On the natural history, action, and uses of Indian hemp / by Alexander Christison.

ON THE

NATURAL HISTORY, ACTION, AND USES

OF

INDIAN HEMP.

BY

ALEXANDER CHRISTISON, M.D., EDIN.,

ANNUAL PRESIDENT OF THE MEDICAL SOCIETY OF EDINBURGH.

EDINBURGH:

SUTHERLAND AND KNOX, GEORGE STREET.

LONDON: JOHN CHURCHILL.

MDCCCLI.

[FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE, 1851.]

INDIAN HEMP.

INDIAN hemp[1] has been long known in India, Persia, and other Eastern countries as a medicinal and intoxicating agent, but was little known to Europeans until it was brought prominently into notice by Dr O'Shaughnessy of Calcutta, in the year 1839. [On Indian Hemp, &c.; Calcutta, 1839.]

The ancients were almost ignorant of its virtues. The Greek physicians, as we are told by Dioscorides, were acquainted with the emollient properties of the seeds of hemp; but they seem to have been wholly unaware of the narcotic virtues of the plant (Diosc. iv. clv.). Galen and his contemporaries were not much more informed on the subject; for that author merely speaks of its seeds being sometimes used as a whet after supper, to create a desire for wine, but condemns the practice, because, when used freely, they heat the system and cause determination towards the head (Opera, ii. 53, Edit. Basiliæ, 1549; De Facultatibus Alimentorum, c. xlix.). It is alleged, however, that hemp was known at an early period to the Chinese. In a communication to the Académie des Sciences in 1849, extracts are produced from a Chinese work, showing that so far back as A.D. 220, a Chinese physician, named Hoa-Tho, produced insensibility in his patients by means of a preparation of hemp, and that operations were then performed without pain to the patient (*Stanislas Julien*, in Comptes Rendus, &c., 1849, p. 197). This statement would, however, require further confirmation. There seems little doubt that in the year 600 the Hindoos were in the habit of employing hemp; and that it has been in constant use ever since as a means of allaying pain, and more particularly as an intoxicating agent, among the inhabitants of the East.

Its properties have been alluded to by various good European authorities several centuries ago, but by no one more distinctly than in 1695 by *Rumphius*, who describes its effects from personal observation at Amboyna. He says that throughout India the leaves and seeds are extensively used to dispel anxiety and to excite agreeable dreams; that a maniacal state sometimes ensues; that he has known it cause, when smoked with tobacco, a frantic pugnacity in some,

[1] This is an abstract of an Inaugural Dissertation, for which one of the prizes of the Medical Faculty of the University of Edinburgh was awarded in August 1850.

sardonic grins and menaces in others, and lamentation in others; and that its effects vary much with individual temperament (Herbarium Amboinense, Edit. *J. Burmann*, 1750, v. 209). Frequent mention is made of it by authors after that period. But Dr O'Shaughnessy has the merit of having first brought the plant fully into notice in Europe; and since his essay was published, many experiments have been made with it. The expectations held out by him have not yet been fully realised. One explanation of this appears to be, that many have used spurious or ill-made preparations, and that others have not made sufficient allowance for the influence of constitutional peculiarities in affecting its action.

BOTANICAL HISTORY.

From the observations of Dr Royle, it appears that Cannabis is a plant of the Persian region, where it is subjected to great alternations of heat and cold; and that it has passed on the one hand into Europe, and on the other into India.

Two species of Cannabis have been described by many botanists —viz., *C. Sativa*, and *C. Indica;* but repeated comparison has not detected any material difference. Dr Royle remarks that, "like Dr Roxburgh and others, he was unable to detect any difference between the plant of the plain and that of the hills of India, nor between these and the European plant. The Indian secretes a much larger proportion of resin than is observable in the European plant; but a difference is observed in this point even in India between plants grown in the plains and those of the mountains, and also when grown thickly together. The natives plant them wide apart, to enable them to secrete their full powers. In Europe, the thick sowing, and moister, often dull climate, will prevent the due secretion of the peculiar principles of a plant of the Persian region."

As I have not observed that any direct experiment has been made on this subject, it appeared that by growing the seeds of the Indian plant in this country, and comparing the result with the common hemp, the question might be determined; and accordingly the following experiment was made in the Edinburgh Botanic Garden :—A few seeds picked from dried tops, or *Gunjah*, in good condition — which had been obtained the previous year in the bazaars of Bombay by Mr Henry Johnston, of the East India Company's service—were sown on the 17th of March 1849. They germinated in a stove-house, and plants appeared above ground in a few days. In the course of a week they attained a height of 3 inches. Three shoots were planted in the open air, while the remainder were left in the hot-house. On August 1st those without had attained a height of 4½ feet, and it was remarked that they had a peculiar strong minty odour. On the 1st October one of these was 9½ feet high, with several strong, somewhat woody stems, and abundant, dense, coarse foliage; flowering appeared to be commencing; but the advance of the season, with accompanying cold weather,

arrested any farther development. The plants in the hot-house at the same period were only 4 feet high, slender, with more sparse, smaller, and tender leaves, but in full flower. Plants of the common or European hemp growing in the garden had a very similar aspect to the latter, being, however, in full fruit.

I am indebted to the kindness of Professor Balfour for the following remarks, and botanical description of these plants :—"Those in the open air were all female plants; among those in the hot-house were one or two males. I have not been able to make out any specific difference between the so-called *C. Indica* and *C. Sativa* of Europe. The common hemp in the garden has not attained the same size as the plants from Indian seeds, and the segments of the leaves are narrower; in other respects they appear alike, more especially as regards their flowers, glands, &c. Both the Indian and European seeds produce plants which have a strong resinous odour; in this respect the European plants in the garden seem to excel the Indian. On the Indian specimens, even when cultivated in the hot-house, there has not appeared any of the *churrus* described by Indian observers. The racemes and spikes of flowers, however, have a resinous feeling when touched. The following is a description of the plants raised from the Indian seeds :—

"*Flowers* diœcious.—*Male* plants in the hot-house about four feet high, circumference of stem at the base about one inch, lower part of the stem woody; *stem* somewhat quadrangular, grooved and roughish, surface of the stem at the base of a brownish colour, mixed with greenish streaks; *leaves* opposite, sap-green above, pistachio-green below, quinate to septenate; at the upper part of the stem the leaves become alternate; segments of the leaves feather-veined, with a prominent midrib below, lanceolate, acute, with large serratures; stipules 2, subulate.

"*Flowers*, in cymose axillary leafy clusters, some of them abortive. —*Perianth* of 5 ovate blunt segments, which are of a pale green colour (the margins being white and the centre greenish), with a marked green midrib, covered externally and internally with glandular pubescence, segments of the perianth concave internally. Stamens covered with glandular pubescence, opposite the segments of the perianth. Anthers large, projecting beyond the perianth, oblong, bilocular, erect, with an apicilar process and longitudinal dehiscence, supported on slender filaments, which are shorter than the anthers, and have pyramidal bases. Pollen spherical, with three facets, each consisting of a small ring in the centre of a larger one. In the centre of the flower there is the rudiment of the pistil.

"*Female Plants.*—These are much stronger than the male plants, have attained a greater size, and have a stronger balsamic odour; those in the hot-house attained a height of 5 feet, and those in the open air 9½ feet; stems hollow, 4 inches in circumference in the plants out of doors, with a tenacious stringy bark. Leaves covered with minute vesicular sessile glands, which give out a viscid

resinous-like exudation, and are interspersed with glandular hairs. Flowers in aggregated spikes; usually three or more unibracteate flowers in a cluster in the axil of floral leaves, which are often tripartite.

"*Perianth* monopetalous, convoluted, swelling at the base, where it includes the ovary. Floral leaves, bracts, and perianth covered with glandular pubescence.

"*Pistil* one; ovary one, rounded, containing a single orthotropal erect ovule. Style short, terminal, ending in two elongate filiform pubescent stigmata. *Fruit* a Caryopsis. Seed erect, marked with a coloured hilum. Embryo exalbuminous."

To this description I may add, that the Indian seeds from which these plants were raised were not distinguishable by any character whatever from European hemp-seed.

From this investigation, so far as it has been possible to extend it at present, the following conclusions may be deduced:—That the minute glands, under favourable circumstances, would act vigorously in producing the resin which is so abundant on the plant in India, but which was in very small quantity on the plants grown here:—That these glands secrete with activity only in a certain climate, which we cannot imitate in this country, either out of doors or under glass:—That the hemp plant possesses a peculiar minty odour, which is not sufficiently alluded to by authors:—That the *C. Indica* and *C. Sativa* are one species.

PREPARATIONS OF HEMP.

The principal forms in which hemp is met with in the markets of the East are—1. Haschich; 2. Bhang; 3. Gunjah; 4. Churrus; 5. A variety of pastes, electuaries, &c., in most of which the vehicle, or *excipient*, is butter, or other oleaginous matter; 6. Tincture of hemp.

Haschich is the Arabian name given to the dried tops of the plant grown in Upper Egypt. These tops are gathered some time before the seeds reach maturity. The meaning of the word is "herb," or "*herbe par excellence*," and it is also the name applied by French authors to the different dried preparations of hemp.

Bhang is an Indian preparation, consisting of the larger leaves and capsules. According to Dr O'Shaughnessy, it is the cheapest form used in India, and therefore in common use among the lower orders for smoking. From it is prepared an intoxicating drink, and it forms a part of the confection called *Majoon*.

Gunjah is the principal Indian form of the dried plant, and consists of the dried tops after flowering, from which the resin of the leaves has not been removed. It is therefore identical, or nearly so, with the Arabian haschich. It is chiefly sold in the Calcutta bazaars for smoking, in bundles three feet long and three inches in diameter; the colour is dusky green, the odour agreeably narcotic, and the whole resinous to the touch. The specimens I

have examined, sent to Dr Christison by Dr O'Shaughnessy, consist of a central stem, with branches, round which and at their extremity, are elongated oval masses of compressed leaves and young fruit, about one inch and a half long, and adhering together by adhesive resinous matter. After being steeped in water, these masses may be spread out, and are found to consist of the flowers, seeds, and smaller leaves. *Churrus* is the resinous secretion mixed with variable proportions of leaf-fibres; it is not met with in Europe except as museum specimens. Those in Dr Christison's museum consist of variously sized, nodulated, rounded masses, from the size of a pea to that of a walnut, and of a dirty grayish-green, or greenish-black colour. A specimen from Yarkand, in Thibet, lately received from Mr Jameson of Saharunpore, is as big as two fists. It is collected during the hot season by scraping the leaves and tops. Dr O'Shaughnessy states that in Central India and Nepaul men in leathern dresses brush forcibly through the plants, and the resin which adheres to them is then scraped off. Dr Royle says the glandular secretion is collected from the plants on the hills by the natives pressing the upper part of the young plants between the palms of their hands, and scraping off the secretion which adheres. This is also the account given by Mr Jameson in a late letter to Dr Christison. And Dr M'Kinnon states that in Nepaul the resin is gathered on the backs of naked Coolies. The most esteemed quality in the Bombay market, according to Mr Henry Johnston, is that which is in roundish warty lumps, of the size of a large pea or marble, of a greenish-black colour, and of a resinous appearance.

In the preparation of the *Electuaries*, &c., butter is used as the means of separating the active principles; consequently these compounds are very apt to become rancid. They are thus described by M. Chaniac in the "Annuaire de Therapeutique" for 1846, as used in Egypt:—1. Preparations mixed with honey or melted sugar. 2. A more active form, called haschich kava-mesk (musked drug), containing musk, essence of roses, and almonds, of pasty consistence, and of the colour of impure honey; the quantity used being about the size of a walnut. 3. Two kinds are found at Smyrna, called Israël, the one a fine powder, the other a roll of firm mastic consistence. 4. A black round kind has great aphrodisiac repute among the fellahs; but in this case it is found that cantharides is added to increase the effect of the drug. At Cairo, the compound from which the various conserves are prepared is thus made: Equal parts of well-sifted haschich, butter, and water, are put in a vessel on the fire; after some boiling, the water is dissipated; the residue is twisted in a cloth to isolate the fatty matter, and to this the different spices are added.

Tincture.—Landerer describes a tincture of hemp used at Cairo, called *chatsraky*, made by infusing in spirit for three weeks, with a gentle heat, the varnish-covered bark sliced from the stems when the plants are in flower.

The activity of the preparations of hemp depends on the presence of the resinous varnish on the leaves. Consequently, as the most active leaves must be those which contain the largest quantity of resin, it becomes a matter of great importance to decide upon the proper period for collecting the plant.

M. Gastinell, an apothecary at Cairo in 1849, states that he found the active powers of hemp to depend on a resinous matter which forms on the leaves as the seeds ripen. Again, M. de Chaniac observes, that in Egypt the tops of the plants gathered at the end of flowering, but before complete maturity of the seeds, are used; and Mr Jameson, Director of the Botanic Gardens at Saharunpore, makes a like statement in a letter to Dr Christison, dated 17th August 1849, which contains an interesting account of hemp in that part of India. He says—"In Kimaon and Gurwhal cannabis is grown in large quantities, partly in order to obtain its resinoid secretion, and partly for its bark, from which a strong coarse cloth, called bungila, is manufactured, for the dress of the poorer inhabitants, particularly through Gurwhal. It is sown in July, and gathered in October. From the female plants only the churrus is procured. Towards the beginning or middle of October the seeds begin to form, and when in this unripe state the upper part of the plant is pressed between the palms of the hands, and deposits upon them a yellowish-green secretion, which is scraped off with a blunt knife; this is the well-known churrus. From the male plant bhang and cath are prepared. Bhang is prepared by drying the leaves and other parts of the plant, both male and female being used. It is thus prepared for use:—A small quantity is put into a mortar with a little water, and pounded; the refuse water being thrown away, an additional quantity of water is then added, from a half pint to a pint, depending on the strength required, and well mixed; it is then strained through a fine cloth, the residue thrown away, and the liquid is ready for drinking—a wine-glass-full or more being taken at a time. Gunjah is the third preparation, and is the produce of the upper portion of the stem—that is, about one and a half feet; it is only used in the hookah to smoke. This also applies to the churrus. The Gunjah is carefully dried and mixed with an equal quantity of tobacco, and well rubbed together in the palm of the hand; it is then ready for the hookah. We have thus the three preparations—1. Churrus; 2. Bhang, or Lubzi; 3. Gunjah, or Ghunjah. The first is only prepared on the hills, and the two latter are common to both hill and plain; but bhang is principally prepared in the plain. At Bhaeit, about sixteen miles from Saharunpore, it is prepared in large quantity, and is subject to a heavy duty. From 40,000 to 50,000 maunds are produced yearly (a maund is equal to 80 lbs). The reason why the churrus is not prepared in the plains is, because the plant does not secrete the resinous principle, showing that its secretion is connected with climate. But still the plants are identical in external characters;

and you will, I think, find that the European and Indian plants are also identical. In order to ascertain the fact, I send you a small packet of hemp-seeds, procured at one of the Gurwhal villages, where it is grown in vast quantity. In your letter you say that the active principle forms on the stem and leaves; this is not the case, as it is only procured when the seeds are in an unripe state; attempt to procure it before this period, and none will be forthcoming. It will appear strange how ignorant natives can distinguish female from male plants; were you to see the plant growing, your surprise would soon be removed. The female plant, when ready for making churrus, has at its upper part a "bunchy" appearance, whereas the male plants have become by this time mere stems and leaves, the flowers having fallen off. In October, in crossing the Himalayas from Almora to Mussuri, I have passed through dozens of villages 6000 to 8000 feet above the level of the sea, and seen hundreds of men, women, and children, all employed in making churrus. The plant grows to a height of from ten to fourteen feet."

The plants cultivated in the Edinburgh Botanic Garden present exactly the characteristic difference between male and female described by Mr Jamieson.

From these observations, then, it appears to be undoubted, that the only period for collecting the plant in its active state, is about the time of ripening of the seeds, at which period the tops of the plant are covered with the resinous varnish on which its properties depend.

The preparations of Indian hemp, hitherto alone used in this country, are a spiritous extract, and a tincture made from it. The resinous secretion is soluble in oils and spirit, but not at all in water. Hence an alcoholic extract is alone admissible, and not a watery one. Gunjah is used for obtaining it. Two extracts have been used in this country: one prepared in London, and the other from Calcutta. There is reason to believe, that the good qualities of English extract are prepared by boiling gunjah in rectified spirit, or by the method of displacement without heat. The finest extract I have seen, is one prepared by Mr Robertson, professor of chemistry at Calcutta, which, however, is not in the market. Of this Mr Robertson prepared about thirty pounds. From a hundred weight of gunjah he obtained about eight pounds of extract. His process consisted in passing the vapour of boiling alcohol downwards through the gunjah, packed in a cask,—an ordinary worm leading from the cask to a receiver. The preparing of it cost him much time and trouble; and, on account of the heavy duties upon hemp, and also upon spirit, he reckoned the expense at fifteen shillings a pound. On these accounts he abandoned the attempt to manufacture it in this way. Specimens, however, were sent for experiment to various parts of Europe, and, among others, to Edinburgh, for Dr Christison;—this is now (1849) four years old, yields a beautiful green tincture with rectified spirit, retains all its energy, and is more active than the ex-

tracts of the shops generally seem to be. I have repeated Mr Robertson's process on a small scale with gunjah, and found it to be a very convenient and complete means of rapidly exhausting the plant, while at the same time the consumption of spirit is less than in the process by cold percolation.

Good extract thus prepared, like all other good extracts that I have seen, has a dark greenish-black colour, a firm consistence, and great tenacity, a faint peculiar aromatic odour, and a feeble peculiar bitterish taste. It softens in the hand, and adheres with great obstinacy to the fingers; it is not at all miscible with water. It forms a beautiful deep green tincture with rectified spirit, in which it is easily soluble. I have sometimes seen in the shops an extract, which is emulsive, so as to be easily diffused in water, and even rubbed down with the finger. All such must be spurious, and are probably feeble, if not inert.

Various investigations have been made as to the nature of the resinoid secretion of the leaves of cannabis; and it has been ascertained that a resin can be separated from it, retaining the properties of the plant in full energy. Gastinell, apothecary at Cairo, has prepared this substance, of which he says two grains are as effective as six of alcoholic extract.

M. de Courtive of Paris says, that the resin prepared by him is, in the dose of three-fourths of a grain, as effective as thirty grains of the butter-extract (*extrait pur, au beurre*). He also prepared the resin from Paris-grown Indian hemp, and from French hemp, and he found that six grains of the first, and eight to sixteen of the second, were necessary to produce the effect [*Comptes Rendus de l'Institut*, 1848, p. 509]. I have found one, two, or three grains of Mr Robertson's alcoholic extract equal in activity to three-fourths of a grain of the resin.

The Messrs Smith of Edinburgh have succeeded in concentrating the properties of the extract in a soft neutral resin, which they are disposed to regard as its active principle, and have denominated Cannabin [*Pharm. Journal*, 1846-47, p. 171]. The essential part of their process, which is somewhat complex, consists in removing from gunjah whatever is soluble in warm water, and in a cold solution of carbonate of soda, and then preparing from the residuum an alcoholic extract with rectified spirit. In this way colouring matter, fat, and chlorophyle, are in part removed. The rest of the process, by which it is proposed to purify the resin still farther, by the successive use of milk of lime, sulphuric acid, animal charcoal, and water, has not appeared to me to make any material difference in the preparation.

The Messrs Smith got seven or eight per cent of this resin from gunjah, which is just what Mr Robertson obtained of alcoholic extract. From Dr O'Shaughnessy's gunjah I obtained fully ten per cent. The numerical results were, from 3840 grains, 500 of watery extract, 640 alkaline extract, 2310 fibrous residue, and 390 purified

resin. Messrs Smith found two-thirds of a grain of this resin to produce decided effects. But a single grain of Mr Robertson's extract has also proved very energetic. I fear, therefore, that there is little advantage in substituting for a well-prepared extract the resin obtained by so operose a method as that of the Messrs Smith. Still less can it be admitted, that they have detached the active principle of the plant; and, indeed, they have very properly assigned the name Cannabin only with a query. The discovery of the true active principle, or even of a uniform resin, is, however, a great desideratum in medicine; for until this object be attained, it is scarcely possible to rely on the action of any preparation of the plant.

PHYSIOLOGICAL ACTION.

The physiological action of hemp is, in the first place, stimulant, in small doses, exciting the cerebral and digestive systems; and, secondly, when given in larger quantity, its effects are powerfully sedative and antispasmodic.

The first question which presents itself is, whether this plant is a poison in large doses, and so much so as to occasion death. The prolonged use of it is said to destroy many in India, by gradually undermining the health; but no mention is made by authors of its proving fatal in one or two large doses. The only allusion to such an effect that I have seen, is by Mr Reddie, member of the Calcutta bar, who, in a letter to Dr Christison, dated July 1849, says,—"The plant is a poison, with many of the qualities of opium, and some singular ones peculiar to itself;" and adds, that "it is frequently used at Calcutta as a poison." Dr O'Shaughnessy made a series of experiments on animals, with the view of determining the quantity that it would be safe to administer as a medicine, but in none of these did death occur. In one experiment he gave ten grains of churrus to a middling-sized dog. "In half an hour he became stupid and sleepy, dozing at intervals, starting up and wagging his tail, as if extremely contented, and eating food greedily; on being called to, he staggered to and fro, and his face assumed a look of extreme drunkenness. These symptoms lasted about two hours; but in six hours he was perfectly well and lively." On another occasion, a little dog got twenty grains of alcoholic extract of gunjah, but was not killed. In none of his experiments was any pain evinced, or any convulsive motion. The dose mentioned above was the largest he gave; and the question remains, whether larger doses would have a fatal effect. One point is, however, determined,—that in so large a dose as ten grains, churrus will not prove fatal to a dog; and it will be seen that Dr O'Shaughnessy often administered equally large doses with benefit in treating disease.

An interesting result of Dr O'Shaughnessy's experiments is, that carnivorous animals and fish very speedily underwent the effects of

hemp, while graminivorous animals were very slightly affected, even by large doses of the drug.

The effects of hemp on man will in general be found to correspond, as Rumphius indicates, to the temperament and natural disposition of the individual. In some, mere laziness and stupidity are induced; in others, a pleasing state of reverie, without any other remarkable condition; and many are attacked with loud laughter, fits of dancing and singing, venereal appetite, or inclination to quarrel, according to their various dispositions. In many there is a remarkable desire for food, which the individual eagerly devours, while at the same time he does not appear to be satisfied, and can with difficulty control his appetite. After the stage of excitement, sleep supervenes; and, on waking, the experimenter returns to his natural state, except that the ideas are often confused for a little, and in some cases vertigo is present to a slight extent. It is in consequence of these remarkable properties that the compounds of hemp have come into such extensive use among eastern nations, especially those where wine is not used. An example of the great extent to which the use of hemp is pushed in India, is given by M. Liautaud [*Annuaire de Thérap.*, 1845] in his communication to the Académie des Sciences, as follows:—"The grand feast of Dourga Poudja is terminated by the ceremony of immersing the idol in the river; after which the people retire to intoxicate themselves with a drink from the leaves of hemp, and the whole ends in a scene of disgraceful drunkenness." And, in allusion to the physiological action, M. Liautaud remarks that there is peculiar ecstasy without convulsion,—and that the drinks excite the nervous system more than the powder or smoke. This intoxication has appeared to him much less intense than that of opium, and that produced in the Chinese smoker; the consequences are not so deadly, but the moral degradation the same.

Dr O'Shaughnessy thus describes the delirium induced by the incautious use of hemp in India:—"The state is at once recognised by the strange balancing gait of the patient, a constant rubbing of the hands, perpetual giggling, and a propensity to caress and chafe the feet of all bystanders, of whatever rank. The eye wears an expression of cunning and merriment which can scarcely be mistaken. There is no increased heat or frequency of circulation, and the skin and general functions are in a natural state."

The effects of hemp are, in the generality of instances, highly pleasurable, while in a few cases most disagreeable sensations are produced. The ideas which enter the mind are often very fantastic, and of most interminable variety. In illustration, I have selected the following cases:—

Case I.—In the work of Moreau, "Du Haschich," M. Théophile Gautier, in describing his sensations, says,—"After a feeling of numbness, it appeared to him that his body became transparent, and that he saw within his breast the haschich which he had eaten in the form of an emerald, from which issued millions of little sparks At

the same time, his eyelashes became indefinitely elongated, and began to roll as gold threads upon small ivory wheels, which revolved with great velocity." A remarkable effect was an increase of his power of hearing, whereby slight noises became as loud as thunder; and he heard the noise of colours—green, red, blue, and yellow sounds coming to him in perfectly distinct waves; he did not dare to use his voice, in case he should knock down the walls, or burst himself like a bomb. His calculation of the time he enjoyed these dreams was about 300 years,—the fact being that only a quarter of an hour had elapsed.

Case II.—Dr Christison describes the effects upon himself as follows:—"On trying Mr Robertson's extract once for toothache, I found that about 4 grains, taken about three A.M., caused in an hour cessation of pain, a pleasant numbness in the limbs, giddiness, a rapid succession of unassociated ideas, and impossibility to follow a train of thought, frequent intervals of sleep, and slight increase in the force of the pulse";—at the same time he felt no pain, while he was quite conscious the toothache was present. Next morning, there was an ordinary appetite, much torpidity, great defect and shortness of memory, extreme apparent protraction of time, but no peculiarity of articulation, or other effect; and these symptoms lasted till two P.M., when they ceased entirely in a few minutes after taking lemonade.

Case III.—On the 3d April, at four P.M., a friend of my own took 2 grains of the Calcutta extract prepared by Mr Robertson. At a quarter past six, he felt as if weak, chiefly about the knees, with slight inclination to laugh, stupidity, and forgetfulness, but without reverie. He continued in this state till he retired to bed, when he slept soundly. Next day he was perhaps more stupid than before, but was enlivened by drinking lemonade. He was not exactly himself till the following day. His appetite was strong; but he was not affected in any other way.

Case IV.—Another friend describes his sensations as follows:—I took 2 grains dissolved in spirit, and 1 grain in the solid form shortly afterwards. This was at four o'clock. At a quarter to six, when seated at dinner, and after taking a copious draught of water, I experienced a buzzing in my ears, with slight giddiness. Two minutes after, I burst into an immoderate fit of laughter without any cause, and was obliged to retire on account of repeated recurrence of the fits. My limbs became unable to support me; and, upon lying down, a variety of delightful dreams came over me,—the laughter continuing at intervals. At eight o'clock I got tea, and ate voraciously; after which I lay down, and recommenced laughing and singing. I slept soundly. Next day the symptoms continued to a moderate degree, and did not fairly leave me till the afternoon, previous to which time I got lemon-juice, which had great effect in restoring my faculties.

Case V.—On the same day, I myself took 1 grain of the same extract dissolved in spirit; and though only half the quantity used

in Case III., the effects were much more apparent. At a quarter past five, when sitting down to dinner, I felt a peculiar numbness creeping through my body and limbs. Not imagining that this was the action of the cannabis, I began to fancy I was ill, so that I could not eat any dinner. On lying down, the numbness continued; but in fifteen minutes my sensations became agreeable. I laughed heartily several times, answered questions incoherently, and immediately forgot what they were about, and what I had answered. Delightful reveries came over me, and whatever I looked at became lost, as it were, in a maze: the lamp appeared to be slowly turning round; and when I lost sight of this, the red lines on the paper of the room appeared to intertwine in a most beautiful manner. The most remarkable effect was the constant succession of new ideas, each of which was almost instantly forgotten. When roused to tea, I ate ravenously, without feeling satisfied. I slept soundly at night afterwards; and next day was stupid and forgetful, but was much improved by drinking lemon-juice.

Case VI.—This case was remarkable for the intensity of the action of a single grain of extract, and for the remarkable hallucinations produced.

A highland porter, aged fifty, was admitted into the Edinburgh Royal Infirmary on the 4th December 1845, under the care of Dr Robertson, on account of attacks of chronic asthma and bronchitis. As sulphuric ether and laudanum produced little effect, it was resolved to give hemp extract in doses of a grain. The first and only pill was given at nine p.m., and at ten he called the nurse, "for he was about to die." He seemed to have awaked suddenly, and stared wildly about him. The clerk and apothecary found him conversing with great volubility, very happy to see them, and begging them to stay with him, "as he was at the point of death." His face was pale and anxious; pulse good; respiration unembarrassed. He informed them "that he had been transported to heaven," and his language, usually commonplace, was quite enthusiastic. Half a drachm of solution of muriate of morphia was administered, soon after which he became jocund, and like a drunk person; in a short time he fell into a sort of trance, and imagined he was conversing with the Deity, using two different tones of voice to express the conversation. He was now wakened, said he had seen visions, and seemed sensible. He then fell asleep, but was roused, as the respirations became very faint, and he exclaimed, "I have just come out of another fit." It was five a.m. before the intoxication ceased, and even at noon visit he was pale and tremulous; his asthma was, and continued, much relieved.

On the evening of the 6th, the hemp was intermitted for forty-eight hours, but resumed again, in ten-minim doses of the tincture every six hours. The first caused nausea and a want of feeling in the limbs; the pulse became slow, and he fell asleep, without delirium; but he said he dreamed much. These sensations were renewed at the second dose.

At 6 a.m. of the 7th, the usual asthmatic paroxysm was very mild. At noon, five minims had the same effect as the last. At his urgent solicitation, the medicine was for a few days discontinued. He frequently after this took five-minim doses, with great relief to his pectoral symptoms, and without the alarming effects induced by the larger quantity. He was dismissed, relieved.

The action of Indian hemp is liable to considerable uncertainty. This, perhaps, more than anything else, has led to distrust of it as a medicine. While on one person large doses have but little effect; on another, most violent and even alarming symptoms are induced by comparatively small doses; and though it is possible to explain such results, from peculiarity of constitution of the individual, still a doubt remains in what cases these unpleasant consequences may be looked for.

Professor Miller informs me, that he was occasioned considerable anxiety after giving a small dose of the tincture to a young lady. Soon after taking it, she complained of a sense of weight in the region of the heart, coldness of the surface, prostration, and the pulse at the same time very feeble. These symptoms, however, gradually passed off, and she recovered completely. A gentleman labouring under chronic pleurisy, a patient of Dr Christison, complained that small doses, although they made him drowsy, occasioned violent concussions in the brain, as if he was threatened with apoplexy.

In the "Monthly Journal" for November 1844, several cases are detailed by Dr Lawrie of Glasgow, where alarming symptoms presented themselves, but my present limits will not admit of their insertion. The individuals so affected were invariably females.

Similar cases have been met with occasionally by most of those who have used the hemp; these might be detailed here, but perhaps enough has been said on the subject to prevent any one from being taken by surprise by such occurrences.

Still I must insist, that these cases are only exceptional ones; that they are for the most part met with in persons of nervous or excitable constitution, particularly females; and that, therefore, the practitioner should not be deterred from administering hemp for this reason alone. It will not do, however, as a means of avoiding such consequences, to administer small doses. It appears to be much better to give full narcotic doses at once, by which means this stage of excitement will be as much as possible avoided.

The means of modifying or increasing the effect of the drug is a matter of considerable interest and importance.

Lemon juice is stated by various authors to have great influence in modifying the action. From my own observation, I am persuaded that it possesses this property to a high degree—that it will arrest the action entirely in many cases, but not during the intensity of the effects,—and that, where it does not arrest it, great modification will be produced. It is stated by Landerer, that at Cairo the

administration of an emetic of salt water is found effectual in removing at once the highest state of intoxication. On the other hand, among substances that increase the action, it is well known to the inhabitants of the East that the admixture of tobacco has a marked effect, while the practice of coffee-drinking is generally admitted to increase and sustain the action. The last observation on this head I have to make is, that some difference will be observed, according as the extract is given in the solid form, or dissolved in spirit. The action in the first case is gradual and less energetic; in the second, the effect is rapidly induced, and of more marked character.

An error is, I believe, often committed in giving small doses, when larger ones would lead more quickly to the sedative action of the drug.

THERAPEUTIC USES.

Notwithstanding the strong recommendations of Dr O'Shaughnessy, the therapeutic uses of hemp have been little studied hitherto in this country.

Dr O'Shaughnessy used it in the following diseases:—In three cases of rheumatism he found it apparently beneficial. In one of these, it seemed to produce great insensibility, and a state resembling catalepsy; but on this state passing off, the man was found to be thoroughly restored to health. In an epidemic of cholera, it was thought serviceable; but although it seemed to stimulate the circulation, and check diarrhœa, it is doubtful whether any ultimate good resulted. In a case of hydrophobia, a soothing effect, with diminution of the spasms, and greater facility in drinking, was kept up for four days; but the patient died. Several cases of tetanus were also treated by him in this way, with apparent success. In one, ascribed to cauterization of the hand, by a quack mixture of incandescent charcoal and tobacco, a state of intoxication was excited by large doses of the extract of hemp, and the spasms were gradually put an end to; but death ensued in the end from mortification of the hand. Another patient consumed 134 grains of the extract, and was ultimately discharged from the hospital cured. A third case, with similar results, is detailed. At the native hospital at Calcutta, Mr O'Brien treated seven cases of tetanus in this way, and in four of them he employed ten-grain doses. The result was, almost immediate relaxation of the muscles, and interruption of the convulsive tendency. Four of these cases recovered. A case in the practice of Mr Richard O'Shaughnessy is also detailed, where the disease was connected with suppurating wounds of the scrotum. The hemp had no effect for four days, and then the patient became tranquil, with fewer paroxysms, and the appetite good. When the hemp was intermitted, the symptoms became aggravated; latterly, the hemp caused much excitement, and was therefore discontinued. The last case is one of infantile convulsions, where very large doses

were given, and where the narcotic action greatly relieved the symptoms. The child recovered. This gentleman is confident that the resin is capable of arresting the progress of tetanus, and that, in a large proportion of cases, it will cure the disease.

It would certainly appear from the above facts, that Indian hemp has proved of service in the treatment of tetanus, as it occurs in India. How far this result has been obtained in Europe, I shall now describe.

That I may not extend my observations to too great a length, I shall limit my remarks to the treatment of tetanus, as observed in cases in private practice, and in the Edinburgh Royal Infirmary.

Professor Miller has provided me with the following remarks :—

"My own experience speaks loudly in favour of the hemp. I can now record three fortunate cases under its use—all traumatic tetanus—and a case which proved fatal, but where great alleviation of suffering was produced.

"The first of these was a girl, aged 7, admitted to the Royal Infirmary October 18, 1844. She had received an extensive injury of the middle finger of the right hand a fortnight previously. Inflammatory swelling and pain became intense, and there was a tendency to spasmodic flexion of the fingers and wrist. On the 23d she was observed by the nurse to take a 'kind of fit,' becoming rigid, having difficulty in opening the mouth and in swallowing, and complaining of pain in the jaws. At visit, she seemed perfectly well. A brisk purge was ordered, and, lest the case should prove tetanus, ten drops of tincture of hemp were prescribed to be taken every four hours. Next day the symptoms were well marked, without any influence from the hemp. The finger was then removed, and the simplest dressing applied to the wound. The dose of hemp was increased to 20 drops, and after five doses, she slept; but the following day the symptoms were aggravated. Turpentine enema was ordered, and ice to the spine—30 drops of cannabis to be given hourly. In the evening there was rigidity, but no spasm; the hemp to be given every half-hour; after which she became drowsy, and at 12 next day she was much improved. Aconite was now substituted; but as the spasmodic attacks became more severe, hemp was again given, with the effect of producing sleep. She continued to improve till the 25th November, the dose of hemp being gradually reduced; producing, when given, drowsiness, or calm sleep; it was soon discontinued, as it then seemed to excite the circulation. Throughout the whole period of its use, its effect on the appetite was most obvious, the craving for food being at times absolutely voracious. After this no more medicine was given, and recovery was complete.

"The second case, occurring in private practice, was that of a boy, about the same age, who had simple fracture of the thigh, with

compound and comminuted fracture of the great toe. The treatment and result were the same.

"The third was a boy, rather older, who had compound fracture of the bones of the arm. Treatment again resulted in cure.

"In these cases a few doses generally induced sleep, with marked mitigation of the spasms. The period of narcotism did not exceed two or three hours; the sleep was deep and unbroken, and seemed to be refreshing. It was followed by no headach, or other apparent inconvenience. The most remarkable effect observed, was the tolerance of the remedy, whereby a girl, aged 7, took every half-hour, and sometimes many hours in succession, doses of hemp sufficient to narcotise an adult."

In these cases, Mr Miller is inclined to give the hemp credit for a chief share in the cure.

In 1846 the virtues of hemp were tested in a case of tetanus in the Royal Infirmary, in the wards of Dr Duncan. In 1847 another case presented itself, where hemp was administered. At that time sulphuric ether was much used as an anæsthetic, and it was thought probable that it would be of service in this case. The patient inhaled it at frequent intervals during a whole afternoon, with decided, but only temporary, relief. After this cannabis was given, without its physiological action being attained by nearly an ounce and a half of the tincture; it was not persevered with. Ether was again tried, and also opiates, with some benefit. The patient died on the 13th day.

The first of these cases was very accurately observed, and the following report of the case from the journal will be found to have considerable interest:—

James Mackay, a railway labourer, was admitted under the care of Dr Duncan, October 20, 1846. He had received a slight lacerated wound of the hand a week before, and tetanus had commenced on his admission. The wound appeared to be healing. He complained of great general uneasiness, particularly about the neck and spine, of some rigidity of the jaws, which could only be separated three-quarters of an inch, of inability to protrude the tongue, and of commencing spasm of the neck and upper part of the back. He complained also of a "burning about the heart." His expression was anxious, with but little "risus." His thirst was great, but swallowing difficult. He perspired profusely. The spasms, of short duration, recurred once or twice every minute; pulse, 115 to 120, soft. Opening medicine was ordered, and at 11 o'clock tincture of hemp was given, repeated in doses of 15 or 20 drops, with appreciable effect. On the 21st the bowels were not opened, though a turpentine enema was administered. The spasms were more violent and general, and a touch caused general spasm. He had not slept; 120 to 140 drops had no effect. The doses were increased to 60 or 80 drops

every three-quarters of an hour, and croton oil was given, producing free action on the bowels; and in the evening the spasms abated, but the hemp caused only slight dozing at intervals. The tincture was ordered to be continued, and strong beef-tea to be drunk.

On the 22d swallowing was easier, the spasms less violent, but not less frequent; 100 drops were given at half-past 11, and continued about every half-hour till 4 o'clock, when drowsiness was quite decided; he was not readily roused, even by the spasms, which, though as frequent, were not so intense. At 9 o'clock drowsiness was passing off; copious stools, coloured as by the medicine, were brought away by injection; 130 drops were given, and repeated at midnight, at which time he was much relieved, but suffered from cough. On the 23d the spasms were again gaining strength, no hemp having been given for nine hours. A drachm of the tincture was given, and repeated at 11, when he became quiet. The doses were continued till evening, when he took mince-collops and beef-tea without difficulty, and the bowels were copiously relieved.

On the 24th, at visit, the spasms were absent, but the chest symptoms were worse, with general mucous râle, and frothy sputa mixed with blood. Drowsiness had been kept up by doses of a drachm to a drachm and a half. In the evening he was much weaker, but quite sensible, with a desire for food. On the 25th he was perfectly free from spasm, but was evidently dying, from accumulation of mucus in the chest. Very little hemp was given. He died at 8 p.m.

In this case, six ounces of O'Shaughnessy's tincture of Indian hemp were given in all, being equal to 144 grains of the extract. The extract for the tincture was reputed the best in Edinburgh. The doses at first were evidently too small. The examination of the body was not permitted.

It is a safe conclusion, from these facts, that Indian hemp deserves further trial in the tetanus of Europe, as well as in that of hot climates. I would particularly urge, however, the necessity, in all such trials, of making certain, by experiment on healthy persons, that the preparation to be used is good. For the present, there is no other satisfactory test of quality.

As to the use of hemp as a calmative and hypnotic in diseases in general, I may mention that, while acting as clinical clerk in the Royal Infirmary in 1849, I had several opportunities of administering hemp in different diseases as a hypnotic. The object was in general attained, and no evil results followed. I regret there is no record of these cases, as at the time I did not pay particular attention to the subject. Hemp is frequently given in the other wards of the Infirmary for a like purpose. In cases of phthisis and other lingering diseases, where opiates have for a long time been administered, but have ceased to produce sleep, Indian hemp may often be given with advantage;

thus, in one case of advanced phthisis, doses of five to ten drops of the tincture were successful in procuring sleep when other means had failed.

Dr Christison has administered hemp in many instances. He gives the following account of two of them :—

A gentleman had suffered from palpitation of the heart for twenty-one years, and at night the attacks were generally most severe. He had used one medicine after another with the hope of relief, but he did not derive any benefit. Dr Christison advised him to try Indian hemp. The patient's wife states that he passed the night on taking it without suffering from the palpitation, though still he was perfectly conscious of its presence; and that the attack left him entirely at 8 A.M., instead of continuing twenty-four hours, as previously it did.

In the other case, a gentleman was afflicted with severe eczema over the whole body, with intense itching. A large dose of solution of the muriate of morphia caused extreme sleepiness, but so much increased the itching that he was kept awake by the necessity of scratching. Twenty-five drops of cannabis tincture gave him six hours' sleep, and he continued to enjoy sleep from four to six hours every night for six weeks, without increasing the dose, until the eruption was nearly removed; during all this time the itchiness continued as before when he was awake.

Dr Christison has observed that, in the generality of cases, hemp has had the effect of causing sleep without disturbing the function of the stomach or bowels. Given where morphia and hyoscyamus had failed, it has also repeatedly failed to cause sleep; but in one or two cases he has found it to succeed where morphia and opium disagreed.

An interesting series of cases by Mr Donovan will be found in the "Dublin Journal of Medical and Chemical Science" for 1845. This gentleman was convinced of the beneficial effects of hemp, particularly in cases of neuralgia. Mr Donovan had himself suffered occasionally since early life from neuralgic pain of different parts of the foot, lasting one or two days, or sometimes a week. Immersion in cold water gave entire relief, but no other treatment did so, till he took five drachms of weak tincture of hemp; in twenty minutes the pain was gone; at the same time, "he had hardly any consciousness of the motion of his limbs when walking—they appeared not to belong to him." On another occasion, he took six drachms without effect; but on the third night, after taking twelve grains of weak extract, he was free from pain, and slept four hours; and in several other attacks he derived similar benefit.

A gentleman was attacked on going to bed with excruciating pain in the left upper jaw, which kept him awake till morning; after a short sleep, he awoke in torture, and in the evening, upon taking his third dose of fifteen minims of weak tincture of hemp, he

slept profoundly till eight next morning, when the pain was much abated. At night he repeated the remedy, with similar results, and next evening he took twenty minims, which deadened the pain; but it soon became as bad as ever. Embrocations of laudanum and camphor spirit were then tried, with another dose of twenty minims, and he immediately fell asleep; in the morning the pain was nearly gone, and it soon disappeared.

Another gentleman had excruciating sciatica for thirteen weeks; his sufferings caused groans, cries, and tears, and he passed sleepless nights. The only relief he obtained was from firm pressure on the hips, and, for a short time, from laudanum. Two doses of hemp, at short intervals, produced sound sleep for eight hours, and on awaking he was perfectly relieved. Five doses more so completely subdued the pain that it gave little farther trouble. He experienced a slight but transitory return on entering a cold room.

A number of other cases will be found in Mr Donovan's paper, in which the hemp, if it did not effect a cure, yet was of great service in the treatment of the complaints to which he alludes; but in several cases no good followed, and, on the contrary, unpleasant effects were produced. Thus, a lady suffering from neuralgia of various parts of the body was ordered five drops of strong tincture at night; next morning she was giddy and weak, and, without authority, took five drops more. She became faint and universally cold, had some apprehension of death, and remained disagreeably affected during the whole day; the pain was not relieved, and the effects of the hemp re-appeared at intervals for two or three days.

Another patient, who was accustomed to take hemp, on one occasion had alarming depressing symptoms; he sat, greatly agitated, with his eyes open, and his head reclining on his chest. The respiration was tremulous, with interruptions of sobbing; his whole frame was in an indescribable shudder, and he seemed to shiver with cold. The pulse was good all the time, and in half an hour he recovered.

Indian hemp in different forms has been recommended, principally by the older writers, for several other purposes, as in the treatment of diarrhœa, gonorrhœa, and locally as an anodyne lotion, or in the form of poultice for hæmorrhoids. For these purposes, I am not aware that it is now used; but there is one affection where it has lately been applied with advantage — viz., uterine hæmorrhage. Dr Churchill says ("Diseases peculiar to Women," Ed., 1849)—"We possess two remedies for these excessive discharges, at the time of the menses going off, which were not known to Fothergill—ergot of rye, and tincture of Indian hemp. The former has been long known to possess the power of restraining hæmorrhage after delivery, &c., but the property of hemp of restraining uterine hæmorrhage has only been known to the profession a year or two. It was accidentally discovered by my friend, Dr

Maguire of Castleknock, and since then it has been extensively tried by different medical men in Dublin, and by myself with considerable success. The tincture of the resin is the most efficacious preparation, and it may be given in doses of from five to fifteen or twenty drops three times a-day, in water. Its effects, in many cases, are very marked, often instantaneous, but generally complete after three or four doses. In some few cases of ulceration, in which I have tried it on account of the hæmorrhage, it seemed to be equally beneficial."

These effects seem to me to be allied to the action of hemp on uterine contraction during labour, to the consideration of which subject I shall next proceed.

Indian hemp appears to possess a remarkable power of increasing the force of uterine contraction during labour, and as I have not observed any special remarks on the subject, the following instances of its employment may be interesting. It was given in a few cases in the Maternity Hospital of Edinburgh, and the following short remarks appear in the Case-book of November 1849 :—

One woman, in her first confinement, had forty minims of the tincture of cannabis one hour before the birth of the child. The os uteri was then of the size of a shilling, the parts very tender, with indurations around the os uteri. The pains quickly became very strong, so much so as to burst the membranes, and project the liquor amnii to some distance, and soon the head was born. The uterus subsequently contracted well.

Another, in her first confinement, had one drachm of the tincture, when the os uteri was rigid, and of the size of a half-crown; from this the labour became very rapid.

Another, in her first confinement, had also one drachm of the tincture, when the os uteri was of the size of a half-crown. Labour advanced very rapidly, and the child was born in an hour and a half. There were severe after-pains.

A fourth had ʒiij. of the tincture, in divided doses, which much accelerated and increased the pains. She had then chloroform for six hours.—[I have since been informed, that the severity of the pains was so great as to cause some alarm, and chloroform became necessary to produce insensibility.]

Shortly afterwards, having directed my particular attention to this action of hemp, I gave it in several cases in the Maternity Hospital, and observed whether it had any effect upon the duration of the pains or intervals. The following tables are examples of the way in which the observations were made, being similar to those of Dr Simpson in his experiments upon the effects of galvanism on the uterus; but I shall not give that of each case, as I am not inclined to attribute much importance to this part of the experiment. The observation was made in the following way :—The duration of seve-

ral pains and intervals was observed, then the tincture of Mr Robertson's extract of hemp, of the strength of three grains to the drachm, was administered, and after a few minutes the duration of the pains and intervals was again observed. In the tables the time is shown in minutes and seconds.

CASE I.

BEFORE HEMP.		AFTER HEMP.	
Pains.	Intervals.	Pains.	Intervals.
65″		8 drops given.	
		50″	4′ 45″
		1′ 45″	5′ 45″
		12 drops after half an hour.	
		1′ 45″	4′
		2′ 45″	4′
		1′	—

CASE II.

BEFORE HEMP.		AFTER HEMP.	
Pains.	Intervals.	Pains.	Intervals.
50″	3′ 20″	17 drops given.	
57″	1′ 50″	1′ 15″	15″
57″	2′ 32″	20″	1′ 58″

CASE I.—Was a natural labour, and eighth pregnancy. The first stage was not completed till twenty-four hours after the woman was seized. Hemp was given four hours before its completion. After the first dose of eight drops, little effect was observed; but after the second of twelve drops, the duration of the pains was increased, and the interval shortened; and it was very obvious that the intensity of the pains, counting from the second pain after the hemp was given was increased; by the fourth or fifth pain the effect wore off, and hemp was not again given.

Case II.—This was a second pregnancy. Seventeen drops of hemp were given in the second stage. The second pain, after the hemp was taken, was lengthened, and the interval shortened; this was not the case with the third pain; but the intensity of the pains was much increased, and the woman was speedily delivered.

Case III.—First pregnancy. Hemp was given in the second stage of labour, and the chief fact observed was increased intensity of the pains; the duration of the pains was slightly increased, and the intervals decidedly shortened, after the second dose of hemp. Twenty drops were first given, and after twenty minutes thirty drops more. Twenty-four hours after, twelve drops were given, and after-pains were induced, which the woman said were "quite as bad as when she took in labour first."

Case IV.—First pregnancy. Twenty-five drops of the tincture were given at the completion of the first stage; after this, both the pains and the intervals were shortened, and the intensity of the pains increased. After one or two pains the effect wore off, and thirty drops more were given at the end of half an hour. The third pain after this became very intense; and pain succeeded pain without intermission for several hours. As there was deformity of the pelvis, chloroform was administered, and delivery accomplished by the forceps.

Case V.—First pregnancy. Hemp was given during the second stage. First thirty drops, and then thirty-five drops after half an hour, and the patient was delivered during its action. The effect of the first dose was chiefly shortening of the interval at first, and prolongation of the pain; but the effect on the interval was more marked after the second dose. The pains were described by the patient as more intense, and by examination it was ascertained that the head of the fœtus was more forcibly propelled.

Case VI.—First pregnancy. Thirty drops of hemp were given in the second stage, and the effect was very decided. Previous to the administration of the hemp there had been no progress for an hour, the patient was nervous and excited, and though she complained much of the pains, the contractions of the uterus were felt to be feeble, and the child's head did not move; but on the second pain after the cannabis the contractions became very strong, forcing down the head, and the child was expelled ten minutes after the hemp was given. At the same time there was no decided effect on the duration of the pains and intervals.

Case VII.—Sixth pregnancy, with the first stage not completed. Thirty-two drops were given, and the action was well marked; the woman said, the second pain after it was the strongest she ever had. After an hour and a half, forty drops were given, but the action was not attended to; and in an hour and a quarter fifty drops were given, but there was no action on the pains; they became irre-

gular, and the intervals were very long; the case was then allowed to proceed naturally. There seemed to be a tolerance of the remedy; for though 120 drops had been taken, no physiological effect of any kind was induced.

In these cases, then, it does not appear that the duration of the pains or of the intervals was materially affected in all; but in Cases I., II., IV., prolongation of the pain and shortening of the interval were most obvious; while in Case V. a shortening of the interval corresponding to each dose of hemp was observed. Shortening of the interval was in general a more conspicuous phenomenon than prolongation of the pain. Upon the whole, however, I am not inclined to lay much weight upon these results. But there can be no doubt that the *intensity* of the pains was greatly augmented by the hemp, except in the last case, where, after the effects of the first dose passed off, no action followed the repetition of it. This case was an exception to all the others.

It is worthy of remark, that in none of these cases were the ordinary physiological effects produced; there was no excitement or intoxicating action, and there did not seem to be the least tendency to sleep in any of them.

In conclusion, I may state what appears to be the most obvious difference between the action of ergot of rye, and that of Indian hemp. First,—While the effect of ergot does not come on for some considerable time, that of hemp, if it is to appear, is observed within two or three minutes. Secondly,—The action of ergot is of a lasting character, that of hemp is confined to a few pains shortly after its administration. Thirdly,—The action of hemp is more energetic, and perhaps more certainly induced, than that of ergot.

There appears little doubt, then, that Indian hemp may often prove of essential service in promoting uterine contraction in tedious labours.

More extended experience will show how far these effects may be depended on, and to what cases hemp is most applicable.

MODE OF ADMINISTRATION.

Indian hemp may be administered in several ways. The extract, in the form of pill, produces the most gradual effect, and the disagreeable taste of the solution is avoided; but its action in this form is very uncertain. The following emulsion has been recommended:—A scruple of the extract rubbed in a warm mortar with a drachm of olive oil, to which are added half an ounce of mucilage, and seven ounces and a half of distilled water (Bromfield). But the simplest method is to use the tincture, which should be dropped into a little water, and immediately swallowed. The water may be sweetened with sugar; or an aromatic, as compound tinc-

ture of cardamom, may be added. The usual strength of the tincture is three grains of the extract to a drachm of rectified spirit.

The extract may be given in doses of one to six grains; the tincture in doses of ten to thirty drops, for ordinary purposes. Less than thirty drops is of little service in promoting uterine contractions; and greatly larger doses, as much as one or two drachms repeatedly, must be used in the treatment of tetanus, in which disease there is very great tolerance of the remedy.

MURRAY AND GIBB, PRINTERS, EDINBURGH.