coffee prepared in the pot from which the dregs had been taken. (5) A case from Karachi, in which atropine was extracted from some cooked rice. 8 persons, it was reported, had suffered from symptoms of datura poisoning after eating some of the rice sent for examination."

"5 cases of poisoning by this drug were reported during the year. In all five the alkaloid was detected in food which had given rise to symptoms of datura poisoning, *viz.*, in 1 case in bread, in 2 cases in flour, and in 2 cases in cooked vegetable food. In 1 of the 5 cases from Amraoti (Berars), the victims, it was stated, were 4 in number, and in another from Sorath (Native State), 2 persons, a man and a girl, were the sufferers. In each of the other 3 cases one person only was poisoned, the victim in each case being a male adult. Of these 3 cases 2 came from Anand (Kaira) and 1 from Haveli (Poona District). In 1 of the 2 cases from Anand the victim died. This was the only fatal case of poisoning by datura reported to this office during the year."

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
Bombay—(*contd.*) ...	1889	2	3	.....	"Three cases of poisoning by this drug were forwarded for investigation during the year under report. The cases were:—A case from Uran (Thána District), in which two women had displayed symptoms of datura poisoning after partaking of some bread, but recovered upon treatment. Datura was found in the vomit and also in the bread. (2) A case from Dholka (Ahmedabad District), in which datura was detected in the viscera of a man who had been poisoned; datura seeds were found in the stomach of the deceased, and also adhering to a stone which the accused had used for pounding the seeds. (3) A case from Malegaon (Nasik District), in which a child, after eating some sweetmeat given to it by a neighbour, had exhibited narcotic symptoms and eventually died. Datura seeds were found in the contents of the stomach of the child."
Do.	1890	2	2	.....	"These 4 cases include the poisoning of thirteen persons:—(*a*) A case from Haveri (Dharwar), in which 8 persons, after eating food, exhibited symptoms of datura poisoning, all recovered. (*b*) A fatal case from Tanna, no history forwarded. (*c*) A fatal case from Borsad (Kaira), no history. (*d*) A case in Bombay in which a brass-pot, containing datura seeds, was forwarded for examination; this case was in connection with the poisoning of 3 women who were treated in hospital; all recovered.

Madras	1855	1	.....	.....	.....
Do.	1868	1	.....	.....	.....
Do.	1870	1	.....	.....	.....
Do.	1871	1	.....	.....	.....
Do.	1874	1	.....	.....	.....
Do.	1875	1	.....	.....	.....
Do.	1878	1	.....	.....	.....
Do.	1879	2	2	.....	.....
Do.	1880	1	1	.....	.....
Do.	1881	3	1	.....	.....
Do.	1882	1	2	.....	.....
Do.	1883	2	.....	.....	.....
Do.	1884	7	4	.....	.....

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

"Datura was detected in viscera only once. It was found once in some pills, and once in a powder, both of which were supposed to have been used with criminal intent."

.....

"Datura was discovered in 8 cases, some of which are worthy of record:—(*a*) Madura. The deceased man was supposed to have been drugged and thrown into a tank while in an unconscious state. The poison is believed to have been given in milk. Another man who partook of the suspected milk, suffered from vomiting and a bitter taste in the mouth, and is reported to have been delirious, clutching at imaginary objects for three days."

"(*b*) Madura. Two men were drugged by poisoned milk while travelling by the South India Railway. One of them remained unconscious for two days. Both recovered. In this case a suspected powder was submitted for examination. No results were obtained with the alcoholic extract, but the alkaloid extracted by the Stas' process produced the physiological effects of datura."

"(*c*)" Godaveri.—Three boys suffered from vomiting, tingling of the skin, delirium and clutching at imaginary objects shortly after taking some toddy. Datura was found in the vomited matters."

"(*d*) Kistna.—After drinking arrack, three persons were affected with vomiting, delirium, and dilated pupils. Datura was found in the arrack.

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					"(*c*) Bellary.—Powdered leaves of *Datura fastuosa* were administered as an aphrodisiac."
					"Fourteen individuals were poisoned by datura, but in no case does a fatal result appear to have been due to the drug. The only death seems to have occurred from drowning while the victim was under the influence of datura.
Madras—(*contd.*)	1885	4	2	.....	Datura was detected in three cases:—(*a*) 4 persons were attacked with characteristic symptoms half an hour after taking food. (*b*) 6 persons were said to have suffered from the usual symptoms soon after taking food; datura seeds were discovered mixed with chilli seeds in the evacuations. The seeds were identified by their structural peculiarities, but no physiological effect could be obtained with them; they were apparently exhausted by maceration during their passage through the intestinal canal.
Do.	1886	2	2	.....	Datura was found in 4 cases:—(*a*) A female traveller put up at a certain house. Soon after a meal, the seven inmates, not the traveller, were seized with giddiness, thirst, tingling in the throat, delirium and stupor. Evidence of datura was found in pepper water, and in a fragment of a cooking pot. (*b*) 23 persons, after a meal, were seized with symptoms of datura poisoning; all recovered. The alkaloid was found in the vegetable curry and in one parcel of vomit. (*c*) A suspected abortifacient drug consisted of datura seeds.

Do.	.....	1887	.....	.....	.....
Do.	.....	1888	1	3	.....
Do.	.....	1889	3	1	.....
Do.	.....	1890	.....	6	.....

Atropine was detected in three cases. The heading now includes cases in which no part of the plant used is available, the identification resting upon the discovery of a midriatic alkaloid; they were formerly included under "Datura."

Datura and atropine were found in four cases alone, and mixed with ganja in one case. (*a*) Three chucklers, who were in the habit of stealing toddy off the trees, became more than usually intoxicated on one occasion, and one of them, who drank a larger quantity than the others, became insensible and died. Atropine was extracted from his stomach and from the toddy, in which were also found datura seeds. (*b*) In another, a woman committed suicide, owing to a quarrel with her husband, by eating the datura fruit; the seeds were found in her stomach, from which also the alkaloid was obtained. (*c*) Four persons became delirious after eating a pudding, and one of them became insensible and died; from the deceased's stomach atropine was extracted.

Datura and atropine were detected in five cases alone, and together with arsenic in a sixth case. In the three cases of atropine no parts of the plant could be obtained, and only a midriatic alkaloid was extracted from the articles sent; while in the three cases returned under datura, some part of the plant was also available for identification. (*a*) Two persons after eating a morning meal, were affected with delirium, incessant talking, twitching of muscles, clutching at imaginary objects, fits of laughter, difficulty of swallowing, and dilatation of pupils. A magician, who was sent for to discover the cause of these symptoms, unwisely ate some of the food as an experiment and suffered similarly. In the meantime 6 other members of the family to whom food was sent out to the fields were found suffering in the same way, and one of them died. (*b*) Two brothers-in-law put datura seeds into the curry of three women, who were their neighbours, with malicious

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle-poisoning cases.	Remarks.
					intent, and were sentenced to 2 months' rigorous imprisonment. (c) A Bengali traveller joined a party of Mahometans who had returned from Mauritius, and were making their way down from Calcutta to Vizagapatam. On the way the Bengali contrived to poison his companions with datura, with the intention of robbing them, but he was foiled in his scheme, and was sentenced to 7 years' rigorous imprisonment.
Punjab	1862	.....	.....	.....	Datura was detected in 4 instances; no further information available.
Do.	1863	.....	.....	.....	Do. in 1 instance do.
Do.	1864	.....	.....	.....	Do. in 3 instances do.
Do.	1865	.....	.....	.....	Do. in 9 instances do.
Do.	1866	.....	.....	.....	Do. in 7 instances do.
Do.	1867	.....	.....	.....	Do. in 6 instances do.
Do.	1868	.....	.....	.....	Do. in 6 instances do.
Do.	1869	.....	.....	.....	Do. in 14 instances do.
Do.	1870	.....	.....	.....	Do. in 7 instances do.
Do.	1871	.....	.....	.....	Do. in 15 instances do.
Do.	1872	.....	.....	.....	Do. in 9 instances do.
Do.	1873	4	16	.....	"Datura is principally used by robbers to cause insensibility, and, indeed, no poison could be better adapted for the purpose, as in ordinary cases the victim rapidly becomes intoxicated, throws off his clothes and picks up dust and straw, and afterwards remains for some time in a state of idiocy or forgetfulness, that makes him unfit to give

Do.	1874	Not available.
	1875	
	1876	
	1877	
	1878	

proper evidence, till the criminals may have made their escape. This state sometimes lasts for days, and is then probably due to whole seeds being swallowed, which, if not expelled by vomiting, may take some time to pass through the whole intestinal canal. Being extremely tough, they are not wholly dissolved or digested, and in one case in hospital whole seeds were found in the fæces. In cases of suspected datura poisoning the intestine should be therefore sent along with the stomach. In 3 fatal cases the whole seeds were found in the stomach; in 1 fragments were found. In 2 specimens of vomit, whole seeds were found; in 2 others, fragments.

"The articles of food in which it was detected were cooked rice and *dall* (pulse), in which it had been put with capsicums which it rather closely resembles, and in 1 case in sweetmeats along with almonds and other seeds.

"Among the drugs, it was found in one case pounded and made up in pills; in 2 in powders with aromatics, in 1, in a *masala* for food; in 1, adhering to a pestle and mortar; in 1 case it was mixed with tobacco; in the rest seeds or the pounded seeds were sent for identification. In all these cases, except 2, the examination for datura poisoning was made on account of suspicious seeds or fragments being found in the physical examination. When fragments were found they were identified by their microscopic characters, and the active principle was extracted and dropped into a cat's eye, causing dilatation of the pupil."

Presidency.	Year.	Human viscera.	Substances suspected to be or to contain poison in connection with human poisoning cases.	Substances suspected to be or to contain poison in connection with cattle poisoning cases.	REMARKS.
Punjab—*contd.*	1879	3	16	.....	"Datura, the Thug poison, is almost always used to facilitate robbery. It not unfrequently causes death, as will be seen from the statistics. Three of the cases referred ended fatally, and two of these were sent up as cases 'found dead,' the Civil Surgeon being unable from the *post-mortem* appearance to certify the cause of death, and forwarding the viscera as a precautionary measure."
Do.	1880	4	22	.....	"In the non-fatal cases (in which vomit or excreta were sent) datura was detected in 15 instances; while datura seeds, powdered, were found in 6 cases in food and once in drugs."
Do.	1881	12	26	.....	In the non-fatal cases datura was detected in 8 instances in vomited matters; in 13 instances in food articles and drugs.
Do.	1882	2	16	.....	In the non-fatal cases datura was detected in 5 instances in the excreta, in 9 instances in food and in 2 in the drugs forwarded.
Do.	1883	3	14	.....	Datura was detected in 6 instances in vomited matter, in 6 in food articles, and in 3 in the drugs forwarded (non-fatal cases).
Do.	1884	1	21	.....	Datura was detected in 10 instances in vomited matters, in 6 in food articles, and in 3 in the drugs forwarded (non-fatal cases).
Do.	1885	2	14	.....	Datura was detected in 5 instances in vomited matters, in 6 in food articles, and in 3 in the drugs forwarded.
Do.	1886	2	12	1	Datura was detected in 1 instance in vomited matters, in 6 in food articles, and in 5 in the drugs forwarded.

Do.	1887	2	3	.....	In connection with cattle poisoning cases, datura was detected in 1 instance mixed in a ball of *atta* (flour). Datura was detected in 2 instances in food articles, and in 1 instance in the drugs forwarded.
Do.	1888	4	.....	.....	.....
Do.	1889	7	54	.....	.....
Do.	1890	Not available.		.....	.....

The following cases of Dhatura poisoning have been recorded by Dr. Brown in his book ("*Punjab Poisons*") :—

"Case No. 23.—Extracted from the Indian *Lancet* of August, 1st, 1860, reported and treated by Dr. Aitchison :

"Busunki, aged 35, employed as a Chaudari, had been ill for some time with a cough for which he went to a native hakim, and on November 23rd, 1859, at 8 a. m., he took some medicine ; on arriving at his own house about half an hour afterwards, he complained of headache and feverishness, and went about nearly naked ; he was also restless, moving about from place to place, and was attacked by convulsive fits.

"He was seen at half past seven in the evening, at which time he was in a state of unconsciousness, with greatly dilated pupils. He continued in a state of restless delirium, incessantly tossing his head from one side to another. The pulse was slow and the mouth dry.

"He vomited after an emetic was given, and then began to stare about and talk deliriously ; afterwards he had two convulsive fits in which he foamed at the mouth.

"The next morning he was less delirious, and the pupils were natural. He remained unconscious till the 3rd day, and then recovered his senses, but he became weaker ; and on November 28th, five days after he had taken the poison, he died from exhaustion. On enquiry it was found that he had never had any fits before this illness. The patient was treated at first with emetic of mustard flour and hot water, afterwards cold affusion was applied to the head and Carbonate of Ammonia administered internally as a stimulant. On the second day castor oil was given as a purgative."

"No. 24.—Case No. 75 of 1866, Punjab Records.—A man visited a house while food was being cooked ; he left suddenly and the three persons who partook of the food were taken ill and one died. Dhatura seeds were found in the food, and also on the person of the man, who was sentenced to death."

"Case No 25.—Gogaira, January 1860.—A man named Furida went to the [illegible] of Mussammat Hatim one evening, while her husband was absent, and took an opportunity of mixing some dhatura seeds with the rice that she was cooking, as he afterwards confessed. Mussammat Hatim, another woman, and an old man partook of the rice when it was cooked, but the poisoner refused to do so. Shortly after eating, Mussammat Hatim was attacked with extreme giddiness, and her mouth and throat became very dry, and subsequently she became insensible as did also the other two.

"The next morning the two women were seen to rush from the house in a very excited manner, tearing off their clothes till they were almost naked, and throwing about bricks like mad people. On entering the house, the old man was found insensible, lying on his bed and clutching at it; his breathing was loud and as if his throat was filled with phlegm; he was perfectly unconscious and remained so for three days. The two women recovered on the second day, one of them declared that she had been raped while insensible.

"An infant also partook of a portion of the food and became insensible. Seeds of dhatura were found on the prisoner, who alone was quite unaffected by any illness."

"Case No 26.—Another very interesting case in which death occurred happened at Umballa in 1861. A man named Din Muhammad was sent with some money to Umballa; on his way he met with a person named Devera, with a companion. These persuaded him to drink some liquid which they had mingled with pounded datura seeds, as they afterwards confessed.

"Shortly after Din Muhammad had drunk this, he complained of feeling thirsty and confused. He was seen to stagger about as if drunk, and then to fall and become senseless. From this condition he was roused by pouring cold water over his head; he then got up and began to roam about like a mad man and to strip off all his clothes.

"Afterwards he ran up a tree and jumped off into thorns, and then began to run about laughing and singing, and to eat earth. Subsequently he fell down and died, vomiting before death."

"Case No. 26.—Lahore, November 2nd, 1859.—Lulloo had been married to Kirpoo for 14 years without having any children. He therefore asked Muhammad Shah to give them some medicine which would produce fertility. This was done at their own house, while they and the poisoner were alone present. Half an hour afterwards the male sufferer felt his head going round, and subsequently he became insensible, as also did his wife. They were found by the man's brother in an insensible state, and the woman remained so for three days, and then died, but the man recovered.

"The prisoner confessed that he had given dhatura."

"Case No. 27.—This case happened at Kasauli in the Punjab, and was investigated there on the 24th August 1860. From the evidence it appeared that Ballu, a Brahmin, was travelling with his brother and some cartmen, and also another Brahmin, named Sadanand; that on July 21st, the last person prepared a dish called *chori* made of *chuppaties* (cakes) and sugar, of which the two brothers ate rather largely, the cartmen sparingly, and the prisoner Sadanand not at all. Very shortly afterwards the two brothers were taken ill and became insensible; the cartmen appeared also as if intoxicated, but the prisoner was not affected. Ballu died the next day, remaining insensible up to the time of his death.

"The prisoner confessed that he had ground dhatura seeds to powder, and mixed them with the food. In consequence none were detected on examination of the contents of the stomach of the deceased, but this was found to be very much inflamed."

"No. 28.—Case No. 112 of 1862, Umritsar.—Two men became insensible after eating some *dhall*; they remained so for several hours, but ultimately recovered. A large quantity of white dhatura was found in the *dhall* left."

"No 29.—Case No 5 of 1869, Hissar.—Three persons began to suffer from thirst, dryness of the mouth, and vomiting half an hour after taking some food; they then became drowsy and delirious; the pupils of the eyes were seen to be dilated; they remained delirious for two days and nights and then recovered. Dhatura seeds were found in the sugar which they had eaten."

"No 30. Case No 27 of 1868 from Punjab Records for 1868.—Some travellers leaving Lahore were joined by a stranger, who supplied them with *atta* and two of them also took some native liquor from him: they soon became ill, and appeared like drunken men: they were taken to Umritsar and tested for poisoning by dhatura. One man who had taken the spirit died in a few days, the rest recovered. No dhatura was found, and the prisoner was acquitted."

"No 31.—Case No. 38 of 1869, Jullunder.—Five persons of the same family became insensible after taking some food and remained so for 24 hours, after which they recovered, but their pupils were seen to be dilated. Dhatura seeds were found in the vomited matters."

"No 32.—Case No. 12 of 1876, from the Punjab Records for 1876.—The accused confessed that he had administered dhatura to his wife, as he said, to frighten her. She and another woman partook of the food into which the poison was introduced, and both became intoxicated and suffered from vomiting and purging, but recovered. The accused was sentenced to 2½ years' rigorous imprisonment, but no compensation was awarded to the sufferers."

"No 33.—Case No. 31 of 1870, Delhi.—Five persons partook of food together, but all complained of a peculiar bitter taste, and one hour afterwards they were all attacked by headache and giddiness. They all became stupefied, but complained of cramps and twitchings of the limbs. They were unable to stand, but fell down and kept on rolling about. They all vomited, and then recovered. Dhatura seeds were found in the vomited matters."

"No. 34.—Case No. 121 of 1879, Lahore.—A Sikh ate some *dahi* (curdled milk). Half an hour afterwards, he began to be delirious and threw off his clothes; he vomited and gradually recovered. Dhatura seeds were found in the vomited matters."

"No. 35.—Case No. 130 of 1868, Muzaffargarh.—A man became insensible in less than one hour's time after drinking some buttermilk, and died in 8 hours. Dhatura seeds were found in the milk."

"No. 36.—Case No. 205 of 1869, Karnal.—Two men partook of some *Mujun** with which dhatura seeds had been mixed by a third man, who afterwards confessed it. Both the men became insensible, and were conveyed to the hospital, where they were found to be in a state of complete coma with dilated pupils and stertorous breathing; no pulse could be felt at the wrist, and both soon died. Dhatura seeds were found in the stomach of each of them."

"No. 37.—Case No. 61 of 1886, Umballa.—A woman and a child became delirious after eating some food, but both vomited, and then recovered. Dhatura seeds were found in the food in poisonous quantity."

"No. 38.—Case No. 111 of 1866, from Hissar.—A poisoner was reported to have killed at least 15 persons, as he was in the habit of giving poisoned sweetmeats to travellers who afterwards became insensible and many died. Dhatura seeds were found in a little bag in his clothes."

An account of 32 cases of dhatura poisoning was given by Assistant-Surgeon Nil Ratan Bannerjee in the *Indian Medical Gazette* for 1885, page 209. All but four recovered.

* A kind of sweetmeat.

SCOPOLIA LURIDA, *Dunal.*

Fig.—*Link & Otto Ic. Sel., t.* 35; *Miers Ill. S. Amer. Pl. II., t.* 78; *Sweet Brit. Fl. Gard., t* 125.

Hab.—Central Himalaya, Nepal, Sikkim.

History, Uses, &c.—The properties of this plant do not appear to be known to the natives of India. It was introduced into Europe as a garden plant by the late Mr. Whitley of Fulham in 1823, and is of the most easy culture, and will grow in any soil, but requires a dry situation. (*Loudon.*) In the *Pharmacopœia of India* it is stated that a tincture prepared from the leaves, in the proportion of one ounce to eight ounces of alcohol, administered to different patients, was found to produce extreme dilatation of the pupil; and in two instances it induced blindness, which only disappeared when the medicine was discontinued. The largest dose given was 20 drops of the above tincture during the twenty-four hours. (*Op. cit. p.* 181.) These experiments were reported in the *Gaz. Med. Nov.* 4th 1843) and appeared in *Braithwaite's Retrospect of Med. IX.*, p. 119. Of late years other species of Scopolia, especially *S. japonica*, have attracted attention in Europe as substitutes for belladonna.

Description.—*S. lurida* is a strong, robust, downy, canescent plant, with something the habit of Belladonna, and solitary, drooping, lurid yellow or greenish-purple flowers. The leaves resemble those of Datura. The fruit is globose, about $\frac{2}{3}$ inch in diameter, circumsciss above the middle, lid one-celled, remainder two-celled; seeds numerous, reniform, granulate, $\frac{1}{12}$ inch.

Chemical composition.—*S. lurida* has been examined by Siebert. (*Archiv. der Pharm. Feb.* 20, 1890, *p.* 145.) From flowering plants he reports that he obtained, by fractional precipitation of an acidulated liquid with gold chloride, a "not inconsiderable quantity of hyoscyamine," but no atropine or hyoscine, while from plants collected when the seed had ripened, only a very small quantity of atropine could be isolated

under the same conditions and no hyoscyamine. The failure to detect hyoscine is thought to be possibly due to insufficiency of the material used. These results seem to indicate that the degree of development of the plant may have an important relation to the quantity and nature of the alkaloids occurring in it. (*Pharm. Journ. Mar. 1st*, 1890, *p.* 709.)

HYOSCYAMUS NIGER, *Linn.*

Fig.—*Bot. Mag., t.* 2894; *Bentl. and Trim., t.* 194; Henbane (*Eng.*), Jusquiame noire (*Fr.*).

Hab.—Temperate Western Himalaya. Cashmere to Gurhwal.

HYOSCYAMUS MUTICUS, *Linn.*

Fig.—*Jaub. et Spach. Ill.* v., *t.* 415; *Griff. Ic. Pl. Asiat., t.* 412. Syn.—*H. insanus*, Stocks.

Hab.—West Punjab, Sind, Afghanistan.

HYOSCYAMUS RETICULATUS, *Linn.*

Fig.—*Commelyn Hort.*, 77, *t.* 22.

Hab.—Beluchistan, Badghis, Khorasan. The herb and seeds.

Vernacular.—Khorasáni-ajowán (*Hind., Beng.*), Khorasáni-ova (*Mar.*), Khorasáni-ajamo (*Guz.*), Kúrásháni-yomam (*Tam.*), Kúrásáni-vámam (*Tel.*), Khurásáni-vádakki (*Can.*),

History, Uses, &c.—Henbane, though a native of the Himalayas, was probably unknown to the ancient Hindu physicians. Parasika and Khorasáni yamáni, the names which it bears in some recent Sanskrit works, indicate its foreign source. Three kinds of ὑοσκύαμος were known to the Greeks, μελας, black, λευκος white, and μηλοειδης, yellow. Hyoscyamus is called Altercum and Herba symphoniaca by Latin writers. Cf. *Pliny*, 25, 17, who states that altercum is its Arabian name. It is probably a corruption of الترياق originally a Persian word signifying an "antidote," in Greek θηριακα. In Palladius and other late

writers we meet with the mutilated form Jusquiamus. Mahometan writers call it Banj, an Arabic corruption of the Persian Bang; they say it is the Afiyun (ὄπιον) of the Greeks, the Azmálús of the Syrians, and the Katfít or Iskírás of the Moors; they also add that in the Deilami language it is called Kír-chak, because the capsules resemble a little basket with a cover, such as the Arabs make out of date leaves and call Kafír. Baron Hammer-Purgstall makes the following important observation: *Bendj*, the plural of which in Coptic is '*nibendj*,' is without doubt the same plant as the '*nepenthe*,' which has hitherto so much perplexed the commentators of Homer. Helen evidently brought the nepenthe from Egypt, and bendj is there still reputed to possess all the wonderful qualities which Homer attributes to it." (*Trébutien "Contes Inédits des Mille et une Nuits,"* i, p. 12, note.) Mír Muhammad Husain's description of Banj in the *Makhzan* agrees well with the genus Hyoscyamus. He says there are three kinds—white, black, and red, and that the white is to be preferred; he mentions the preparation of a sun-dried extract from the juice of the fresh leaves, and says that the leaves are also pounded and made into a paste with flour, out of which small cakes are formed, which when dry retain their medicinal properties for some time. Henbane is described by Eastern writers on Materia Medica as intoxicating, narcotic and anodyne; among the many uses to which it is put the following may be mentioned as now peculiar to the East. A poultice of the juice with barley flour is used to relieve the pain of inflammatory swellings. The seeds in wine are applied to gouty enlargements, inflamed breasts, and swelled testicles. About half a drachm of the seeds with 1 drachm of poppy seeds is made into a mixture with honey and water, and given as an anodyne in cough, gout, &c.* Equal parts of the seeds and opium are said to be a powerful narcotic. A mixture of the powdered seeds with

* Compare with Scrib. Comp. 89 to 93. The smoke of the burning seeds was inhaled by the ancients to cure toothache. (Scrib. Comp. 54.) Suffire autem oportet ore aperto alterci semine carbonibus asperso, subinde os colluere aqua calida, interdum enim quasi vermiculi quidam ejiciuntur. (See *Solanum xanthocarpum*.)

pitch is used to stop hollow teeth which are painful, and also as a pessary in painful affections of the uterus. The juice or a strong infusion of the seeds is dropped into the eye to relieve pain. Lastly, the seeds made into a paste with mare's milk and tied up in a piece of wild bull's skin if worn by women, is said to prevent conception. Ainslie and other European writers upon Indian Materia Medica notice the use of Hyoscyamus seeds in India.

The officinal Henbane of the ancients is generally considered to have been *H. albus*, Linn., and in the Mufaridát-i-Násari the seeds are described as Bazr-el-banj-abiad, "seeds of white henbane." Pliny mentions four kinds of the plant; the first with a black seed, flowers bordering on purple, and a prickly stem, growing in Galatia (*H. reticulatus*); the second, or common kind (*H. niger*); the third having seeds like *Lrio*, *i. e.* "reddish" (*H. aureus*, Linn.); and the fourth with white seeds, which is preferred by medical men (*H. albus*). All of them have, he says, the effect of producing vertigo and insanity. The Henbane seeds brought from Khorasán are those of *H. reticulatus*. This plant has also been sent to us from Quetta, where it grows abundantly. *H. niger* is cultivated at the Saharanpur Botanic Gardens, where the extract is also manufactured for use in the State Sanitary Establishments. The physiological effects of Hyoscyamus are the same as those of Belladonna, which have already been described. In certain conditions of the system the action of the drug, and especially of hyoscyamine, appears to be considerably modified, as will be seen from the following cases quoted by Stillé and Maisch. "Dr. H. A. Hutchinson, of Pittsburg, took ¼ grain of Merck's hyoscyamine (*Phila. Med. Times*, xiii. 139.) Besides the dryness of the mouth and throat, there was intense congestion of the head and face and violent throbbing of the heart and carotids, numbness over the whole body and muscular incoördination, and an inability to walk without watching the steps. There was no mental excitement or sensory illusion, but an over-powering tendency to sleep, which came on and lasted for 11 hours. Various means were used by friends who were ignorant of the cause of the

sopor to arouse the sleeper, but uselessly. During the sleep the muscular system was completely relaxed, and the pulse at first was full and hard, 138 a minute, the respirations 34 to 40, and the temperature 106° F. As the narcotism subsided these rates subsided rapidly toward the normal standards. On regaining consciousness the mind was unsteady and confused, and all objects looked tinged with yellow. During the sleep there was more or less nausea, and once vomiting. No recollection of anything after the commencement of sleep remained. For several days the pupils remained dilated, and there was double vision, while all the secretions, including the perspiration, were suspended. A patient of Empi's affected with paralysis agitans took 5 mgm. of hyoscyamine (gr. $\frac{1}{12}$), and, finding the tremor diminished, used a like quantity on the following day. The first dose caused a slight intoxication, and after the second there was a like confusion of the mind and senses, the face was flushed, the expression anxious, the whole interior of the mouth dry, the tongue stiff, and nausea was experienced. Hallucinations in which rats and serpents appeared, and familiar persons were not recognized, were accompanied and followed by furious delirium, tetanic spasms, and extreme dilatation of the pupils. Deglutition was impossible; the respiration was hurried and oppressed, the pulse at 96; and constant vesical tenesmus existed. The attack lasted for 3 hours, and gradually subsided, and on the morrow only some recollection of the hallucinations remained. (*Bull. de thérap.*, xcix. 373.) A phthisical patient accustomed to hypodermic injections of morphia was given $\frac{1}{10}$ grain of hyoscyamine. After vomiting he became delirious, lost all correct perception of the distance of objects, and constantly caught at insects, with which he said his bed-clothes were covered. (*Practitioner*, xxii. 369.) In some forms of hypochondriasis hyoscyamine seems to have been useful as a means of calming agitation. Prolonged experience has confirmed these statements. Prideaux states (*Practitioner*, xxiii. 446) that it produces sleep, sometimes of considerable duration, in excited conditions of the brain, as in mania, delirium tremens, meningitis, and where ordinary

hypnotics, and especially opiates, are inadmissible. In such cases small doses ($\frac{1}{16}$ gr.) suffice, but in chronic mania large doses ($\frac{1}{2}$ grain, or even 1 grain) are necessary, and are very useful in cutting short exhibitions of temper and excitement of a violent and destructive character. It would appear to be particularly useful in delusional insanity; the illusions which it conjures up overlie and gradually obliterate those which belong to the disease. In chronic dementia, associated with destructive tendencies, bad habits, and sleeplessness, the patients are much improved by a course of small doses of the drug. (*Stillé and Maisch.*) Of late years the hydrochlorate of hyoscine has been recommended as calmant in maniacal excitement in doses of one-half to one milligram. It is claimed for it that there are no injurious after-effects, and that it is a good hypnotic, but at the same time its depressing influence on the system is admitted, and it appears to have been of no use in a considerable proportion of the cases in which it was tried. There can be no doubt that much of the discrepancy which is observable in the records of the medicinal effects of hyoscyamine, is due to the use of impure or inert samples of the alkaloid.

Description.—The bazar seed is reniform, laterally compressed, equal in size to that of *H. niger*, of a greyish-brown colour. The testa is finely reticulated. The albumen is oily. The embryo curved like the figure 9, the tail of the 9 being represented by the radicle. The taste is oily, bitter and acrid.

Microscopic structure.—The outer envelope of the seed is composed of a row of large cells, the outer walls of which are thin but the lateral and interior very much thickened. The second layer is made up of very small cells tangentially extended and closely applied to one another. The cells of the albumen are polyhedral, and contain granular matter and oil globules.

Chemical composition.—Henbane contains *Hyoscyamine*, $C^{17}H^{23}NO^3$, an isomeride of atropine. It occurs both in the seeds and in the juice of the different species of Hyoscyamus, and is accompanied by *Hyoscine* or amorphous hyoscyamine.

It crystallizes in needles (from dilute alcohol), or prisms (from $CHCl^3$), is more soluble in water and dilute alcohol than atropine, and is lævorotatory, $[\alpha]_D = -21°$. It enlarges the pupil of the eye in the same manner as atropine.

Hyoscyamine occurs mixed with atropine in several plants of the Solanaceæ, such as Datura, Duboisia, Atropa, and probably in some others. Ladenburg is of opinion that atropine is an optically inactive base standing to hyoscyamine in the relation of racemic acid to lævotartaric acid. From 20 grams of commercially pure atropine aurochloride he isolated by recrystallization one gram of hyoscyamine aurochloride, and to this he attributes the statement that atropine can be converted into hyoscyamine. Hyoscyamine is converted into atropine by heating it for 5 or 6 hours above its melting point. Its optical activity may likewise be diminished by allowing its alcoholic solution to stand in the cold after a slight addition of one of the following bases: NaOH, KOH, NH^5, NMe^2H, and NMe^4OH, but cannot be reduced below $[\alpha]_D = -1{\cdot}89°$ by this method; so that if Ladenburg is correct in holding atropine to be optically inactive, the conversion of hyoscyamine into atropine is incomplete. Hyoscyamine is split up by boiling dilute HCl or baryta water into the same products as atropine, *viz.*, tropine and tropic acid.

Hyoscine or amorphous hyoscyamine $C^{17}H^{23}NO^3$, is a colourless syrupy fluid, and occurs in the mother-liquor from which hyoscyamine has crystallized. It closely resembles hyoscyamine, both in its mydriatic action on the pupil and in other respects. Boiled with water it splits up into tropic acid and pseudo-tropine. (*Watt's Dict. of Chem*, 2d. Ed. II., 744.)

Henbane seeds contain 26 per cent. of fatty oil, and according to Warnecke yield 4·51 per cent. of ash.

Toxicology.—No clearly authenticated cases of poisoning by Hyoscyamus appear to have been recorded in India, but its use has occasionally been suspected in the Punjab and Beluchistan, where *H. muticus* is common. Under the name of *Kohi-bhang*, "hill bhang," its intoxicating properties are well known to the

natives, and it is stated to be smoked like Ganja, and sometimes used in the same way as Datura to facilitate robbery.

NICOTIANA TABACUM, *Linn.*

Fig.—*Lam. Ill. t.* 113; *Wight Ill. t.* 166; *Bentl. and Trim. t.* 191. Tobacco (*Eng.*), Tabac (*Fr.*).

Hab.—America. Cultivated throughout India. The herb.

Vernacular.—Tambákú (*Hind.*, *Mar.*), Támáku (*Beng.*), Pugai-ilai (*Tam.*), Pogáku, Dhúmra-patramu (*Tel.*), Pukayila, Pokala (*Mal.*), Hogesappu (*Can.*), Tamakú (*Guz.*).

History, Uses, &c.—In the Encyclopædia of Sanskrit learning by Rája Rádhákánta Deva, entitled Sabdakalpadruma, tobacco is mentioned under the name of Támrakúta. This name occurs in the Kulárnava-tantra as that of one of eight intoxicating agents. No Sanskrit medical writers mention Tobacco. Támrakúta is a word compounded of Támra, "a red or copper colour," and kúta, "deceitful or vile," and the Hindi name Tambáku may possibly be derived from it and not from the Portuguese, in which case Tobacco has usurped the place of some older but now forgotten drug. From the *Maásir-i-rahimi* and the *Dára-shikohi* we learn that tobacco was introduced into the Deccan by the Portuguese about A. H. 914 (A. D. 1508), and that it began to be smoked about 1605, towards the end of the reign of Sultán Jaláleddeen Akbar. Rumphius speaks of it as having been known from a remote period in the East, and it appears to have been introduced into China in the 16th century probably by way of Japan or Manila. In Europe the Spaniards first became acquainted with Tobacco on the discovery of Cuba in 1492, and introduced it into Spain as a valuable medicinal herb. Gonzalo Fernandez de Oviedo y Valdés, governor of Domingo, in his *Historia general de las Indias*, printed at Seville in 1535, states that the plant is smoked by the Indians through a branched tube of the shape of the letter Y, which they call *Tabaco*.

In the edition of 1570 of Estienne and Liebaut's *L'Agriculture et Maison Rustique*, Nicot's own account of the herb, which was called after him *Nicotiane*, is given. In it he relates the wonderful cures which were effected by it at Lisbebron (Lisbon), where he was resident as French ambassador to the Court of Portugal in 1559-60 and 61. Nicholas Monardes in 1517 published a full account of the uses of Tabaco, the proper name of which amongst the Indians he says, is *Picielt*; and in 1577 "*Joyfull newes oute of the newe founde worlde*," by John Frampton, appeared, in which the Spanish and French accounts of the plant are reproduced in English. Frampton describes himself as a retired Spanish merchant. Tobacco was first brought to England by Sir John Hawkins about the year 1565, but was not used for smoking by Englishmen until many years after.

Smoking appears to have been first taught in England under the following circumstances: —

Sir Walter Raleigh's first expedition took possession of Virginia on July 13th, 1584, and after a six weeks' stay in the country, returned home. The next year, a second expedition conveyed out a colony under Master Ralph Lane, which remained in the country from August 17th, 1585, to June 18th, 1586: when Sir Francis Drake with his fleet, returning from his victorious raid in the West Indies, brought home the colony to the number of 103 persons. Among these was the celebrated mathematician, Thomas Hariot, who in his, "*Briefe and true report of the new found land of Virginia, &c.*," London, 1588, describes tobacco, and the adoption of the smoking of it by these Virginian colonists. It would therefore appear that Raleigh himself had nothing to do with the introduction of the weed itself, or of the habit of smoking it. But while Sir Walter introduced neither the herb nor the manner of smoking it, there is a general consent that he principally brought the habit of Tobacco-smoking, or, as it was at first called, Tobacco-drinking, into fashion, and a string of stories of a humorous character are on record which connects his name with it. For these stories

we must refer the reader to Arber's reprint of King James' famous "*Counterblaste to Tobacco.*"

From George Sandys' travels in 1610 we learn that tobacco smoking was becoming common among the Turks at that date, and that it had been introduced into the country by the English merchants.

Like coffee drinking, the use of tobacco met with much opposition at first, and even at the present day is visited with the severest penalties by the Wahabis. Sandys remarks that tobacco from England would prove a principal commodity in Turkey were it not for the severity of Morat Bassa (Murad Pasha), who commanded a pipe to be thrust through the nose of a Turk who was caught smoking, and that he should be led in derision through the city. The Mahometan law doctors in Arabia and Turkey universally condemned its use, in Persia* and the East they appear to have been less severe. In the former country "to fill a pipe for any one" is a vulgar expression for doing a favour. Mulla Fauki says:—

آن یکی پهلو زند کانیک بسر قلیان ناز
کرده ام بتنباکوی لطفی که از من نکذری

A Sofi praises tobacco in the following terms :—

آن جوانانیکه تنباکو کشند .·. اولش الله و آخر هو کشند

"Who drink tobacco; breathe Allah first, then God."

The liberal policy of Akbar probably prevented any persecution in India; in China its use was prohibited by the emperors both of the Ming and Tsing dynasties. In Russia up to the time of Peter the Great snuff-taking was forbidden under the penalty of having the nose cut off.

In England Ben Jonson, in *Every Man in his Humour*, acted on 25th November, 1596, skilfully represented both sides of the controversy in the speeches of Bobadilla and Cob. From this date up to 1604 numerous writers appeared in defence or condemnation of the herb. King James 1st then wrote his well

* Tobacco was introduced into Persia by the Portuguese in the reign of Shah Abbas the Second.

known *Counterblaste*, and published a *Commissio pro Tabacco* by which he placed a duty of six shillings and eight pence upon every pound imported into England, in addition to the custom of twopence which was before levied. Offenders against this act were liable to confiscation, fine and corporal punishment.

Even now the controversy is not extinct in England, but Tobacco appears to have the best of it, and in all other countries, except in the Wahabi territory, it reigns supreme. Nának Shah indeed when he established the Sikh religion thought it necessary to forbid the use of something, and selected tobacco as the forbidden article, but, nevertheless, he allowed converts who had been in the habit of using it to continue the practice.

The author of the *Makhzan-el-Adwiya* states that native physicians consider tobacco smoke to be disinfectant, and recommend it for fumigating cholera patients. Taken in various ways it is said to purge the brain and stimulate mental activity. The smoke is calmative in asthma and other chest affections, and prevents costiveness if inhaled fasting. The ashes of the plant made into a paste with oil are a useful application to sores and wounds to prevent bleeding. The water from the *hookah* is diuretic, and the black oil which collects in the pipe stem is used on tents to heal up sinuses, and is dropped into the eye to cure night blindness and purulent conjunctivitis. Mir Muhammad Husain closes his notice of Tobacco by remarking that the better classes of English in India smoke the *hookah*, but in their own country they mostly take snuff, a few chew, and smoke pipes (the author of the *Makhzan* wrote about one hundred and twenty years ago). Ainslie mentions the application of the leaves to the anus to promote the action of the bowels by the natives of Southern India. In the Concan a paste made with snuff, lime and the powdered bark of *Calophyllum inophyllum* is applied in orchitis. Dr. Leith of Bombay was in the habit of applying a poultice of Tobacco leaves to the spine in tetanus with good results. The use of Tobacco is very general amongst the natives of India, even women and young children habitually smoke and chew it. The Gúrákú which is used in the *hookah* is essentially a mixture of Tobacco and Gur (coarse sugar), in

equal proportions, but the wealthier classes add other ingredients to it.*

Guraku has the appearance of an extract; when used it is broken into fragments which are packed in the *chilam* and covered with a layer of live coals of wood, or rice balls specially prepared for the purpose. In Western India cigarettes rolled in the leaves of *Bauhinia racemosa* or *Diospyros Tupru* are much used. Many among the labouring classes chew Tobacco along with their betel leaves and areca nut. Snuff-taking also is very common in some parts of India.

Physiological effects.—Tobacco acts as a poison upon most insects, but is fed upon with impunity by weevils. In frogs, nicotine, after a period of temporary excitement, causes a tetanic condition; sometimes accompanied by convulsions, and followed by muscular ralaxation. Herbivorous animals are not affected by moderate doses injected into the stomach, but large doses reduce the frequency of the pulsations of the heart, and may prove fatal to them. The carnivora are affected by it in the same way as man. When its fumes are thrown into the lungs of animals, or when its decoction is applied to their skin its poisonous operation is speedily developed. Tobacco first

* Apples and *Sumbul*, the root of *Nardostachys Jatamansi*, according to the author of the *Makhzan*, who resided for many years at Murshidabad. Dr. K. L. Dey *"On the Use of Narcotics and Stimulants and their Effect upon the Human Constitution."* Calcutta, 1868, gives the following as the composition of the two kinds of *Guraku* commonly used in Bengal:—1st quality, Mild or Bhalsah—Tobacco leaf powder 72 parts, Powdered scents 16, Treacle 88, Ripe Champa plantains 16, Ripe Jack fruit juice 2, Ripe Pineapple juice 1 part. The ingredients to be thoroughly mixed, and the mixture to be allowed to ferment for 6 months.

2nd quality, Strong or Mitla Kurrah—Tobacco leaf powder 12 parts, Tobacco leaf rib powder 6, Powdered scents 2, Treacle 22, Slaked lime 1 part. The ingredients to be thoroughly mixed; it is then ready for use. The following is the composition of the powdered scents:—Root of *Nardostachys Jatamansi* 5 parts, Cassia bark 10, Juniper berries 2, Sandal wood 2, Leaves of *Artemisia Sieversiana* 5, Bdellium 1, cloves 1, Patchouli 5, Capsules of *Xanthoxylon hastile* 5, Alkekengi 5, Storax 5, Tobacco powder to serve as a vehicle for preserving the scents 49. The ingredients to be thoroughly powdered, mixed and sifted.

stimulates the spinal cord, giving rise to convulsions and afterwards paralyses it. The convulsions are of spinal origin in the frog, but those which occur before death in mammals are probably asphyxial. (*C. Bernard, C. Rouget, L.-Brunton.*)

On man the minutest doses of nicotine ($\frac{1}{5}$ to $\frac{1}{15}$ grain) occasion a burning sensation in the tongue, a hot, acrid feeling in the fauces, and sense of rawness throughout the œsophagus. Salivation is abundant. Small doses produce a sense of heat in the stomach, chest, and head, and even in the fingers, with some excitement of the nervous system; larger ones cause heaviness, giddiness, torpor, sleepiness, indistinct vision, with sensitiveness of the eye to light, imperfect hearing, laborious and oppressed breathing, and dryness of the throat. In 40 minutes after the larger doses a sense of great debility is perceived, the head droops, the pulse-rate falls, the face grows pale, the features are relaxed, the limbs seem paralyzed, the hands and feet are cold, the coldness advances gradually toward the trunk, and faintness ends in loss of consciousness.

The disorder of the digestive organs manifests itself by eructations, nausea, and even vomiting, the abdomen becomes distended, and an urgent desire is felt to go to stool; wind is discharged and urine voided copiously. The nervous system, after the debilitating influence of the poison has developed itself, shows its condition by muscular spasm, which begins with tremulousness of the extremities, and gradually involves the whole muscular system, including the respiratory muscles, so that the breathing is oppressed, gasping, and incomplete.

This enumeration of effects is sufficient to prove that nicotine acts primarily upon the spinal and sympathetic nervous systems, and not upon the brain. It may cause death by direct paralysis of the heart, or more indirectly by paralysis of the respiratory muscles, producing asphyxia. The blood examined during life of a person under the full influence of tobacco presents a striking disaggregation of the red corpuscles, which are also less regularly circular than natural, and have jagged or crenated edges. As the poisonous operation passes off, however, the

blood regains its normal characters. The action of tobacco itself is so nearly identical with that of nicotine as to render unnecessary a detailed account of it It, however, is mainly exhibited in muscular relaxation and collapse. In some cases "lethargy" and "insensibility" are mentioned, but the condition is not that of cerebral oppression so much as of cerebral exhaustion. Of other symptoms especially prominent in certain cases of tobacco-poisoning, either caused by a single excessive dose or by inordinate indulgence in smoking or chewing tobacco, may be mentioned: a rapid followed by a very slow pulse, hiccough, and cold perspiration, profuse diuresis, convulsions without loss of consciousness, sometimes cataleptic and sometimes hysterical, and great numbness as well as impaired motor power of the limbs and of the tongue. (*Stillé and Maisch.*)

Tobacco is now hardly ever used medicinally. Formerly it was applied to certian cutaneous eruptions such as scabies, and as a palliative in rheumatism and other painful affections, but its local application, if the skin be broken, is dangerous, and its administration in the form of enema, to induce muscular relaxation or remove worms, has often been followed by alarming symptoms. The value of tobacco smoking as a palliative in the paroxysms of asthma is well established, and in some cases its use appears to affect a permanent cure.

There can be no doubt that the moderate use of tobacco smoking is not injurious to a great many people, but it is equally certain that on some constitutions it produces mischievous effects. For a full account of the injurious action of the excessive use of the herb by smoking, snuffing, or chewing, Stillé's *Therapeutics* may be consulted. He shows that it lessens the natural appetite, more or less impairs digestion, and induces constipation, while it irritates the mouth and throat, rendering it habitually congested and impairing the purity of the voice. It induces a constant sense of uneasiness and nervousness, with epigastric sinking or tension, palpitation ("irritable heart"), hypochondriasis, impaired memory, neuralgia, and frequent micturition. Chewing and snuffing tend to

cause gastralgia, but smoking causes neuralgia of the fifth pair. It renders the vision weak and uncertain, causing objects to appear nebulous, or creates muscæ volitantes and similar subjective perceptions. Analogous deraugements of hearing occur, with buzzing, ringing, etc., in the ears, and even hallucinations of this sense. Often there is a feeling of a rush of blood to the head, with vertigo and impairment of attention, so as to prevent continuous mental effort; the mind is also apt to be filled with crude and groundless fancies leading to self-distrust and melancholy. The sleep is frequently restless and disturbed by distressing dreams. It impairs muscular power and co-ordination, probably both by interfering with nutrition and by exhausting nervous force, and usually keeps down the growth of muscle and the deposit of fat. Lauder-Brunton remarks that the effects produced on the system by tobacco smoking may be partly due to nicotine, but are probably rather due to products of its decomposition, such as *pyridine* and *collidine*. In pipe-smoking pyridine preponderates, but when tobacco is smoked in cigars, where there is free access of air, the chief product of the dry distillation undergone by the tobacco is collidine, which is far less active than pyridine, and this may partly account for the fact that many Europeans who have resided for some years in India, are unable to smoke a pipe, but can smoke many times the equivalent of a pipeful of tobacco in the form of cigars with impunity.

In those accustomed to smoke tobacco, it has a soothing effect on the nervous system, but it often acts as a nervous stimulant to mental work, as in reading. In these cases the effect is probably not due to the nicotine itself, but to the stimulus of the smoke on the sensory nerves of the mouth, which reflexly stimulates the vaso-motor centre, and dilates the vessels of the brain; since some people produce the same effect by sucking sweets, or sipping whisky and water.

Description.—Tobacco-leaves are from 6 to 20 inches long, and from 2 to 6 inches broad, oval or ovate-lanceolate, sometimes rather obovate in form, pointed and acute at the

apex, and with an entire margin. In the fresh state they are rather thick, green, and covered with viscid hairs and with small sessile glands; after drying they are thinner, lighter or darker brown, or mottled with different shades of brown, and friable. The leaves have a thick, prominent midrib, branching under acute angles into lateral veins, which are curved near the margin. The odour of tobacco is peculiar and heavy, and its taste disagreeable, bitter, and acrid.

The variety *rustica*, Linn., is chiefly cultivated in India.

Chemical composition.—Tobacco contains a large amount of salts, consisting of sulphates, nitrates, chlorides, phosphates, and malates of potassium, calcium, ammonium, and nicotine, and yields from 14 to 18·5 per cent. of ash. Larger amounts have been obtained, sometimes as much as 25 to 27 per cent. —a result which is probably due in some cases to dust adhering to the viscid glands, as was suggested by B. F. Creighton (1876). The other constituents of tobacco are albumen, resin extractive, gum, citric acid (*Goupil*), and nicotianin.

Nicotianin was discovered by Hermbstädt on distilling tobacco with water; it separates from the distillate in the form of white oliaceous crystals, which have an odour resembling that of tobacco-smoke and a warm and bitterish aromatic taste. (Posselt and Reimann, 1828.) Landerer (1835) obtained nicotianin from the dried, but not from the fresh leaves. Barral (1845) stated that it contains 7·12 per cent. of nitrogen.

Nicotine or *nicotia* is the poisonous principle of tobacco, and was discovered by Posselt and Reimann (1828). It may be prepared by exhausting bruised tobacco with acidulated water, concentrating the infusion, adding an excess of potassa, and agitating with ether, which dissolves the alkaloid, and on the addition of powdered oxalic acid, nicotine oxalate, which is insoluble in ether, is separated (*Schloesing*): or, the ether is evaporated, the liquid neutralized with oxalic acid, evaporated to dryness, and the residue exhausted with boiling alcohol which dissolves oxalate of nicotine. (*Ortigosa.*) On evaporating the solution to a syrupy consistence and agitating it with potassa and ether, an ethereal liquid is obtained, which on

fractional distillation yields the alkaloid. This is a colourless oily liquid, having at 15° C. the specific gravity 1·0111, and remaining liquid at —10° C. It has an unpleasant, and when heated a pungent, acrid, tobacco-like odour, a burning taste, and a strongly alkaline reaction. Exposed to air and light, it rapidly acquires a brown colour and is partly converted into a resinous compound. It boils near 250° C., but distils at a lower temperature, always leaving a residue. Its composition is $C^{10}H^{14}N^2$. It absorbs water from the air, dissolves readily in water, and is separated from this solution by caustic potassa. Alcohol and ether dissolve it in all proportions, and it yields with acids neutral and acid salts, of which the former crystallize with difficulty, and are mostly soluble in weak alcohol, but insoluble in ether. The alkaloid acquires a wine-red colour with strong sulphuric acid, and on heating the mixture is charred. Chlorine gas colours it deep-red or red-brown. When heated with a little hydrochloric acid a violet colour is produced, which on the further addition of nitric acid changes to yellowish-red. The double salts with mercuric and platinic chloride are sparingly soluble in cold water. Dried tobacco leaves contain from 2 to 8, and occasionally as high as 11 per cent. of nicotine. The alkaloid is present in all parts of the green plant, as well as in the dried leaves, and, according to Kissling (1882), also in tobacco-smoke. Instead of nicotine, H. Vohl and H. Eulenburg (1871), found chiefly *collidine*, with *pyridine*, *picoline*, and other bases of the same series in tobacco smoke, besides ammonia and traces of ethylamine; and, in passing the vapours through potassa solution, hydrocyanic, hydrosulphuric, acetic, formic, butyric, valerianic, carbolic, and probably other acids were retained. (*Stillé and Maisch.*)

According to Herr Dieser (*Archiv.* Mar. 31, 1889, p. 266) the acid tartrate of nicotine can be obtained as a well crystallized and definite salt. He prepares it by adding to pure nicotine a hot concentrated filtered alcoholic solution of tartaric acid, when the acid tartrate separates as a white syrup. After cooling, more of the tartaric acid solution is added, so long as it con-

tissues to produce a milky separation, and then the last trace of the salt remaining dissolved in the alcoholic liquor is precipitated by the addition of ether. The precipitate is dissolved in hot alcohol, the solution filtered, and ether added to promote the separation of the salt, when it is obtained in handsome crystalline tufts. Analysis of the salt indicated the formula $C^{10}H^{14}N^2(C^4H^6)^2+2H^2O$; it therefore contains 32 per cent. of nicotine.

M. de Coninck (1889) made the interesting observation that in the oxidation of a ptomaine having the formula $C^8H^{11}N$ by means of a solution of potassium permanganate a pyridincarboxylic acid was obtained presenting the principal characters of nicotinic acid. Having since obtained the compound in a purer condition he is able now to state definitely (*Compt. Rend.*, cviii., 809) that this acid produced in the oxidation of a ptomaine is identical with nicotinic acid resulting from the oxidation of nicotine. (*Pharm. Journ.*, *June* 8, 1889.)

Prof. E. Schmidt and Mr. Schütte (*Apoth. Ztg.* 1890, 511) have discovered traces of mydriatic alkaloids in tobacco.

Toxicology.—The reports of the Chemical Examiners in India do not contain many cases of poisoning by this drug. Dr. Brown, *Punjab Poisons*, refers to a case of an infant, taken from its mother in the morning, and returned at night but soon died. Portions of tobacco were found in the stomach. In a second case, also reported by Dr. Brown, a female child of a woman who had left her husband was found dead; the stomach contained a quantity of green substance which proved to be portions of tobacco leaves; the brain and lungs were congested. In the Bengal Chemical Examiner's Report for 1884, tobacco was received in connection with three cases of alleged attempts at poisoning, in two of the cases *ganja* was mixed with the tobacco. In the Bombay Dispensary Reports (vol. ii., p. 4,) the injurious effects of tobacco as an emetic in a case of poisoning by opium is recorded. Dr. Lyon (*Med. Jurisprudence for India*, p. 291,) remarks:—"Death has resulted from swallowing tobacco, from administration of a

decoction of tobacco as an enema, and from swallowing tobacco juice such as collects in pipes; and bad symptoms have been caused by the application of tobacco leaves to a wound, and even to the sound skin. Death has occurred from excessive smoking; it is doubtful, however, whether tobacco smoke contains nicotine; probably its poisonous effects are due to pyridine bases, developed during the combustion of the tobacco.

Commerce.—The average annual total exports of tobacco from India amount to 40 millions of pounds, valued at 11¼ lakhs of Rupees. It is exported from Bombay to Aden, Arabia, and the East Coast of Africa. Of manufactured tobacco the exports average 80,000 lbs., valued at about 24,000 Rupees; three-fourths of this quantity goes to Aden, and the remainder is distributed among twenty-eight different countries, and probably consists of small consignments of Indian cigars for the use of those who have acquired a taste for them in this country.

The annual production of tobacco in all countries has been estimated at about 3,000,000 tons. In former days the tobacco grown at Bhilsa in the Deccan was greatly esteemed, and it seems probable that tobacco was first cultivated in India at that place.

END OF THE SECOND VOLUME.