

has been recognized by the brain. When jolted in a rapidly moving car, we involuntarily step forward or backward, so as to preserve the centre of gravity of the body.

26. Another variety of reflex motions takes place in certain involuntary muscles, and over these the cord exercises supreme control. They are principally those movements which aid the performance of digestion and nutrition, the valve-action of the pylorus, and other movements of the stomach and intestines. In these movements the mind shares no part. And it is well that this is so; for since the mind is largely occupied with affairs external to the body, it acts irregularly, becomes fatigued, and needs frequent rest. The spinal cord, on the contrary, is well fitted for the form of work on which depends the growth and support of the body, as it acts uniformly, and with a machine-like regularity.

27. The objects of the reflex activity of the cord are threefold. In the first place, it acts as the protector of man, in his unconscious moments. It is his unseen guardian, always ready to act, never growing weary, and never requiring sleep. In the second place, it is the regulator of numerous involuntary motions, that are necessary to the nutrition of the body. And, thirdly, it acts as a substitute and regulates involuntary movements in the muscles usually under the influence of the will. It thus takes the place of the higher faculties in performing habitual acts, and permits them to extend their operations more and more beyond the body and its material wants.

28. The Functions of the Medulla Oblongata.—The prolongation of the spinal cord, within the skull, has been previously spoken of as the medulla oblongata. It resembles the cord, in being composed of both white and gray matter, and in conducting sensory and motor influences. A portion of the medulla presides over the important function of respiration, and from it arises the *pneumogastric* nerve, so called because its branches serve both the lungs and stomach. The feelings of hunger, thirst, and the desire for air are aroused by means of this nerve.

29. The Function of the Cerebellum.—The function of the cerebellum, or "little brain," is the directing of the movements of the voluntary muscles. When this organ is the seat of disease or injury, it is usually observed that the person is unable to execute orderly and regular acts, but moves in a confused manner as if in a state of intoxication. Like the larger brain, or cerebrum, it appears to be devoid of feeling; but it takes no part in the operations of the mind.

30. The Function of the Cerebrum.—The cerebrum, or brain proper, is the seat of the mind; or, speaking more exactly, it is the material instrument by which the mind acts; and, as it occupies the highest position in the body, so it fulfills the loftiest uses. All the other organs are subordinate to it: the senses are its messengers, which bring it information from the outer world, and the organs of motion are its servants, which execute its commands.

31. There have been a few, but only a few, men of distinguished ability whose brains have been comparatively small in size; the rule being that great men possess large brains. The relative weight of the brain of man, as compared with the weight of the body, does not, in all instances, exceed that of the inferior animals; the canary and other singing-birds have a greater relative amount of nervous matter than man; but man surpasses all other creatures in the size of the hemispheres of the cerebrum, and in the amount of gray substance which they contain.

32. Impressions conveyed to the hemispheres from the external world arouse the mental operations called thought, emotion, and the will. All these mental acts, and many others, are developed through the action of the brain; not that the brain and the mind are the same, or that the brain secretes memory, imagination, or the ideas of truth and justice, as the stomach secretes the gastric juice. But rather, as the nerve of the eye, stimulated by the subtle waves of light, occasions the notion of color, so the brain, called into action by the

mysterious influences of the immaterial soul, gives rise to all the intellectual, emotional, and voluntary activities of mankind.

33. Effects of Alcohol upon the Brain.—The brain under the influence of small and occasional doses of alcohol shows no serious changes other than an increased supply of blood to the head. Very serious changes, however, result from the habitual use of alcohol; the brain becomes harder and tougher than is natural and its cell elements show a wasting away, its substance appears shrunken, and an undue amount of watery fluid fills the cavities in the brain, in order to make up the diminished bulk. The blood-vessels of the brain are sometimes found to be in a weakened condition and from this various diseased conditions may follow.

34. Effects of Alcohol on the Mind.—Alcohol produces an artificial insanity, in which, according to the quantity taken, the various types of mental diseases are distinctly manifest. The perceptions are bewildered, there is sleeplessness, loss of memory, delusion, clouded reasoning power and benumbed moral sense following in the train of alcohol drinking. There is also a monomania caused by the prolonged use of alcohol, a craving for drink that knows no bounds, and but rarely a cure; this is dipsomania, or thirst madness.

Trembling due to Alcohol.—“Another condition is trembling, due to alcohol. The hands are shaky, or unsteady, even when at rest, or if the hand is held out it is seen to vibrate slightly, or in more advanced condition, ‘shakes like an aspen leaf. I have seen this in a spirit-drinker, a barber, as almost the only symptom: he worked night and day, in shaving, and to ‘steady his hand,’ partook repeatedly of spirits—at first to relieve fatigue and then, because he saw that if he discontinued, his hand was too shaky to use the razor. Complete abstinence from alcohol and strong coffee, quite removed his tremblings and his desire for spirits.”—*Dr. W. S. Greenfield.*

Alcohol a Poison of the Intellect.—“In the normal state of a man’s mind all the faculties, the imagination, the judgment, the memory, the association of ideas, are regulated by another superior faculty, viz., the attention. The attention of the will, is the man himself; it is the *ego* which, being in the full possession of the resources of which it disposes, takes them where it will, when it will, to do whatever it pleases. Now in drunkenness, even at the very beginning, the will and the attention have disappeared. Nothing is left but the imagination and the memory, which, left to themselves without regulation and without guides, produce the most irrational results.”

—*Charles Richet.*

“Alcohol in small doses super-excites certain intellectual faculties—the imagination, the memory and the association of ideas, but it paralyzes others, especially the will, the reflection and judgment. Yet, with a stronger dose all trace of intelligence disappears. When old Sly is stretched on the ground insensible from drink and snoring in the mud, he excites compassion and disgust:

O monstrous beast! how like a swine he lies!
Grim death, how foul and loathsome is thine image.”

Charles Richet, in Revue des Deux Mondes.

Drunkenness and Insanity.—“The connection between drunkenness and crime, and between drunkenness and poverty is close and unvarying in its effect upon society. The remarkable increase of insanity in recent years may in part be traced to the use of intoxicating beverages. It has been asserted that at least seven-tenths of all the crime and poverty and calamity to the people of the United States spring from the abuse of liquors.”—*Dr J. E. Reeves.*

35. The Impairment of the Will.—The direct result of the taking of alcohol is seen in the loss of self-control. “The worst estate of man is that wherein he loses the knowledge and government of himself.” It is in the formation of the drinking habit that alcohol too often works the absolute ruin of its devotee, in both body and mind. It is apt to be a continuous habit, having for its sequel the dethronement of the will. It may be stated, as the rule, that after forty years of age, a man who has formed this habit is unequal by his own strength of will to abandon it. Many men of fine intellectual capacity and amiable qualities have become intemperate, and have so continued, as long as their efforts to get free again have not been supplemented by outside and enforced restraint. It is for such as these that inebriate asylums have been built. Other hard drinkers drift into violence and crime, and finally find a curative restraint within prison walls. The benumbing effects of drinking habits upon the moral being of man is universally known. “All delicacy, courtesy and self-respect are gone; the sense of justice and of right is faint or quite extinct; there is no vice into which the victim of drunkenness does not easily slide, and no crime from which he can be expected to refrain. Between this condition and insanity there is but a single step,” and death, in a worldly sense a deliverance, in spite of many an effort to rally, “terminates the miserable scene; one by one lights have

been removed from the banquet of folly, and the last is now extinguished."*

36. An illustration of the disadvantage of drunkenness to the moral tone of a community may be drawn from the results of the labors of Father Mathew, about forty years ago, as a temperance reformer. In the five years, 1838-1842, the consumption of whiskey in Ireland fell 50 per cent., the crimes of violence falling from 64,520 to 47,027, and executions from 59 in the first year to 1 in the last year.

Alcohol and Crime.—Thirty years of judicial experience have taught me that of the crimes which judges are called upon to try, and upon which sentences of the law are pronounced, more than eight-tenths of them involving any degree of violence in their character are directly traceable to the liquor shops. How often have I had young men look up at me when I asked them what they had to say why the sentence of the law should not be pronounced, declare, "I should never have done this crime if it were not for drink. Rum was my ruin; rum and not my hand struck the blow, that killed the man for whose death I am tried; rum has caused me to beat my wife and injure my helpless child or to do the act which now confines me to a prison."—*Judge Noah Davis.*

37. The Poisonous Effects of Alcohol.—Alcohol is, in the main, a narcotic poison in its effects upon human beings; although the visible results vary immensely according to the quantity taken. If a sufficient quantity be taken to cause any visible result, a condition, known as stimulation, is observed.†

* **The Effects of Mild Stimulation.**—"Words of caution to young men concerning the injurious effects of tobacco, as well as indulgence in wine or the pleasures of the table, elicit, in ninety-nine out of one hundred cases, the reply, 'It does not hurt me.' Does not hurt you! Wait and see. In years to come, when you ought to be in your prime, you will be a poor, nervous, irritable, nerve-dried creature. Your hands will tremble, your head will ache, your sleep be fitful and disturbed, your digestion impaired; in short, the unnatural and transient pleasure at one end of your life will be more than counterbalanced by the discomfort and misery at the other. It is a truth of the greatest moment, which ought to be so impressed upon the mind as to be always rising up within it, that *transgressions of the laws of health, not punished at one end of life, are sure to be at the other.*"—*J. R. Black on the Ten Laws of Health.*

† "Suppose, for instance, you measure your muscular strength with a 'health lift' or dynamometer (by which muscular exertion can be accurately measured), and then take some of the drink, in the strength-inspiring power of which you have most confidence, and when you are most exhilarated by it and feel as if you could shoulder a large fragment of Mount Olympus measure your strength again. The drink has fooled you, that is all. You *felt* that you were stronger than natural; you *find* that the narcotic has been true to its paralyzing nature and that you are weaker. Then, after a

If an extremely large dose be taken, a state of stupor follows, and death has been known to result in some cases. Between these two extremes there may be a variety of manifestations. As a stimulant, it appears to many to have a kindly action, to cause a glow and sense of warmth, to increase muscular activity, and to make the mind and organs of speech more nimble. Alcohol is not the only narcotic poison that exercises this influence, which is not kindly, but is, in fact, the first indication of a paralysis of a portion of the nervous system.*

Most of the habitual takers of alcohol freely admit that they are injured by it in one way or another, and still they continue in their indulgence. In such cases, the mental balance is already lost: for a person to covet that which he knows to be hurtful to him, is manifestly not the sign of a sound mind.

38. Tobacco and its Effects.—Tobacco, familiarly known as "the weed," is an annual plant said to be a native of America. It grows to the height of several feet, with leaves of a pale green color. These leaves, when dried, are made into cigars, chewing tobacco, and snuff, which are extensively used throughout the civilized world.

39. Tobacco as a Poison.—Tobacco is a poison to the

time, when the drug has spent itself and reaction (so called) comes on, and you feel weak and prostrated, measure your strength once more. Fooled again; the stuff has fooled you twice. When you felt yourself strong you were weak, and now when you feel yourself weak you find yourself stronger—your natural strength is returning, and what you have called reaction is in reality recovery from the weakening effects of the narcotic."—*Dr. A. F. Kinne.*

* "Here is a company of 'jolly good fellows' all standing on their feet, their faces red and radiant, and all swinging their arms and talking at once. These men have been taking alcohol, and, surely, you will say, it has stimulated them. But if you will attend for a moment to what they are saying, you will see that there is no true brain-stimulation about it. We shall be reminded rather of what Addison says of the difference between the mind of the wise man and that of the fool: "There are infinite, numberless extravagancies, and a succession of vanities which pass through both. The great difference is that the first knows how to pick and cull his thoughts for conversation, by suppressing some and communicating others; whereas the other lets them all indifferently fly out in words? The case with these revellers is precisely this. The poison which they have taken has paralyzed their conservative faculties, and the talking propensity is running on without anything to hold it in check and regulate it."—*Dr. A. F. Kinne.*

young, and is far more hurtful to the adult than is generally supposed. It may be stated as a rule that there are few persons using it habitually who do not suffer injury from it. The injury is mainly caused by what is known as "nicotine," one of the narcotic poisons, and particularly prominent in tobacco. Some of the effects of its limited use are nausea, vomiting, vertigo, and weakness; and its prolonged use, by those who are sensitive to it, often results in convulsions and other like symptoms, together with an irritability and weakened condition of the heart known to physicians as the "tobacco-heart."

40. Effects on the Young.—Of the pernicious influence of the use of tobacco upon the young, the testimony of the Naval and Military Academies of the country is very decided. It has at times been allowed in both institutions, but at present it is forbidden, on the ground that its use is attended with serious damage to health. It is stated that its prohibition at the Naval Academy in 1881 was received with unanimous approval by the officers in charge and with "great joy by many of the cadets." Tremor of the muscles, caused by smoking, was very noticeable in the drawings that form so important a part of the cadets' work. A teacher of drawing, of fourteen years experience, has said that he can always tell from the character of the lines in the drawings whether or not the pupils used tobacco.* Its avoidance has resulted in the reduced number of minor ailments that swelled the sick-list in years when its use was unrestricted.

Athletes and other persons who engage in running matches and the like, are commonly not allowed to use either alcohol or tobacco while they are "in training"; as such use interferes with the fullest development of muscular strength.

* Prof. Mantegazza, of Florence, Italy, a distinguished sanitarian and physician, testifies that "Tobacco is never necessary; it is always hurtful to boys and young men, to weak people and those disposed to consumption. * * * * All good citizens should try to put a stop to the general invasion of tobacco, which threatens to involve the whole of Europe in a dense cloud of smoke, which poisons even those who do not smoke."

41. Cigarette-Smoking.—This form of taking tobacco is injurious in two particulars that do not apply to the other forms. The smoker of cigarettes, either voluntarily or involuntarily, takes into his lungs a very large amount of smoke, and with it, that hurtful element, carbonic oxide. Again, there is an excessive amount of adulteration of the tobacco in cigarettes; and one substance, opium, is largely so used and is extremely injurious.

42. Snuff-Taking.—In addition to the hurtful effects of tobacco generally, snuff-taking is notoriously injurious to the senses of smell and taste, and to the voice.

"The end of all science is to secure long life and good health to the individual and the race, and it ought to be a part of the rational creed of every good man and woman to abjure the use of tobacco and keep others from falling into the vice."—*Dr. C. R. Drysdale.*

"Of tobacco, Franklin said that he could not think it had ever done much good in the world, since he never knew a person who used it habitually who would recommend another to do the same."

"Tobacco is certainly not a food for man, nor has it much value as a medicine. The tobacco-worm is the only animal known to thrive upon it."—*F. H. Hamilton.*

An illustration of the depressing influence of tobacco is given by Dr. Jacob Bigelow, who states that soldiers, when wishing to shirk duty and get on the sick-list, sometimes succeed in bringing on the symptoms of alarming illness by wearing a piece of tobacco under each arm-pit. The skin absorbs sufficient of the poison to affect the general system to a marked degree.

43. Narcotics.—The term narcotic is applied to different substances derived chiefly from the vegetable kingdom, which have the wonderful property of quieting pain and causing sleep. Next in importance to alcohol—which belongs to the narcotics—are opium (and its preparations), chloral hydrate, hasheesh and chloroform.

44. Opium.—Opium is the thickened juice of the poppy-plant of India, and is commonly regarded as the most important of the narcotics. Its active principle is morphine, which gives the soothing property to laudanum, paregoric, and Dover's powders. It is also used in nostrums to put infants to sleep: but unwisely used often brings on a sleep that knows no waking.

45. Effects of Opium.—Opium is particularly injurious to the young, even small doses sometimes producing alarming symptoms. Upon adults the external effects are not as noticeable as are those of alcohol, but the mind is more deeply stirred and the flow of ideas more copious.

46. Danger from Opiates.—The use of opium for relieving pain has been known for hundreds of years. The enchanting sense of relief to suffering wrought by opiates leads to the morphine habit, commonly called opium-eating. It will be seen, therefore, why such great care is exercised by physicians in administering opiates, lest their patients afterward fall into the habit of taking them without medical advice.

“The opium eater loses none of his moral sensibilities or aspirations; he wishes and longs as earnestly as ever to realize what he believes possible and feels to be exacted by duty; but his intellectual apprehensions of what is possible infinitely outruns its power not of execution only but even the power to attempt. He lies under the weight of incubus and nightmare; he lies in sight of all that he would fain perform, just as a man forcibly confined to his bed by the mortal languor of a relaxing disease, who is compelled to witness injury and outrage offered to some object of his tenderest love; he curses the spells which chain him down from motion; he would lay down his life if he might but get up and walk; but he is powerless as an infant and cannot even attempt to rise.”—*De Quincy's Confessions of an Opium Eater.*

47. Physiological Effects of Opium.—The frequent use of opium disturbs and weakens the stomach as well as the other digestive organs; hence we invariably find the opium-eater to be a lean, yellow, sallow personage. His muscular and mental powers are impaired, and his will is terribly enfeebled. This dreadful habit can be broken only with unspeakable suffering to its victim.

48. Chloral Hydrate.—Chloral hydrate, commonly called chloral, is produced from alcohol, but its power as a sedative was not generally known until within the past twenty years. It also is a destroyer of appetite as well as of digestion, unless prescribed in proper doses, and the unfortunates once given over to it find themselves unable to sleep without its continued use. It should never be taken except under the direction of a physician.

49. Hasheesh.—Hasheesh, the juice of Indian hemp, is said to be used by millions of the inhabitants of Asia. It is not much known in the western countries. In the East the excitement caused by its use takes the form of furious madness, leading its victim to commit acts of violence and murder. Hence the term “hasheeshers” in our language has come to be synonymous with assassins.

“As everybody knows, the intoxication caused by alcoholic liquors, by hasheesh, by opium, after a first period of excitement, brings about a notable impairment of the will. The individual is more or less conscious of this: other persons see it more clearly. Soon—especially under the influence of alcohol—the weakening of the will becomes excessive. The extravagances, violences and crimes committed in this state are innumerable.”—*Dr. T. Ribot.*

50. Chloroform.—Chloroform, another product from alcohol, is used by inhalation when surgical operations are to be performed. As it is very powerful and subtle in its action, the unskilful use of it is dangerous in the extreme. The habit of taking chloroform by those who are great physical sufferers, or whose constitutions have been wrecked by the use of other narcotics, should be discouraged. It too often happens that the career of such is short, for the drug may easily be taken in excess and so cause death.

51. Sleep Produced by Narcotics.—Opium and the opiates have the power of quieting the activity of the brain, and of compelling sleep. This may be a blessed action if skilfully applied by the physician, but not so applied it is the source of infinite peril. The sleep so caused differs from natural, restful slumber, especially in the fact that the after effects are commonly depressing and disturbing to the brain to the extent of being harder to bear than the wakefulness on account of which the drugs are taken.

Very young persons are especially subject to injury by sleep-producing medicines; and many are the deaths that have been caused among infants by the giving of “soothing syrups,” “cordials” and “anodynes” that are so freely made and sold for the purpose of compelling sleep.

52. Results of the Use of Narcotics.—The use of any of these narcotics, without proper medical advice, is their abuse. In this way they become powerful for harm. They are no longer remedies, but poisons. Self-prescribed, they have a thousand times been the instrument of unintentional suicide.

The Narcotics and Digestion.—The habitual use of opium and other narcotic drugs is unfriendly to digestion, leading to nausea and a distaste for wholesome food. The vigor of the organs of digestion is impaired.

The disturbing effects of tobacco, in producing nausea and vomiting, is well known; and is almost the invariable experience of all beginners in the use of that substance, loss of appetite is a very frequent result of the habitual use of it.

The Emotions Influence the Bodily Health.—“The exciting emotions which are pleasurable, such as joy and hope, are of a kind that seldom tend to a dangerous excess, and may be regarded as exercising generally an eminently healthful influence upon the body. Hilarity is a great refresher and strengthener of life. Laughter is a wholesome exercise, which, beginning at the lungs, diaphragm, and connected muscles, is continued to the whole body, ‘shaking the sides,’ and causing that jelly-like vibration of the frame of which we are so agreeably conscious when under its influence. The heart beats more briskly, but with a safe regularity of action, and sends the blood to the smallest and most distant vessel. The face glows with warmth and color, the eye brightens, and the temperature of the whole body is moderately raised. With the universal pleasurable sensation there comes a disposition of every organ to healthy action. When hilarity and its ordinary expression of laughter become habitual, the insensible perspiration of the skin is increased, the breathing quickened, the lungs and chest expanded, the appetite and digestion strengthened, and nutrition consequently increased. The old proverb, ‘Laugh and grow fat,’ states a scientific truth. The influence of laughter upon the body is recognized by Shakspeare, in his description of the ‘spare Cassius’—‘Seldom he smiles.’ ‘To be free-minded and cheerfully disposed at hours of meat, and sleep, and exercise, is one of the best precepts of long-lasting.’ Such is the testimony of Lord Bacon to the favorable influence of the pleasurable emotions upon the body. The depressing emotions, such as fear, anxiety, and grief, are always fatal to health, and frequent causes of death. There is an Eastern apologue which describes a stranger on the road meeting the Plague coming out of Bagdad. ‘You have been committing great havoc there,’ said the traveler, pointing to the city. ‘Not so great!’ replied the Plague. ‘I only killed one-third of those who died; the other two thirds killed themselves with fright.’”—*The Book of Health.*

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