

On the uses of narcotics and stimulants and their effects on the human constitution / by Kanny Loll Dey.

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Dey, Kanny Lall.
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Publication/Creation

Calcutta : [publisher not identified], 1868.

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ON THE USES
OF
NARCOTICS AND STIMULANTS
AND
THEIR EFFECTS ON THE HUMAN CONSTITUTION,

BY
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READ BEFORE THE BENGAL SOCIAL SCIENCE ASSOCIATION, ON THE 30TH JANUARY 1868.

CALCUTTA:
1868.

ON THE

ALCOHOLIC AND STIMULANTS

THEIR EFFECTS ON THE HUMAN CONSTITUTION

BY J. J. DUFF

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THE UNIVERSITY OF CHICAGO PRESS

CHICAGO, ILL.

1894

R36074

ON THE USES
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As a sequel to my paper on the laws of Health, which I had the honor of reading at the last meeting of this Association, I propose in this paper to treat of the narcotics and stimulants, embracing therein all the drugs and beverages used either for excitement or intoxication, and to view their uses and effects in relation to health.

In examining this subject, I must guard against the common error of taking a one-sided view of the question, in which many in the fervour of enthusiasm overlook facts and principles to the great disparagement of truth and science.

I will take first for review the known varieties of the most important drugs used as intoxicating agencies, giving, where practicable, their chemical composition and describing the properties of the constituents. The beverages or stimulants properly so called will come last for consideration. In treating of them, I will devote some space to the description of some of the commonest forms of adulteration of wines, as many serious evils to the system may be traced to these adulterations as much as to abuses of excess and intemperance.

It appears from the universal use of narcotics and stimulants amongst all races and tribes of mankind in some form or other, that the craving for such excitement arises from a natural want, and that the same instinct which drives man as well as the inferior animals to seek for those healthy aliments which contribute to their bodily support and nourishment compels him to seek for these indulgences, hence it may be presumed that their use is a necessity of life.

Adhering to the plan I have laid down for the treatment of this subject, I will first describe the known varieties of the intoxicating *drugs*. The most important amongst these, as far as they are known, are, 1st, tobacco, 2nd, gunja, and its com-

panion species, churus, sidhee, bhang, subjee, majun and khatta; 3rd, opium, chundoo, and gooly; 4th, tarry, and 5th, dhatoora, or thorn apple. There are some other varieties of foreign growth and use which, though not in common demand, may be incidentally mentioned. They are, the Siberian fungus, foxglove, henbane, belladonna, cocculus indicus, and nightshade.

First, in the order of these drugs, is tobacco. It is generally consumed, as is well known, almost in the state in which it is found in nature. The changes it undergoes are very inconsiderable, and, in most cases, inexpensive before it is made fit for human consumption. It is, like many other drugs, never eaten. It is used only by chewing, smoking, and snuffing. In Europe its use is chiefly restricted to smoking and snuffing. In Asia and America all the three modes are resorted to, only there is a difference in manner according to the tastes and habits of the different people. In Europe the smoke is inhaled either from pipes or leaves rolled into spindles; in Asia the favorite plan is to manufacture the drug into a sweet and odorous compound and inhale its smoke from a pipe peculiar to the people who use it.* In Europe the weed is preferred to be consumed in its raw state; in Asia it is softened and weak-

* Recipe for hookah tobacco—

The subjoined two recipes are for the manufacture of smoking tobacco of standard quality. One marked A. is for the first quality, mild tobacco, and the other marked B., first quality, strong tobacco; the latter is commonly consumed by the middling classes of society.

Recipe A for making mild tobacco compound—

BHALSAH.			BHALSAH.		
Parts.			Parts.		
Tobacco leaf powder	...	72	Ripe champa plantain	...	16
Powdered scents	...	16	Ripe jack-fruit juice	...	2
Treacle (chitta-goor sit)	...	88	Ripe pineapple juice...	...	1

The above ingredients to be thoroughly mixed, and the mixture to be allowed to ferment for six months, after which it will be fit for use.

Recipe B for making strong tobacco compound—

MITTA-KURRAH.			MITTA-KURRAH.		
Parts.			Parts.		
Tobacco leaf powder	...	12	Powdered scents	...	2
Tobacco leaf rib powder	...	6	Treacle chitta-goor	...	22
Lime slaked	...	1			

The above ingredients, when thoroughly mixed, make the compound ready for use.

Ingredients of the powdered scents with proportions of each as used above in scenting the tobacco compound—

										Parts.
Jatamangsi	...	...	Sumbul	...	...	...	...	...	...	5
Tawz	...	...	Cassia bark	...	...	...	...	...	...	10
Abhul	...	...	Juniper berries	...	...	...	...	...	...	2
Chundun	...	...	Sandal-wood	...	...	...	...	...	...	2
Doona	...	...	Artimesia indica leaves	...	...	...	...	...	...	5
Golab	...	...	Rose petals	...	...	...	...	...	...	5
Googul	...	...	Bedellium	...	...	...	...	...	...	1
Lunga	...	...	Cloves	...	...	...	...	...	...	1
Pucha-pât	...	...	Patchouli	...	...	...	...	...	...	5
Tambul	...	...	Capsules of xanthoxylum hastile	...	...	...	...	...	...	5
Akungee	...	...	...	...	...	...	...	...	...	5
Soyloze	...	...	...	...	...	...	...	...	...	5
Tobacco powder to serve as a vehicle for preserving the scents	...	...	...	...	...	...	...	...	...	49

The articles to be thoroughly powdered, mixed, and then sieved.

ened. There are races, however, in the Eastern Continent, who, like the Europeans, are fond of smoking the raw unmanufactured leaves—the Oorias, for example, and some people on the Western Coast of the Indian Peninsula, as well as some of the Islanders of the Eastern Archipelago. These smokers form, however, a very inconsiderable section of the whole Asiatic nation. In America also smoking is not unfrequent, but chewing is nearly as much a favorite method as smoking is in Asia and Europe. There it is put into the mouth, in the form of quids, which cause profuse secretion of saliva in the mouth, and it is not unfrequent or uncommon for ladies and gentlemen being seen to squirt the tobacco liquid in volumes in the midst of social gatherings, to the infinite disgust of people not accustomed to such sights.

In India also tobacco is used by chewing, but here this form of use is solely confined to the very lowest classes. Low caste men and drain coolies of the hilly tribes, as well as women of the same rank of life, are somewhat fond of this use of raw tobacco, but I have seldom found that even they prefer to chew unmixed tobacco. What they do is to take a chip only at a time and chew it with betel and nut. Cigar smoking is least in fashion, and does not seem to suit our taste, though amongst one or two comparatively barbarous races of Hindoos it finds preference.

The use of tobacco for snuffing, though nearly as universal as smoking in most countries in India, and in most of the other Asiatic countries, is not so unrestricted as the smoking of manufactured tobacco, which is the only method universally resorted to for gratifying the narcotic appetite. In this form it fully satisfies the natural demand, as well as contributes to the gratification of a luxurious indulgence peculiar to the national character. With the rich and the well-to-do classes tobacco smoking is a luxury, with the operative and the middle classes it is an indispensable necessity. It is so much a necessity that a poor laboring man may one day dispense with some of the necessities of life, but he cannot for an hour undergo the privation of tobacco. Amongst the richer classes generally, it is apparently not indulged in so much for the gratification of an appetite as for luxury and external display. The tobacco of the rich is so much spiced and perfumed that the presence of its chief constituents is scarcely perceptible; amongst them the external paraphernalia of tobacco smoking receives greater attention than the practice itself. In large assemblies, and on occasions of festivity, the glittering smoking apparatus forms an important and a conspicuous ornament of a Native gentleman's saloon and drawing-room.

The practice, as it obtains amongst the masses of the people, deserves more than a passing notice. A tobacco pipe of the ordinary sort as used in this country is an indispensable appendage of Native life. It is one of those things which the humblest amongst the people cannot do without; he may not have the means of providing himself with a decent water-pot; his resources may not allow him to replace his cracked and broken stone-platter with a sound one to eat his rice from, but his *hooka* and its adjuncts will be always found complete. It may be, a family is living on half rations for days together, but they have always the means of entertaining a host of visitors with *chillum* after *chillum* of tobacco for hours together. A Bengallee's passion for tobacco is a prominent feature in his national character. A laboring man amongst them is almost useless when under the privation of this indulgence. It is therefore a great mistake committed by his employers when, in view to exact from him the greatest amount of work, he is long kept without it. It is true that much of a laboring man's time is unnecessarily wasted in tobacco smoking, but if it be intended to save that time by keeping him without it, not only is that time wasted in gaping and yawning, but that which would otherwise have been devoted to work is frittered away in trifling with his tools.

It is a remarkable fact in the habits of the people of this country that the prevalence of the practice of smoking varies according to locality and circumstances. People living in the interior, and far removed from the metropolis, for example, are more addicted to this habit, and contract it earlier than those living in the metropolis itself. In villages boys in their teens are hard smokers, and no pains are taken to discourage their early indulgence; and men also are, as a rule, most passionately fond of smoking. An ordinary villageman in Bengal consumes nearly six times as much tobacco as a citizen of Calcutta. With him nothing short of 50 doses will be sufficient during his waking hours; with us eight to ten at an average are ample. In Calcutta the practice of smoking amongst boys is very uncommon. It may be mentioned to our credit that while the use of the weed for smoking is almost universal in this country, it is wholly restricted to the male population amongst the Hindoos. In the Up-country the pipe may now and then be seen in the hands of respectable Mahomedan females, but amongst Hindoo ladies it is a forbidden indulgence. We should not in this estimate take into account the practices of women who have already in graver matters set at defiance all laws, human and divine.

I have referred to the use of tobacco as being extensive in this country, but it may be remarked that this universality of use applies to the whole human race. It has been supposed that next to salt it is the article most extensively used by man. In Europe, where the duty on tobacco is throughout heavy, its use on that account is neither limited in quantity nor confined in extent. The quantity of consumption per head varies from 2 to 12lbs. Besides what is obtained by indigenous cultivation, more than 140 millions of lbs. are annually imported from America, and the share of distribution for each country ranges from three hundred thousand to 38 millions of pounds. The largest tobacco consumers in proportion to the population are the Germans, and the most abstemious are the Portuguese.

It has been estimated that nearly eight hundred millions of the human race are consumers of tobacco, and the average consumption is 70 oz. a head. The total growth is nearly two millions of tons, which at 800lbs. an acre would require more than $5\frac{1}{2}$ millions of acres of rich land.* One other fact in connection with this subject may be noticed, which to those who take interest in the progress of agriculture will appear to be of no small importance. I allude to the effect of tobacco cultivation in the soil in which it is grown. Agricultural chemistry has by indisputable scientific facts demonstrated that no crop that is grown for human subsistence or luxury has so deteriorating an influence in the productive powers of a soil as tobacco. Vegetable substances when burned in the open air leave a residue of inconsumable mineral matter or ash, the quantity of which determines their exhaustive effect on the soil. The leaves of plants abound in this incombustible ash, and those of tobacco yield proportionally the largest quantity. A dried tobacco leaf when burned, it has been shown, yields from 19 to 28 per cent. of ash, or the proportion of ash to other matter is nearly one-fourth; now this ash belongs to the class of constituents in a soil which are most necessary to vegetation. The quantity of the weight of these constituents withdrawn from the soil must be in proportion to the weight of the leaves gathered; and bearing in mind the proportion of these ashes to other ingredients, the exhaustion to the soil caused by the cultivation of tobacco may be imagined.†

I will now conclude this part of the subject with a few words on the effects of tobacco on the human constitution. It was a

* Johnston's Chemistry of Common Life, Vol. II, page 14.

† " " " " " 38.

subject of enquiry whether tobacco, in whatever form taken, has an injurious effect on the health of man. Those who deprecate its use on the score of its injurious tendency often base their assertion on mere fanciful theories. They have not been able to adduce a single fact based on chemical or physiological enquiries which would entitle their theories to credit. I cannot, however, forbear mentioning a theory which, though similarly unsupported, is still deserving of consideration, and our experience in some way seems to give to it a colour of truth. It has been maintained that amongst the constituents of tobacco, there are some nicotin and empyreumatic oil which have poisonous properties, and which, if inhaled by persons in green youth, when their organs are in a state of development, have a tendency to stunt their growth and give their persons an appearance of dryness and emaciation, and when tobacco is indulged in by a youthful pair, their offsprings will be of a diminutive size, sickly, and bony;—all these evils, it has been urged, are caused by the above poisons having the power of arresting the inhalation of oxygen in respiration.* Whatever truth there may be in the theory itself, the effects supposed are, I believe, in many cases apparent in this country amongst those who are addicted to an early indulgence in the use of this weed. I will quote some of the other evil effects which tobacco in any one of its forms is said to produce. When smoked to excess, specially by persons unaccustomed to its use, it produces nausea, vomiting, in some cases purging, universal trembling, staggering, convulsive movement, paralysis, torpor, and death. Another authority has the following: "Tobacco disorders the assimilating functions in general, but particularly, as I believe, the assimilation of the saccharine principle. Some poisonous principle probably of an acid nature is generated in certain individuals by its abuse, as is evident from their cachectic looks and from the dark and often greenish-yellow tint of the blood. The severe and peculiar dyspeptic symptoms sometimes produced by inveterate snuff-taking are well known; and I have more than once seen such cases terminate fatally with malignant disease of the stomach and liver." Great smokers also are said to be liable to rodent ulcers and cancerous affections of the lips. "Excessive use of snuff blunts the sense of smell, alters the tone of voice, and occasionally produces dyspepsia and loss of appetite. In rare cases it ultimately produces apoplexy and delirium."† Dr. Pereira and

* Dr. Richardson.

† Dr. Prout.

Dr. Christison, however, agree in maintaining that no well ascertained ill effects have been shown to result from the habitual practice of smoking.

Let us now see what has to be said on the other side of the question.

The first question which naturally comes for consideration is, whence came this weed to be so extensively and universally used? Is any of its constituents possessed of the virtues which affect the animal constitution in the same way as most of the edibles are known to do? Does it contribute to the support and nourishment of the human body? But we know that none of its constituents is capable of producing any of these effects, at least in a perceptible degree, as will be apparent from the following analysis of tobacco given by Posselt and Reinmann:—

Nicotina	...	...	...	...	0.06
Concrete vegetable oil	...	...	...	...	0.01
Bitter extractive	...	...	...	...	2.87
Gum with malate of lime	...	...	...	...	1.74
Chlorophylle	...	...	...	...	0.267
Albumen and gluten	...	...	...	...	1.308
Malic acid	...	...	...	...	0.51
Lignine and a trace of starch	...	...	...	...	4.969
Salts	...	...	...	...	0.734
Silica	...	...	...	...	0.088
Water	...	...	...	...	88.280
Fresh leaves of tobacco	...	...	...	...	100.836

The only two of the above constituents which possess the nutritive principle are albumen and gluten, of which there are less than three parts in nearly 200. But whatever good they are capable of doing is more than neutralised by a strong odorous poison taken into the constitution in the consumption of tobacco. But even without it, they would not contribute to nourishment, since tobacco is not so used as to come within the influence of the digestive functions. There is first the volatile alkali which may be found by the infusion of tobacco leaves in water made slightly sour by sulphuric acid, and when the infusion is subsequently distilled with quicklime, there comes over mixed with water a small quantity of a volatile oily colourless alkaline liquid, which is heavier than water, and to which the name of *nicotina* has been given. "It has the odour of tobacco, an acrid burning long continuing tobacco taste, and possesses narcotic and very poisonous qualities. In this latter respect it is scarcely inferior to prussic acid, a single drop

being sufficient to kill a dog. Its vapour is so irritating that it is difficult to breathe in a room in which a single drop has been evaporated.”* The most important use for which it is valued and which has led to its large consumption is the property it possesses of gratifying the appetite for narcotic indulgence in man. But its effects as regards that object can with difficulty be described. Even the hardest consumer will be at a loss to define his sensations while under the influence of this narcotic. We all know that it possesses no perceptible intoxicating quality. The only thing that can be said of it is, that like many intoxicating drugs and beverages, when once you have begun the indulgence you cannot do without it. It cannot, however, be denied that it does afford a kind of relief to the fatigued body after toil and trouble. In habitual smokers, says Dr. Pereira, the practice, when moderately indulged in, provokes thirst, increases the secretion of saliva, and produces that remarkably soothing and tranquilising effect on the mind which has caused it to be so much admired and adopted by all classes of society and by all nations, civilized and barbarous.† We also know that it also forms a great aid to reflection. Poets and Essayists in our own country, when under the inspiration of the muses, find the pipe to be indispensable to the rapid and uninterrupted flow of their thoughts. To the chess-players the tobacco pipe is an inseparable adjunct. If the supply falls short they are undone. They find themselves then as if paralysed and quite incapable of moving the pieces. Tobacco, however, is said to possess one medicinal virtue, which, though not well known, is therefore not the less valuable. It is a great antidote to strychnia. A sufficient quantity of the juice of tobacco-leaf administered to the persons affected by the poison has been known to effect a cure. It is also used in some places as a sovereign application for wounds and bruises and the bites of poisonous serpents. None of these uses appear to be sufficiently known in this country.

I will now allude to the other drugs. Next to tobacco in the ascending scale are gunja and churus, both of Asiatic growth, and both are more or less consumed in the East. Unlike tobacco they are used for their intoxicating property alone. The first is the well known hemp, and the second is the resin of the same plant. There is but one form in which they can be used, which is by burning, like tobacco, in a *chillum* and inhaling the smoke through a pipe. Gunja is very common in India, and grows in

* Johnston's Chemistry of Common Life, Vol. II, page 29.

† Pereira's Materia Medica.

abundance in the Upper Provinces. It is a favorite with the up-country people quite as much as tobacco is with a Bengallee. I do not intend to say that its use is confined to the higher provinces alone; it is also in demand in Lower Bengal, but here it is not so universally adopted as a stimulating drug.

Churus, as is well known, is an extract or resin spontaneously exuded by the plant. In describing how these drugs are obtained, we must speak of the plant and extract together. A plant from which the resin has been extracted is not fit to be used as gunja, then it wants the very property for which it is valued. To make gunja what it is, it must be dried with the resin, for it is the existence of this sticky juice which helps the flower of the plants on each twig to stick with the leaves on it and form itself into a pod. In India some art is resorted to to quicken the formation of these pods, and particular care is taken of the plant to prevent its vegetating into an exuberantly leafy plant. Some say that to quicken the formation of the gunja-pods they pour milk at the root of the plant and mix sugar with the earth too when it has begun to flower. I am not prepared to dispute this fact, but I attach no importance to the practice as regards the end intended to be gained by it.

The churus or juicy extract of hemp is collected from the hemp plant either by scraping with the hand as in Nepaul, or by men covered with leather aprons running backwards and forwards through the hemp fields and beating the plants violently. The resin thus detaches itself from the leaves, stems, and flowers, and adheres to the leather, from which it is scraped off and formed into balls. This mode is adopted in Central India, and churus thus formed is known as the churus of Cabul. In Persia the resin is detached by pressing the plant on coarse cloths, and afterward, scraping it off and melting it in a little warm water. The ordinary churus sold in the bazars is the churus of Cabul as gathered in Central India. The most valuable drug is that grown in Nepaul, and sold at double the price of the ordinary churus. The Churus of Herat is said to be the most powerful variety of the drug, but it is scarcely known in this country. There is another form of obtaining the resinous extract, which is by boiling gunja in alcohol, which method is said to be most economical, as the extract obtained is in a pure state and therefore most efficient, while the expense of producing it is small. This method of obtaining the resin is not in use in India, and it is not known whether it is thus obtained in any other Asiatic country.

Very little is known of the properties of the chemical constituents of gunja and churus, except that when distilled with water the dried leaves and flowers yield a volatile oil in small quantity, and the resin dissolves readily in alcohol and ether, and is separated from these liquids in the form of a white powder when the solutions are mixed with water. The resin has a warm bitterish acid, somewhat balsamic taste, and a fragrant odour especially when heated.

A word now as to the effects of gunja and churus on the persons who indulge in them. Both gunja and churus, as is well known, are not smoked singly. They are both mixed with tobacco before burning them in the chillum or *kulka*; with gunja the leaf is used, with churus the prepared tobacco, which in the latter case is simply mixed in the proportion of nearly $\frac{2}{3}$ ds, the whole weighing about a tolah. A dose of gunja is also nearly of the same weight. A leaf or half a leaf is taken accordingly as a stick or half a stick of gunja is used, and both cut into chips on a piece of short thick wood and then pressed in the palm of the hand until the whole is nearly reduced to a powdered ball. The *kulka* used for smoking gunja is of a peculiar shape, quite unlike that for tobacco smoking, and the same thing may be said of the hookah. Its votaries, before beginning to smoke, always take the name of Mohadeb, with whom it is a favorite drug, and then sit in a ring and pass the hookah round, no body taking more than one or two long sustained puffs. It is a remarkable fact that in this country at least, the votaries of gunja, as a rule, always smoke the drug in company and never singly; a stranger falling in with them, though unaccustomed to the drug, is never allowed to be a passive spectator without joining the ring, which he is often pressed to do.

A gunja-smoker may often be made out by his appearance, which is always dry and ricketty—eyes sunken and cheeks flattened. Gunja fumes are believed to possess the property of drying up the humours of the body, and giving the persons who inhale them a faded look. A gunja-smoker can never be slim, and if the habit of excessive indulgence be long persevered in, it brings dysentery and diarrhoea. These evils are, in a great measure, counteracted by wholesome diet of milk and ghee, and confectionary having a large share of these oily ingredients. None of these effects are perceived in churus-smokers. I do not know whether the resin has any property of mitigating the evils produced by gunja; but I believe the indulgence in this drug seldom or never grows into a passion.

Much has been said of the peculiar sensations produced while under the influence of gunja. I have never been able to elicit any satisfactory information as to what those sensations are even from those long inured to the use. The intoxication produced by churrus-smoking is much tamer than that of gunja. It scarcely brings on any hallucination such as is caused by intoxication generally. Persons under its influence scarcely betray any incoherence in manner or speech, neither is the habit productive of any perceptible evil in the constitution. But gunja is more powerful in its effects, and it leaves a more lasting impression on the system. One peculiarity of gunja-smoking is that it makes the person, with whom the indulgence has become a habit, choleric and irascible, rough in manner and rough in speech.

I know of no useful purpose to which gunja is employed except its seeds, which are sometimes boiled with oil for external application for cure of cutaneous diseases. Of the resins however, there are many important medicinal uses. If taken in moderation, it is said to produce increase of appetite and great mental cheerfulness, and excess causes a peculiar kind of delirium and catalepsy.* Though it is a well known fact that habits of intoxication when persevered in have a great tendency to affect the nerves, the truth is most strikingly illustrated in cases of intoxication produced by gunja-smoking. I have compiled a statement (Appendix C), which I annex, from the latest reports on lunatic asylums, of attacks of insanity induced by indulgence in drugs and liquors, from which it will be seen that gunja-smoking has a more powerful tendency in bringing on the attacks of this disease. More than 55 per cent. of these cases is the result of gunja-smoking.

Hemp is used in another form in Persia and Arabia, which there is known by the name of haschisch. Very glowing descriptions are given of the effects of the drug in this form. When taken in small doses its effect is simply to produce a moderate exhilaration of spirits, or at most a tendency to unreasonable laughter. Again, taken in doses sufficient to induce the *fantasia*, it produces an intense feeling of happiness which attends all the operations of the mind. "The sun shines upon every thought that passes through the brain, and every movement of the body is a source of enjoyment." The same writer concludes with the following descriptions given from his personal experience:—"It is real happiness which is produced by the haschisch; and by this

* Pereira's *Materia Medica* quoted by Johnston.

I mean an enjoyment entirely moral and by no means sensual as might be supposed. For the haschisch-eater is happy not like the gourmand or the famished man when satisfying his appetite, or the voluptuary in the gratification of his amative desires, but like him who hears tidings which fills him with joy, or like the miser counting his treasures; the gambler who is successful at play, or the ambitious man who is intoxicated with success."

There is another use of the hemp plant for the purpose of intoxication which remains to be noticed. When the plant is unusually leafy the leaves do not adhere to the flowers on the stems, so as to become clotted, but remain detached; these leaves are gathered and dried, and sold as *sidhee*, *subjee*, or *bhang*. As an intoxicating agency this drug is least in favor in Lower Bengal, but like gunja is a universal favorite amongst the up-country people and the Punjabees. With them it is more in demand than tobacco is in this country. It is used in two forms, one is in liquid state, and the other in shape of paste. In Bengal, in whatever of the two forms it is used, it is always spiced and sweetened.

Its intoxicating power is very mild if moderately indulged in, but when taken in excess, it quite upsets the man and produces sensation by no means agreeable; while under its influence the person feels as if he is resting on his head, and the most familiar objects seem as if they are inverted. Its after effects are to sharpen the appetite and induce an extraordinary voraciousness. It has also the effect of producing costiveness.

The name of *sidhee* will recall to the mind even of the most heterodox Bengallee many agreeable associations. It is considered a sacred beverage indispensable on the occasion of those social and family gatherings which take place on the last day of the dusserah festival, when a cup of the mixture is offered to friends and relatives as pledge of welcome and friendship.

Sidhee or *bhang* takes the name of *majaun* under a different form which resembles the *haschisch* and *dawames* of the Arabs and Syrians. It is a confection of powdered spices, milk and sugar, mixed with almost an equal portion of *bhang* formed into cakes, and the effect produced upon the system of the person under its influence differ very little from those of the other varieties of the drug—*churus* excepted, which may be always considered as the mildest form of the hemp. Whatever other people may say about the extatic effects while under its influence, the sensations may be described as being of an agreeable and cheerful character, exciting to laughter, dancing and singing, and to the commission

of various extravagancies. Hemp in one or other of the forms described is consumed, it is supposed, by at least 300 millions of the human race.

Of all the known intoxicating drugs which I have described and may describe hereafter, opium occupies an important place and deserves to have more than a passing notice. It is comparatively rare, more costly than most inebriating agencies; but this inconvenience is fully compensated by a very small quantity being sufficient for all purposes either of intoxication or medicinal use. It may be considered as the concentrated essence of the narcotic principle. In taste, though not so hot and acrid as the varieties of the hemp, it is indescribably bitter and nauseous. The following is a chemical analysis of the drug given by Mülder:—

Morphine	...	...	...	...	...	6.3
Narcotine	...	...	...	...	...	7.7
Codeine	...	...	...	...	...	0.7
Narceine	...	...	...	...	...	9.0
Meconine	...	...	...	...	...	0.6
Meconic acid	...	...	...	...	...	6.1
Fat	...	...	...	...	...	2.2
Caoutchouc	...	...	...	...	...	4.5
Resin	...	...	...	...	...	2.7
Gummy extractive	...	...	...	...	...	25.3
Gum	...	...	...	...	...	1.7
Mucilage	...	...	...	...	...	18.7
Water and loss	...	...	...	...	...	14.5
						100

Since the above analysis five other constituents have been discovered, which are, thebaine, opeanine, pseudo-morphine, porphyroxine and papaverine.* The analysis here presented is that of Turkish opium. It is the proportion of morphia existing in any variety of the drug which determines its value, and in this respect Indian opium is inferior to the Turkish, but in the markets where it is valued it has no competition.

It is no part of our purpose here to dwell at any length on the processes of manufacturing opium or sorting or packing it for the market. I will content myself with describing how it is used for intoxication and what are its effects.

As far as is known, its use is confined to three forms, solid pills, smoke or vapour, and the liquid form of laudanum.† The last is a

* Johnston's Chemistry of Common Life, Vol II, page 87

† In the Punjab an infusion of the Virgin poppy-head called *post* is consumed for intoxication.

perfect stranger to our part of the country or any place in the Asiatic continent as far as it is known. We owe its introduction into this country to European physicians, and the use in this form is solely confined to medicinal purposes. It is in Europe only where laudanum is used as an intoxicating drink amongst those who have learned this mode of sensual indulgence. There is little to be said about the process of pilling, which is simple enough, being nearly little bullets of pure opium swallowed with a draught of water, the quantity ordinarily consumed at each dose being from two to five grains, two or three times a day, increased up to from 30 to 90 grains. There is much of skill and contrivance in the smoking process, which is worthy of notice.

Opium, when used for this purpose, is called chundoo and gooly. The first is the celebrated composition universally used in the Indo Chinese-territory, and in the places where any of the Malay race are known to reside. The chundoo of India is an imitation of the Chinese invention, but the credit of inventing gooly is wholly our own. It is a pure Bengallee invention, having, it is said, originated in Chandernagore, where it began first to be used. A description of the two contrivances may well repay perusal. First, of the chundoo. Chundoo is opium in its pure state, divested of such impurities as vegetable matter, resin, and oil with the extractive matter. The soft part of opium is scooped out of balls and thrown into an earthen dish; the operative always moistens and washes his hands in a vessel where the water is preserved. When the soft part is carefully abstracted the shells or husks are broken up and split, and thrown into the vessel containing the water. These husks are then boiled in large shallow iron pots just as long as is necessary to break down the husks and dissolve the opium. This boiled matter is strained through folds of China paper laid in a frame of basket work, and over the paper is placed a cloth. This strained fluid is mixed with the soft opium scooped out and boiled in another large iron vessel to the consistence of thickish treacle. The refuse from the straining of the boiled husks is again boiled in water filtered through paper, and the filtered fluid added to the mass first obtained. The dissolved opium, being reduced to the consistence of treacle, is seethed over a fire of charcoal of a strong and steady but not fierce temperature, during which time it is most carefully worked, then spread out, then worked up again and again by the workman so as to expel the water and at the same time avoid burning it. When it is brought to the proper consistence, it is divided into half a dozen lots, each of which is spread like a plaster on a

nearly flat iron pot to the depth of from half to three quarters of an inch, and then scored in all manner of directions to allow the heat to be applied equally to every part. One pot after another is then placed over the fire, turned rapidly round, then reversed, so as to expose the opium itself to the full heat of the red fire. This is repeated three times;—the length of time requisite and the proper heat are judged of by the workman from the effluvium and colour.* In the last operation the fired opium is dissolved in a large quantity of water and boiled in copper vessels till it is reduced to the consistence of chundoo used in the shops. The method adopted here is precisely the same, except, from the custom being limited, the same purity is not secured. In the chundoo shops of Calcutta the drug is smoked by the consumers in the shops themselves, where there are arrangements for such purpose. There are beds in the shops for the smokers, the quality of which varies according to the rate of fee, which ranges from 8 annas to 2 rupees,—a common mat being for the first, and a mattress and pillow on a charpoy are provided for the last or the highest class. It is said that beds become absolutely necessary from the fact that the smokers, immediately after indulgence, fall either flat on their faces or on their backs, in either of which postures there is a corresponding result which I refrain from mentioning. The votaries of chundoo, after inhaling the smoke to their fill, remain in a trance for hours together, after which they are roused, and the beds and their occupants then both require to be thoroughly washed and cleansed for the sake of decency. These shops are kept by Chinamen, and principally resorted to by the Chinese and Mahomedans and scarcely by any Bengallee. Gooly has none of these effects, neither is so much preparation required for its indulgence. Judging from its price, it must be a mixed drug composed of all sorts of impurities which are melted and made into pills. One important ingredient which give these pills their peculiar character and effect are chips of guava or betel leaves and sometimes of rose petals which are fried in a dry pan. For this purpose every shop is furnished with one or two portable forges and bellows. These chips when fried are called *jassoo*. The hooka of the smoker and its pipe in the peculiar phraseology of the votaries are called *tore* and *jore* respectively. The kulka in which the pills are dressed for burning, called *maroo*, is the stump of what is used for tobacco smoking, being merely the tubular part without the surmounting cup.

* Cooke's Popular History of the seven narcotics.

The fire for burning is made by igniting short sticks of the same materials with which *ticca* and *hooka gools* are made. These sticks are called *batty*. The tongs with which these sticks are ignited are called *futky lutky*, and the chums who meet together in the shops for the purpose of smoking address each other by the name of *iarro* or friend. I have omitted one fact in connection with the arrangements for gooly smoking. It is indispensable that the smoker, immediately after the indulgences, should have some edible by his side to improve his taste. For this purpose he always provides himself with a cup of sherbet or some bits of sugarcane or fruits. There are many with whom even this simple arrangement is an inconvenience. For them small bits of common cork are soaked in sherbet and they suck one or two of these corks at a time. One or two pice often suffice to purchase as much gooly as is necessary for one indulgence.

Not having had any opportunities of coming in contact with a habitual *chundoo* smoker, I can give no idea of its effects on those who indulge in it. But a gooly-smoker, as we daily see him, is an ugly beast, whatever his rank of life may be; for it must be borne in mind that the shops are resorted to as much by men better born and better bred as by those of the lowest grades of society. A gooly-smoker has a lean haggard appearance, with sunken eyes blackened all round, and a protuberant belly, while the bones of the whole frame seem staring you in the face. Generally, an opium-smoker may be distinguished by his black eyes, blackened lips, and a thick voice.

It is said that opium imparts energy to the man, makes him active and conversable. I cannot do better than quote some intelligent Europeans who have left on record their unbiassed opinions on the effects of this drug. Some of these, it may be remarked, were no lovers of the drug. Dr. Christison, the most impartial writer on this subject, and who always condemns this and other similar drugs, says that its common effect is to remove torpor and sluggishness and to make the opium-consumer in the eyes of his friends an active and conversable man. Another writer, who speaks from personal experience, comparing opium with wine, thus concludes his observations: "Wine robs a man of his self-possession, opium greatly invigorates it; wine unsettles and clouds the judgment and gives a preternatural brightness and a vivid exaltation to the contempts and admirations, the loves and hatred of the drinkers: opium, on the contrary, communicates serenity and equipoise to all the faculties, active or passive;

and with respect to the temper and moral feelings in general, it gives simply that sort of vital warmth which is approved by the judgment and which would probably always accompany a bodily constitution of primeval or antediluvian health. To sum up all in one word, a man who is inebriated or tending to inebriation is and feels that he is in a condition which calls up into supremacy the merely human—too often the brutal—part of his nature; but the opium-eater feels that the diviner part of nature is paramount, that is, the moral affections are in a state of cloudless serenity, and over all is the great majestic light of the intellect.” Dr. Eatwell—who was many years in this country, and who had an extensive knowledge of the history and action of opium, has thus recorded his opinion: “The question to be determined is not what are the effects of opium used in excess, but what are its effects on the moral and physical constitution of the mass of individuals who use it habitually and in moderation, either as a stimulant to maintain the frame under fatigue, or a restorative and sedative after labor, bodily or mental. Having passed three years in China, I can affirm thus far that the effects of the abuse of the drug do not very frequently come under observation, and that when cases do occur, the habit is frequently found to have been induced by the presence of painful chronic disease, to escape from the sufferings of which the patient has fled to this resource. That this is not always the case, however, I am perfectly ready to admit; and there are doubtless many who indulge in the habit to a pernicious extent, led by the same morbid influences which induce men to become drunkards in even the most civilized countries, but these do not at all events come before the public eye. As regards the effects of the habitual use of the drug on the mass of the people, I must affirm that no injurious results are visible. The people generally are a muscular and well framed race, the laboring portion being capable of great and prolonged exertion under a fierce sun in an unhealthy climate. Their disposition is cheerful and peaceable, and quarrels and brawls are rarely heard of even amongst the lower orders, whilst in general intelligence they rank deservedly high amongst orientals. I conclude, therefore, with observing that the proofs are still wanting to show that the moderate use of opium produces more pernicious effects upon the constitution than the moderate use of spirituous liquors, whilst at the same time it is certain that the consequences of the abuse of the former are less appalling in their effects upon their victims and less disastrous to society at large than the consequences of the

abuse of the latter. All seem to agree in maintaining that when taken in moderate doses, the result of the action of opium on the nerves are, that the mind is exhilarated, the ideas flow more quickly, and a pleasurable or comfortable condition of the whole system is experienced which it is difficult to describe." Again, opium is said to possess "a wonderful power of sustaining the strength which is not found in alcoholic drinks, and of enabling men to undergo fatigue and continued exertion under which they would otherwise inevitably sink."*

In the literary ranks of England there were two men who were for a considerable portion of their lives slaves to opium. I allude to Samuel Taylor Coleridge and De Quincey, both of whom have left remarkable memorials of their impressions of the effects of opium. The second was an ardent admirer of the drug as long as he was in the habit of using it, as his *Confessions* will bear testimony. He has thus described the effect of laudanum when he took it for the first time: "But I took it, and in an hour, oh heavens! what a revolution, what an upheaving from its lowest depths of the inner spirit; what an apocalypse of the world within me! That my pains had vanished was a trifle in my eyes. This negative effect was swallowed up in the immensity of those positive effects which had opened before me in the abyss of divine enjoyment thus suddenly revealed. Here was a panacea for all human woes; here was the secret of happiness about which philosophers had disputed for so many ages at once discovered. Happiness might now be bought for a penny and carried in the waistcoat pocket; portable ecstasies might be had corked up in a pint bottle, and peace of mind could be sent down in gallons by the mail coach." Both De Quincey and Coleridge had recourse to opium to dispel bodily pain. De Quincey felt himself in raptures; Coleridge was in gloom and despondence while under the influence of the habit. The latter has thus painted his misery: "Conceive a poor miserable wretch who for many years has been attempting to beat off pain by a constant recurrence to a vice that reproduces it; conceive a spirit in hell employed in tracing out for others the road to that heaven from which his crimes exclude him; in short, conceive whatever is most wretched, helpless and hopeless, and you will form as tolerable a notion of my condition as it is possible for a good man to have."

Whatever might be said in praise by the admirer of the drug, whatever effect it may have on the Chinese and others of the Malayan

* Pereira's *Materia Medica* quoted by Johnston.

race, our experience in this part of the world does not give any favorable impression of its salutary effects. We leave entirely out of view the cases of men who have recourse to it to mitigate physical suffering, but those who indulge in it for the sake of pleasure and excitement often present miserable wrecks of humanity. There is much of truth and practical knowledge in the following picture of an opium-eater: "A total attenuation of body, a withered yellow countenance, a lame gait, a bending of the spine frequently to such a degree as to assume a circular form, and glossy deep sunken eyes betray the opium-eater at the first glance. The digestive organs are in the highest degree disturbed; the sufferer eats scarcely anything and has hardly one evacuation in a week. His mental and bodily powers are destroyed, he is impotent." It is for the property of constipating the bowels that opium is largely resorted to in this country in cases of chronic bowel complaints. I know of other diseases too in which it is used to mitigate suffering; as for the energy and liveliness which it is said to impart to the consumer, cases are neither so numerous nor frequent as to associate the drug with these virtues. I know only of one exceptional case in which these virtues remarkably exhibited themselves. There was a clerk, in a flourishing mercantile firm of this city, now extinct, who was a hardy opium-eater, and this was known to his employers. He was often made to taste opium, for his opinion on the quality of the drug was found to be correct, and as an indulgence the man had a daily allowance, which he took during office hours. As long as he had it not he was found to be sluggish and drowsy, perpetually yawning over his work; almost immediately after swallowing his usual medicum, he would be found a changed man altogether. He would resume his seat and work immediately from 12 to nearly an hour after candle-light, and then he did the work of nearly four men. He was as quick as he was accurate.

It is a common mistake that opium induces sleep. It brings on a state of half-waking and half-dreaming drowsiness; an opium-eater scarcely knows what is sound sleep. That state of listless insensibility which opium produces should not be confounded with sleep. I know of an opium-eater who, on one occasion, while dozing in a couch at candle-light, called for the servant to replenish his *chillum* with tobacco; for this purpose he held out his hand. The *chillum* was replenished, but the outstretched hand with the hooka in the grasp remained stiff and motionless; the man dozed away, the night wore out. It was nearly an hour after day-light he seemed to rouse himself; he reiterated the order

for tobacco, not being conscious that the order of the evening had been obeyed, and that since a whole night has passed away.

It is a remarkable and a peculiar characteristic of the opium-eaters of this country that they are inordinately fond of tobacco. You cannot give them tobacco too often. We can note the minutes of their respite from tobacco, but shall be perplexed to give an account of their consumption. Except that it is an aid to the effects of opium, we cannot account by any other way for this inscrutable relationship. We know not of any similar longing amongst the class in any other country.*

The habit of indulging in opium, when once ripened, cannot be shaken off. It has such a hold of its victim that it makes a slave of him. It is not every man who can be a De Quincey and Coleridge; the way in which they achieved their emancipation only proves how difficult it is for ordinary men to break the fetters. The following extract from the confessions of a living opium-smoker will be read with interest—"If the usual time of smoking should be put off through any excuse or difficulty, terrible spasms of the muscular system come on, so much so, that I was once lying on a couch which was shorter than my length of body, and something had delayed my morning smoke, when a spasm came on and very nearly dislocated my jaw; another caused my feet to stretch out full against the side of the couch which was broken by the stretch."

Laying aside the question of wholly shaking off the habit, the opium-eater feels as if he is under the pangs of death if deprived of the supply at the appointed hour of indulgence. Opium, it is supposed, is consumed by nearly four hundred billions of the human race.

I have enumerated the most important and extensively used intoxicating drugs; the few that remain are of little note, and may be simply indicated by their names for the curious. The first in this list is tarry or toddy; it is the juice of the fan palm (*borassus*) obtained like date juice by tapping the neck of the tree where the palms hang; when drunk fresh from the tree at day-break or candle-light it is quite innocuous. If taken in excess, it, in some measure, produces intoxication. Even in this state it can never do harm.

* Milk, it is well known, is considered as an indispensable adjunct to an opium-eater's diet. He sustains himself only by frequent potations of this beverage; and his health and vigor will be in proportion to the consumption.

It is a cool and refreshing drink, often recommended for its diuretic properties to those laboring under urinary diseases. Its effects are somewhat violent when fermented by solar heat. Then it froths and foams, being sour and turbid. In weak stomach it causes flatulency and purging.

The following is a chemical analysis I made of tarry (toddy) ten hours after its being taken down from the tree, and kept exposed to the sun, from which it will be seen that its constituents very much resemble those of beer.

Percentage of constituents in toddy.

Absolute alcohol by volume	...	...	3.63
Total acidity	...	...	.40
Volatile acid	...	...	.18
Fixed acid	...	...	.22
Solid residue at 230° F.	...	...	2.76
Ash chiefly consists of alkaline chlorides and phosphates and traces of carbonates and sulphates	...	...	.17
Specific gravity at 60° F.	...	...	1007.

Adopting mean numbers, about 21 ounces of toddy will contain—

Alcohol	...	...	...	...	363 grains.
Extractives	...	...	...	...	276 "
Free acid	...	...	...	...	40 "
Salts	...	...	...	...	17 "

We have next khatta. This drug is a composition of sidhee, lemon-juice, salt and spices. It is not in common use, being prepared for special use according to the taste of the consumer. Dhotoora or thorn apple, though a strong stimulant, is seldom used for intoxication in the lower country; it is more dreaded for its poisonous than for its inebriating power. Its use in India is confined to the hilly regions of the Himalaya, but it is very extensively used by the savage tribes of America.

Drugs similar to those I have described obtain in some of the European and Northern Asiatic countries. I have no room for any lengthened description of them. I can but barely enumerate some of them. They are the Siberian fungus, foxglove, henbane, belladonna, cocculus indicus, and nightshade.

I have, in the preceding pages, confined my attention to drugs which are more or less intoxicating, and which are, for the most part, used in such a manner as least to contribute to the growth and nutrition of the physical system. There is little in the substances themselves which can serve either of the two purposes, and the manner of using them is opposed to the utilization

of the vital elements contained in them. I will now dwell on the intoxicating beverages embracing all spirits and wines. These, unlike the drugs before treated of, are composed of ingredients each of which demands special attention, and the effects produced by them, both by the manner of using them and their chemical constituents, present many curious and interesting facts.

It has now become a fashion to condemn wholesale the use of these beverages in any form ; but I will run the risk of incurring some odium in steering clear of these partisan opinions, and present an impartial view of both sides of the question. I must however, admit, before proceeding further, that there cannot be any dissentient opinion as to the evils of the abuse of a beverage which otherwise is calculated to contribute to the happiness of mankind. I know of no other cause which has done more to heap upon society misery, distress, and incalculable physical suffering as intemperance, and yet, when used with moderation, wine has been known to be a fruitful source of the most innocent, social, and domestic pleasures. It is also a great help to the medical practitioner in sustaining the sinking pulse as much as in restoring vigour to the fainting sick and worn-out convalescent ; while to the care-worn jaded man of business, its efficacy as a restorative and sedative cannot be denied.

If all those who have spoken their views on the use and abuse of alcoholic and fermented drinks had spoken as sensibly and temperately as in the extract from an address which I give below, they would have succeeded more in obtaining a respectful hearing and making a corresponding impression on those for whose benefit their instructions were intended than those rhapsodists who indulge in meaningless rant and bring ridicule upon themselves. The address I have alluded to is that of Dr. Lankester, delivered before the Congress of the British Social Science Association of 1864, and its conclusion runs as follows :—

“The extent to which substances may be taken with impunity that address the nervous system is a question that is occupying the attention of some of our most distinguished physiologists, and whilst at the present time science cannot be said to have pronounced on the question, there is no doubt of the fact that one of the most terrible scourges of the human race is the tendency to indulge to excess in drinking alcoholic beverages. The vices of tobacco smoking, chewing and snuffing, with opium and hemp eating, exert but little evil as compared with the

terrible vice of drunkenness. There are many here who will feel that the interdiction of these beverages is not the sound conclusion of social science. But all must acknowledge in a scientific point of view the value of the large body of facts which have been presented to us by total abstainers from alcohol, who have thus demonstrated that the consumption of these fermented liquors is not necessary for the maintenance of health or strength." With this may be contrasted the remarks of another writer with no more experience of the subject than what a general and intelligent thinker may be expected to have. "The most recent enquiries," says he, "into the action of alcohol upon the human body confirm the teachings of experience and observation which may be summed up in one brief sentence. That *vis naturæ* derives no real aid from the *vis vini spiritus*; that all the miserable effects of alcohol tend to diminish vital energy and to shorten life; and that no one has anything to fear, but something to hope for in reference to health and longevity by dissolving all fellowship between himself and the bottle."* We stand least in want of such monitors to warn us of the effects of alcoholic indulgences. What is wanted is a scientific research into the effects of the drink, and the limits of its indulgence. That when long and habitually indulged in it lessens appetite, causes enlargement of the liver; its action in cases of immoderate indulgence is also to alter the molecular constitution of the lungs by inducing chronic bronchitis and lobular emphysema; it also in most cases is the cause of that terrible malady which we are familiar with under the name of *delirium tremens*, and also of that which the profession designate by the name of chronic alcoholic intoxication, the common effects of which are loss of appetite, impaired digestion, and inability to sleep, giddiness, and headache, and mental hallucinations approaching to unsoundness of the intellect; premature old age, or the appearance of it is also one of the common effects of habitual indulgence. But all these, it must be borne in mind, are the effects of habitual vicious indulgence.

Wine, beer, and spirits, and any drink which contain more or less of alcohol impartially considered may be taken as a food, a medicine, a luxury, and a poison. But every one of these views of the beverages must be supposed to be variously modified according to the difference of age, sex, climate, and constitution and occupation. As an article of food, though not susceptible of digestion in the same way as other alimentary substances, it serves the pur-

* Transactions of the British Social Science Association for 1864.

pose which many varieties of food known as heat-giving are intended to do, and therefore those addicted to moderate doses of alcohol in any one of the various forms in use, do not require much sugar, starch, and fat in the food which they consume. But this use of the beverage loses much of its urgency in climates where the want of heat-giving food is not felt. But there is another view of the question which deserves consideration. Alcohol, whether existing in beer or wines, is not, as I have said before, digested, and therefore transformed into an essential constituent of the blood. Hence it does not supply waste and effect restitution, which are the chief uses of food, but still it passes into the blood. It thereby *prevents* waste and indirectly serves the purposes of food by economising little food that may be taken. "By the oxygen we inhale, it is burnt in the blood into oxalic acid and water, and finally into water and carbonic acid. But the oxygen which decomposes the alcohol, is withdrawn from the albuminous and fatty substances of the blood. Alcohol from its greater combustibility protects these constituents of the blood from being burnt, and if in addition to this, both special experiment and ordinary experience prove that alcoholic beverages diminish the quantity of carbonic acid we inhale, apparently from a great part of the inhaled oxygen combining with the hydrogen of the alcohol into water, there is a two-fold argument for believing that alcohol moderates the combustion of the constituent of the blood, and therefore diminishes the first cause of the need of restitution."* It thus compensates for the scanty food of the poor, who with a frugal and may be insufficient meal are enabled to retain as much in the blood and tissues as an abstainer who has his full diet.

The instinct which drives a working man to have recourse to spirits is not, unless under exceptional circumstances, the result of a morbid craving after vicious indulgence as the impulse of an inexorable law which leads him to supply that which he has not the means to procure. "He must work, but in consequence of insufficient food, a certain portion of his working power is daily wanting. Spirits by their action on the nerves enable him to make up the deficient power."† We thus account for the fact why almost all the lowest orders of our working classes in this country who live by the meanest occupations and earn generally a scanty living are reckless and habitual drunkards. I have called wine, beer, and spirits as indirect and negative food from the absence

* Dr. Scoffern on the Chemistry of Food.

† Leibeg.

of proper nutritive elements in their composition, but beer, however, does not properly fall under this category. There are some constituents in beer which possess properties of some of the best elements of nutritious food; in a measure of 20 ounces of beer there are in mean numbers—

Alcohol	...	..	...	...	1	ounce.
Extractive, dextrine sugar	...		...	...	1.2	"
Salts	...	...	...	...	13	grains.
Free acids	...	...	...	...	.25	"

Thus the important ingredients in beer are four, *viz.*, the extractive matter and sugar, the bitter matters, the free acids and the alcohol. The first play the same part in the system as starch and sugar, appropriating the oxygen and saving fat and albuminates from destruction.* Hence when large potation of this beverage is indulged in without corresponding exercise it induces a plethoric state of the body.

I have alluded to the beverages under notice being considered as medicines. They are as much so to the healthy as to the infirm and aged. Generally they are great restoratives in recruiting the wearied and enfeebled powers of the mind and body when both have been exhausted by fatigue. But they have also their special medicinal virtues. To the convalescent after lingering diseases, mild doses of beer have been found to be valuable restoratives. Brandy may be resorted to as a domestic remedy to relieve spasmodic pains of flatulency, to check vomiting, and to give temporary relief in some cases of indigestion, attended with pain after taking food. Even rum is preferred as a sedative in cases of slight colds, long standing coughs, and rheumatism.† Wines and alcoholic drinks act most beneficently in the aged and infirm in arresting too rapid changes of the tissues, and giving them increased vigor and strength. They are also prescribed in those diseases which are attended with depression of the feelings and diminished activity of the mental powers.

When I now speak of the use of intoxicating beverages as a luxury, I must guard against misapprehension as not implying sensuous pleasure and gratification. For such a purpose the indulgence must verge into dissipation. I mean that they may be used as ministers of refined domestic enjoyments and convivial pleasures. I cannot imagine any invention of art which adds

* Parkes' Practical Hygiene.

† Pereira on Food and Diet.

so much to the zest of social gatherings and refined enjoyment of friendly company as these beverages. Moreover, it is not desirable for a protracted healthy action of the intellectual faculties that the mind should during its waking hours be perpetually strung up to a pitch of thoughtful and care-ridden mood. It must have its moments of relaxation and ease when care disappears and ideas flow more easily and pleasantly.

To conclude, "wines," as has been remarked, "when used in moderate quantities, as to the extent of two or three glasses daily, prove a very grateful, and, to those who have been accustomed to it, an almost indispensable stimulant. They quicken the action of the heart and blood vessels, diffuse an agreeable warmth through the system, promote the different secretions, augment the muscular force and activity, excite the mental powers, and banish unpleasant ideas and reflections."* The notion that daily use of wines in moderate doses shortens life is imaginary, for proofs have not yet been collected to give to the conclusion the cogency of fact.

I have said that spirits and wines may be viewed in the light of poison, so they may, and the most baneful of all poisons when abused. I need not dwell here on the common-place facts relating to the evils which have afflicted society from over-indulgence in spirituous beverages. "Otherwise they are no more poisons than the common salt and the oxalic acid of our food. In common with many medicines they are poisons taken in over-doses; they kill as quickly as strychnia or arsenic; they may act as slow poisons by oft-repeated doses, but this is no argument against their use."†

Wines and spirituous drinks, therefore, unless abused, are not such unmitigated evils as they have been often represented by mere declaimers, and to use the words of an eminent chemist:—"I believe alcoholic drinks taken within limits of temperance to be a good and rational means of developing the mental and bodily powers of man. I cannot join in the gratulations of those who now so enthusiastically enjoy the blessings of total abstinence. I have seen something of the operation of this enthusiasm not only in England, but in Ireland, more especially in the native city of the originator of the movement; and even taking the low ground of argument that a pledged abstainer is a drunkard saved, I find it impossible to accede to that proposition in all its universality. According to my experience a

* Pereira on Food and Diet,

† Dr. Lankester on Food.

pledged abstainer is too frequently a man who drinks in secret, thus adding hypocrisy to the other sin.* And to this I have to add that the truth is universal, that what holds good in Europe, holds as well or more in India.

But to be fair to all parties, as well as persistent in my resolution of impartial dealing, I must reproduce two important documents in favor of total abstinence; one signed by men of the highest celebrity in the Department of Medicine and Chemistry, such as Sir Benjamin Brodie, Dr. W. F. Chalmers, Sir J. Clark, Mr. Bransby Cooper, Mr. Benjamin Travers, Dr. Marshall Hall, Dr. Herbert Myo, Dr. Hope, Sir James Eyre, Dr. Roupell, Dr. A. Thomson, and Sir Alexander Ure, which runs as follows:—

“An opinion handed down from rude and ignorant times, and imbibed by Englishmen from their youth, has become very general that habitual use of some portion of alcoholic drinks, as of wine, beer or, spirits, is beneficial to health and even necessary to those subjected to habitual labor. Anatomy, physiology, and the experience of ages and countries, when properly examined, must satisfy every mind well informed in medical science that the above opinion is altogether erroneous.”

The second certificate, circulated under the auspices of Sir John Forbes, Dr. W. B. Carpenter, and Dr. W. A. Gay, and signed by a large proportion of the most eminent members of the faculty in Great Britain and Ireland, declared:—

“That a very large proportion of human misery, including poverty, disease, and crime, is induced by the use of alcoholic and fermented liquors as beverages; that the most perfect health is compatible with total abstinence from them, and that total abstinence would greatly contribute to the health, prosperity, morality, and happiness of the human race.†”

I will now add a few facts relative to the adulterations of wines and spirits. These adulterations make them, even when most sparingly used, most noxious poisons. Spirits in general do not admit of so much tampering as wine and beer. But there is a way by which they may be made to act most injuriously on the system. When spirits are the products of vinous fermentation they combine more readily with the other ingredients of

* Dr. Scoffern on the Chemistry of Food.

† Revd. Dawson Burns' Paper on Vital Statistics in relation to the use of intoxicating Liquors, read before the British Social Science Association.

liquors, and therefore prove less injurious. It is the existence of uncombined spirits mixed up with fermented liquors in bottles or casks to add to their strength, or to make up for deficient quality, which quickly inebriates, and induces in time, if long indulged in, complicated derangements in the chest, liver and lungs. This adulteration may often be detected by an ordinary drinker by taste and smell. The most common adulteration of brandy is rum. We may make one important use of the fact that spirits mixed with the alcohol of vinous fermentation do not readily combine in the use we make of brandy. Those who drink this liquor for health should remember that immediate dilution at the moment of consumption will not weaken it. Even water will not easily combine with spirit unless the mixture be made sufficiently long before potation, and the minimum time supposed to be necessary for combination is twelve hours.*

In justice to the trade of this city, I must add that they have never been known to adulterate brandy or other spirits. All adulterations on this head originate with the exporters. If they ever tamper with them it is by mixtures which do no more harm than withhold from the buyers their money's worth of alcohol. I had occasion once to test the quality of about a dozen variety of brandies, in all which the adulteration I found was water. To the lovers of cheap brandy I would warn that, if expensive liquors be inconvenient, they should for their personal safety confine themselves to the use of rum or some country arrack. Brandy at Rs. 10 a dozen is a composition of some of the most insidious poisons. The ingredients which usually enter into the composition of this so-called brandy, are wood-naptha mixed with spirit of wine, disguised with sugar, ginger and fenugreek. The adulteration of beer, like that of brandy, when it is made, also takes place in the brewery, for the simple reason that it repels foreign mixtures when finished and stored in casks and bottles. The most common ingredients employed for this purpose are first, *cocculus indicus*, a poisonous fruit which imparts strength and inebriating quality to the mixture; quassia, to do the service of hops and communicate a bitter taste; grains of paradise and cayenne pepper to give pungency; coriander, caraway, and similar other spices to give flavor; liquorice, treacle and honey to give color and consistence.† But it is the wines which admit of large foreign admixtures with which great liber-

* Pereira on Food and Diet.

† Edinburgh Review, No. 257.

ties are taken. Port, sherry, and champagne even in England do not always mean what their names often import. The most astounding fact in these adulterations is, that they are sometimes not mixtures, but quite new fabrications without a drop of grape juice in them, and these fabrications take place as much in England as in the places of their growth. The common ingredient of adulteration in port and sherry, which is mixed in the countries where they are grown before exportation to England, is spirit, and this is done to suit it to the English taste for a strong sweet wine. The spirit used for this purpose is not always the product of any vinous fermentation, but corn and potato-spirit, and sometimes beet-root spirit. There are other ingredients also which enter into the composition, such as treacle and elder berries. The following anecdote relative to the manufacture of port wine will tell its own tale :—

“ A friend of mine, says the writer, who was staying in Reading, where the militia were exercising, had occasion to go into a back yard of one of the hotels, where he saw an old crone stirring a black mixture in a huge caldron, which looked like a compound of blacking blackberries and sloes plucked from the neighbouring hedges. What are you brewing there, my good woman ? said my friend. The old witch, stirring up the compound with a thick stick, replied, naively enough, port wine for the Berkshire Militia.”

Similar adulterations take place in sherries, of which the following are some illustrations. First, for cold brown sherry, 20 or 30 gallons of unfermented juice are put into an earthen vessel and heated until not more than a fifth part remains, when it looks and tastes like treacle ; this is turned into a cask, containing more must which causes it to ferment, and the result is a very full luscious wine. But this is an innocent draught compared with what follow, of which three receipts are given below.

1st.—Forty-five gallons of cider, 6 of brandy, 8 of port wine, 2 gallons of sloe pressed in, 10 gallons of the liquor pressed off. If the color is not good, tincture of red sanders or cud bear is directed to be added. This bottled is sold as port.

2nd.—Spanish wine 1,529 gallons, of Fayal wine 544 gallons, of French wine 4,472 gallons, of Cape wines 689 gallons, of Portugal wine only 117 gallons, with 154 gallons of brandy, the result obtained being 7,525 gallons, minus 8 gallons loss, and the grand

result is 7,533 gallons of port wine thus manufactured ; and all this, it is added, was for exportation.

If this were all there would have been some consolation ; but we are treated with the refuse of what other people have disgorged and that at our expense. " All the refuse wine, red or white, old samples, heeltups of bottles, half tasted glasses, are thrown down and passed away into the collecting barrel, just as the cook throws any kind of meal and soup liquor into his stock pot, and with the addition of a little spirit and coloring matter it comes out very good eighteen shilling port*. Our Radha Bazar dealers, treading in the footsteps of their big prototypes in Europe, have learnt a bit of the art, and can turn out sherry of their own making. Here is their receipt—

Juice of pine-apple peel, fatty matter of rotten plantain of the *champa* species, treacle, rum and coloring matter. They will sell this at any price from Rs. 5 to 18 a dozen according to the experience of the buyer, but they will never refuse custom.†

It is my firm conviction that intoxication has a remarkable tendency to add to the number of our criminal population. Many of the most hideous crimes which the perpetrators would have never dreamed of in their sober moments are committed under the influence of liquor. This is capable of satisfactory demonstration, but I regret that the plan in which criminal statistics are now furnished does not admit of this information being given.

To give some idea of the progress of intemperance I annex two tabular statements showing the number of shops in existence for the sale of drugs and liquors in Calcutta and its suburbs, as also of the amount of excise revenue realized from this source in the Lower Provinces.

* See *Edinburgh Review*, No 257, for July 1867—Article—"Wine, and the Wine Trade."

† Here is another general receipt for making sherry, port, and ginger wines. They are all mixtures of hen eggs, sugar, and ginger with rum, together with coloring matter made from burnt sugar and sapan wood according to demand. These sell at 12 annas and 1 rupee a bottle. Some liquors are also similarly manufactured. Anis is a mixture of aniseed, jack fruits and plantains with rum make khatulia. Vendors also use gunja, sidhee, chilly, and bakoor pills which contain datura to strengthen the drinks.

A.

Statement showing the Excise Revenue of the Lower Provinces in the year 1865-66.

	Rs.
Revenue from license fees on account of imported wines and spirituous and fermented liquors ...	58,751
„ tarry ...	5,68,705
„ puchwai ...	1,27,576
„ churru ...	5,492
„ sidhee, subjee and bhang ...	6,834
„ Majun ...	2,650
„ Muddut ...	72,813
„ Chundoo ...	8,881
„ Gunja... ...	7,65,626
„ Abkarry opium ...	19,15,951
„ Rum or spirits manufactured in India in the English method ...	6,22,257
„ Country spirits... ...	14,43,903
TOTAL ...	49,39,439

NOTE.—Imported wines, it should be remembered, pay a separate import duty not included in this Table.

B.

Statement showing the number of Shops in Calcutta and its Suburbs for the sale of Liquors and intoxicating Drugs.

	Calcutta.	Suburbs.
Shop for retail sale of rum and imported liquors...	99	88
For imported wines only ...	23	8
„ gunja ...	14	29
„ Opium ...	32	29
„ Chundoo ...	14	2
„ Churus ...	13	11
„ Sidhee ...	2	8
„ Muddut ...	26	14
„ Toddy ...	6	61
„ Majun ...	4	2
Hotels ...	27	7
Punch-houses ...	4	0

C.

Statement showing cases of insanity produced by habits of intemperance.

YEAR.	DULLUNDA.*				MOYDAPORE.				DACCA.				CUTTACK.*				PATNA.*				REMARKS.
	Admitted.	Ganja.	Opium.	Liquor.	Admitted.	Ganja.	Opium.	Liquor.	Admitted.	Ganja.	Opium.	Liquor.	Admitted.	Ganja.	Opium.	Liquor.	Admitted.	Ganja.	Opium.	Liquor.	
1863 ...	229	46	1	3	62	27	0	0	322	164	8	4	0	0	0	0	157	58	6	23	The number shown in the admitted column of 1863 was the number remaining in hospital in that year, which was the first of report.
1864 ...	127	47	0	2	32	3	0	0	121	53	0	2	30	12	0	0	70	32	1	19	
1865 ...	177	66	1	1	41	12	0	0	114	61	5	2	30	12	2	0	76	27	0	17	
1866 ...	166	95	1	2	34	12	0	0	68	5	0	2	25	9	1	0	59	34	3	6	
1867 ...	180	47	2	17	0	0	0	0	67	22	1	6	21	7	1	0	75	26	0	19	

* There was one case of dhootura intoxication.