from: Every Saturday 1868, VT

other they have not. "In earthquakes," says Humboldt, "we have evidence of a volcano-producing force; but such a force, as universally diffused as the internal heat of the globe, and proclaiming itself everywhere, rarely acts with sufficient energy to produce actual eruptive phenomena; and when it does so, it is only in isolated, and particular places."

Of the influence of the earth's subterranean forces in altering the level of land, we might quote many remarkable instances, but considerations of space compel us to confine ourselves to two or three. The slow processes of upheaval or depression may, perhaps, seem less immediately referrible to subterranean action than those which are produced during the progress of an actual earthquake. We pass over, therefore, such phenomena as the gradual uprising of Sweden, the slow sinking of Greenland, and (still proceeding westward) the gradual uprising of Nova Scotia and the shores of Hudson Bay. Remarkable and suggestive as these phenomena really are, and indisputable as the evidence is on which they rest, they will probably seem much less striking to our readers than those which we are now about to quote.

On the 19th of November, 1822, a widely felt and destructive earthquake was experienced in Chili. On the next day, it was noticed for the first time that a broad line of sea-coast had been deserted by the sea for more than a hundred miles. A larger part of this tract was covered by shell-fish, which soon died, and exhaled the most offensive effluvia. Between the old low-water mark and the new one, the fishermen found burrowing shells which they had formerly had to search for amidst the surf. Rocks some way out to sea, which had formerly been covered, were now dry at half ebb-tide.

Careful measurements showed that the rise of the land was greater at some distance inshore than along the beach. The watercourse of a mill about a mile inland from the sea had gained a fall of fourteen inches in little more than a hundred yards. At Valparaiso, the rise was three feet; at Quintero, four feet.

In February, 1835, and in November, 1837, a large tract of Chili was similarly shaken, a permanent rise of two feet following the former earthquake, and a rise of eight feet the latter.

The earthquake which took place at Cutch in 1819 is, perhaps, in some respects, yet more remarkable. In this instance, phenomena of subsidence, as well as phenomena of upheaval were witnessed. The estuary of the Indus, which had long been closed to navigation, — being, in fact, only a foot deep at ebb-tide, and never more than six feet at flood, — was deepened in parts to more than eighteen feet at low water. The fort and village of Sindree were submerged, only the tops of houses and walls being visible above the water. But although this earthquake seemed thus to have a land-destroying, instead of a land-creating effect, yet the instances of upheaval were, even in this case, far more remarkable than those of depression. "Immediately after the shock," says Sir Charles Lyell, "the inhabitants of Sindree saw, at a distance of five miles and a half from their village, a long elevated mound, where previously there had been a low and perfectly level plain." To this uplifted tract they gave the name of Ullah-Bund, or the "Mound of God," to distinguish it from several artificial dams previously thrown across the eastern arm of the Indus. It has been ascertained," he adds, "that this new-raised country is upwards of fifty miles in length from east to west, running parallel to the line of subsidence which caused the grounds around Sindree to be flooded. The breadth of the elevation is conjectured to be in some parts sixteen miles, and its greatest ascertained height above the original level of the delta is ten feet, — an elevation which appears to the eye to be very uniform throughout."

THE DANGERS AND DELIGHTS OF TOBACCO.

A FRIEND of mine, who had passed through severe struggles of poverty, assured me that he and his companion once finding themselves reduced to a single penny, tossed up whether it should be spent on bread or tobacco. But hear the other side: a medical man assures the public, through the *Gazette des Hôpitaux*, that tobacco has no sort of attraction, — "n'offre réellement aucun véritable attrait," — but is a nuisance to smokers and to those who do not smoke.

Here we have an illustration of the opposing attitudes taken by two classes, — the one maintaining that tobacco is a source of vast diffusive pleasure, lightening the burden of our daily life; the other maintaining that it is nothing but an evil, shortening our already brief existence, and darkening it with many maladies. From the very first day when the fascinating plant disclosed its charms to Europe, down to the moment of my writing this, there have been incessant cries of alarm and disgust; but this vast expenditure of rhetoric and exhortation has been in vain.

The Delights of Tobacco, though vociferously denied, have exercised so persistent a fascination that no rehearsal of its Dangers has sufficed to arrest the rapid increase of its votaries. Singular! It has been proved over and over again to be the deadliest of poisons, and every year the consumption grows larger. Medical science has aided moral suasion, long lists of diseases have been attributed to its influence, penal legislation has attempted to suppress it, sarcasm and ridicule have endeavored to make it unpopular, but the tide rolls on; and, seeing this, the unexcited spectator naturally asks, How does it come to pass that this deadly poison, annually consumed in millions of pounds, fails to inspire terror? Are men indifferent to poison? or are they unsusceptible to it? How is it that the great majority of men in every country can daily "poison" themselves, and yet the effects of this imprudence escape our notice?

The mere putting of such questions shows that there must be some serious flaw in the statement of the real relation between Tobacco and the Organism; and the consequence of this flaw is that men in general, finding the massive experience of daily life at variance with the teachings of a few writers, set aside those teachings as "stuff and nonsense"; they find that the consumption of tobacco is doubled in ten years, and not observing any corresponding increase of mortality or disease, they laugh at medical alarmists. One must admit that the subject has generally been treated with lamentable want of candor and insight. We have been told with emphasis that the tobacco-plant belongs to the dreadful family of nightshades, and ranges beside the belladonna and mandragora. It is true; but no less does this plant range beside the potato, the tomato, and the capsicum. We have been

told that it contains a virulent poison. This also is true; but wheat, tea, coffee, almonds, — nay, even animal flesh, as we shall see presently, — also contain poison. We have been told that it has paralyzed Spain, destroying the chivalric grandeur of her people, no less than the political importance of her government; but since it has not ruined Prussia, nor prevented the rise of the great American republic, since it has left England and France their ancient energy, men are not much appalled by the example of Spain. We have been told that smoking leads to weariness, indolence, apathy, egoism, and grossness; and members of the British Anti-Tobacco Society are firmly persuaded, — or at least endeavor to persuade others, — that smoking is one great source of the crimes and debauchery of the masses. Nevertheless, the smokers daily become more numerous. Formerly, the canton of Berne classed the "crime" of smoking with the crime of adultery; yet at the present moment there are few men in the canton who are not habitual smokers.

Is all the outcry the voice of a foolish prejudice, or is there a valuable truth underlying the exaggerations? In one word, Is smoking dangerous, and what is the extent of the danger? I will endeavor to answer these questions with a severe impartiality. I will do it for the reader with the same earnestness that I have done it for myself, being neither a tobacconist nor a preacher, but a physiologist with a very delicate constitution, which needs great vigilance to keep it up to working order. I am a moderate smoker; but much as I enjoy a cigar, I would most willingly give it up, if I had even a strong suspicion that by doing so I should improve my health.

There is danger in tobacco. The fact should never be disguised. What are the real elements of that danger will appear in the course of this essay; meanwhile the contradiction between the two parties, previously noticed, may be summarily reconciled by the assertion that although tobacco contains a deadly poison, smoking is not poisonous, — except under such conditions as will hereafter be noticed.

The mere fact that tobacco contains nicotine, a poison, is in itself of no great significance to the smoker. When the physiologist describes the terrible effects of nicotine administered to animals, he furnishes valuable facts to science; but they must be very imperfect physiologists who infer that the same or similar effects will be produced on a man who smokes tobacco containing nicotine. Indeed, when we know that one cigar will contain an amount of the poison which, if chemically separated, and administered pure would kill two of the strongest men, and yet see men daily smoke half a dozen such cigars without appreciable effect, we need no physiology to assure us that the action of nicotine is one thing, the action of tobacco-smoke another. I shall presently give the physiological rationale of this; but the fact itself suffices to set aside as irrelevant a mass of evidence and argument commonly adduced to prove the deleterious influence of tobacco-smoking, grounded on the effects of nicotine. No one doubts that tobacco is poisonous. No one doubts that alcohol is poisonous. But the massive evidence of national experience utterly repudiates the inference that smoking a cigar and drinking a glass of wine are poisonous. It is a question of quantity; and we shall by and by see how all poisoning is a question of quantity, and how food itself becomes poison when taken in excess.

Although the presence of nicotine is no valid ground for the inference that smoking is necessarily poisonous, the fact points to an element of danger upon which our attention should be fixed. A poison is there, and its effects on the organism may be terrible; what we have to ascertain is how these effects are avoided. Every one knows from early experience how powerful and unpleasant is the effect of a small quantity of tobacco on the tyro: after a few puffs he feels his heart palpitate; if he continues the experiment, a cold sweat breaks out, his face becomes ashy pale, the room swims round, and he is relieved from his misery by sickness.

So horrible are the sensations which usually accompany our first introduction to the enchantress, that no greater proof of her charms can be given than our willingness to go through the stages of initiation. Yet in a little while the organism becomes so adjusted to this stimulus that none of the early effects are appreciable: delight replaces discomfort. The fact of the discomfort shows that tobacco is capable of exerting a powerful and noxious influence, seriously disturbing the functions; the fact of its ceasing to exert that influence shows that what was at first a disturbance has become a gentle stimulant, by which the pulse is slightly accelerated, the secretions increased, and the cerebral activity heightened.

But, in admitting that tobacco is a stimulant, we may seem to be admitting all that its opponents claim. They ask, "Can such a stimulant be daily applied without injury? Is there not a cumulative effect. Is not the excitement temporary, and followed by a depression which is hurtful? Are not the brain and nervous centres, in the long run, deteriorated by this excitation?" Pertinent questions, the answers to which must be determined by the precision with which the questions are understood; we may answer them yes or no, with equal justice, according to the sense we affix to them. It is certain that no stimulus which is a disturbance of the natural functions can be daily applied without injury. But is it certain that smoking tobacco daily is the daily application of such a disturbing stimulus? Is it even probable? Is it not demonstrably untrue? You might as well argue that sailors shortened their lives by daily exposing themselves to the horrible disturbance of sea-sickness; much as they suffer at first, it is plain that in a little while they cease to suffer at all. In like manner the disturbance created by the first few pipes soon disappears, and can only be reproduced by an excess: the disturbance has given place to a stimulus.

Finding themselves at variance with obvious facts, our opponents endeavor to maintain their position by arguing that, although the organism may become so far accustomed to the stimulus as to exhibit only a trifling disturbance on each separate occasion, yet, inasmuch as this is repeated frequently, there is a cumulative effect, which tells injuriously. When Voltaire heard that coffee was a slow poison, he replied, "Very slow; it has been eighty years killing me." Indeed this notion of a gradual storing up of its injurious influence is a notion which, had it not been countenanced by professed physiologists, I should be tempted to affirm that no one familiar with vital processes could steadily conceive. It is absurd; and daily experience refutes it. If the slight increase of the heart's action, consequent on smoking a cigar, is injurious because it is an increase, and if such excitement is cumulative through daily repetitions, and, by accumulation, will produce idiocy, mania, loss of memory, general paralysis,

and all the other terrors of tobacco, then, on similar grounds, we should avoid the slight increase of the heart's action which follows our daily cup of tea or coffee, our morning tub, and daily walk, with all other stimuli of food, emotion, and thought. Life is one incessant reaction upon stimuli; and, were it not that life is also an incessant renovation of tissue, these reactions would rapidly come to a close; but, as I have elsewhere said, since the old tissues are incessantly being replaced by new tissues, there is a repetition, not a cumulation, of effect. Every time fresh oil is poured on fresh burning coal, the same phenomenon presents itself; every time an eel is skinned he wriggles with ancestral vigor, and will not become "used to it"; in like manner, every time a fresh stimulus is applied to fresh nerve-tissue the original effect ensues. Change, incessant change, is the law of our being; fresh food renewing fresh tissue for fresh stimulants. The basket is always wriggling with eels, but the eels are strangers, and can't get "used to the skinning." Those who rehearse the deadly effects of tobacco, and infer that small daily doses will, by accumulation, produce these effects, should never drink tea; since it is notorious that tea is poisonous, and not only produces paralysis when taken in large doses, but even in moderate doses causes tremblings, palpitations, and other distressing symptoms. Many persons cannot sleep at night after a cup of tea; and the men employed as tea-tasters are subject to headache, giddiness, and other evils; while those employed in unpacking tea-chests are very liable to paralysis. Hence it is clear that a cup of tea, taken twice daily, would, if the effects were cumulative, rapidly induce disease. But as the effects happen *not* to be cumulative, tea is drunk with impunity; so of cigars.

And now for the other physiological argument, based upon the indisputable truth, that all excitement is followed by a corresponding depression. It is inferred from this that the stimulus of tobacco, although for a time increasing the activity of the circulation, necessarily depresses it in the long run (an error), and hence the bloodless, ill-nourished organs of the habitual smoker (an absurd misstatement of the fact). Dealing with the asserted fact, before touching upon the inference, I refer to the reader's own experience of his tobacco-loving acquaintances to decide whether they are more bloodless and feeble than their non-smoking fellows, or I may refer to the experience of nations and classes. Having this guide as to the matter of fact, we might disregard the physiological inference; but, as that inference is itself demonstrably erroneous, and the exposition of the error may not be without interest, —we will pause awhile to consider it.

That excitement is followed by a corresponding depression is true, as was said before. But in what sense true? In the case of nervous excitation it means that, when a nerve has used up material in action, it needs a period of repose, during which the waste may be repaired, — this period is one of depression; that is to say, having used some of its force, it has for a time less disposable force for action. But, in the case of the heart's action, which is continuous, and accompanied by continuous repair, any excitement above the normal rate is followed by a corresponding depression when the stimulus ceases; the depression, however, corresponds with the previous exaltation, it does not exceed it. That is to say, if, when the pulse is eighty a stimulus raise it to a hundred, — this excess of twenty will be followed by a corresponding depression of twenty on the cessation of the stimulus; and then, the normal rate being once more reached, no further depression takes place. This is evident *à priori*; for, otherwise, the excess of depression would be without a cause. It is evident in experiments on animals. It is evident in ordinary experience; for, inasmuch as the pulse is incessantly varying under changing stimuli, if each excess of activity were followed by a depression below the starting-point, there would rapidly arrive a complete cessation of the heart's action, it would go deeper and deeper still, each revival being succeeded by a wider sweep of paralysis.

Having thus disposed of the most ordinary objection, I turn to one of great importance, if true, and less easily answered. Does tobacco, in moderation, injure the brain and other centres, producing paralysis, idiocy, loss of memory, and other maladies arrayed against it by various medical authorities? That it affects these organs is beyond dispute, since it stimulates them; but the point interesting to us is, whether the organs are injuriously affected. Medical writers of high position and large practice have declared emphatically that smoking does injure the brain; and no wise man will let such declarations pass unheeded, in spite of the exaggeration and fallacy which may often be detected in them. Let me say at once that I have myself no doubt whatever that smoking, in excess, or in exceptional cases, does produce the injuries attributed to it; as I have no doubt that alcohol in excess is even more injurious; but the argument from excess is an excess in argument.

M. Joly, in a memoir recently read at the Académie de Médecine of Paris, invokes statistics to prove that the increase in the consumption of tobacco is accompanied by a corresponding increase in the number of the insane. Thus in 1842 the duty on tobacco produced 80,000,000 of francs, and the registered number of the insane was 15,000. In 1852 the duty amounted to 120,000,000, and the insane to 22,000. In 1862 the duty amounted to 180,000,000, and the insane to 44,000. Appalled by such figures, he exclaims, "Le jour que la France se mit à fumer on peut dire qu'elle commença à s'empoisonner!" It is a slight objection to this array of figures that the number of the insane is greater among women, who do not smoke than among men who do.

M. Morel,* referring to the enormous quantities of opium and tobacco now consumed, says that it is impossible not to give them a large place in the history of substances which act fatally on the nervous system, — an undeniable position, but equally applicable to alcohol. M. Sandras,† admitting that the methods of using tobacco render it less dangerous than if nicotine were taken pure, thinks that, in a minor degree, the ill effects of narcotism are produced, and, when taken in excess, narcotism supervenes, and the cerebral functions are finally affected. The attention and the memory become weakened, and finally destroyed, the judgment is progressively altered, vague images and extravagant conceptions traverse the troubled mind, and the disease advances till it reaches the state of helpless stupidity. A good warning against excess, but inapplicable to moderation.

The famous oculist, M. Sichel, declares that ex-

* Morel, "De l'Aliénation Mentale," p. 213.
† Sandras, "Traité des Maladies Nerveuses," i. 630.

cess very frequently leads to blindness, and he has specially treated the subject of the smoker's amaurosis. One case is worth citing. A man, aged forty, who had entirely lost his sight from excess of smoking, was completely cured by a treatment combined with the entire cessation of this excess.

But, without citing authorities, it is enough to say that tobacco in excess acts as a narcotic, — stupefying the brain, — to say that the frequent repetitions of such stupefaction must at last alter the texture and consequently the functions of the brain, the disturbance of function in stupefaction being very different from a stimulus. We can therefore understand the very general suspicion which hovers over tobacco in the minds of medical men as the cause of those nervous affections which they cannot trace to some more apparent source. But medical suspicions of this kind are only valuable as hints for the direction of research; they are of little value as evidence. In the present case I think the suspicion very questionable, unless when referring to excess, because the experience of nations is against the notion of any injury to the brain. I go further, and dispute the common assumption that tobacco — in small doses — is a narcotic. The statement may startle, because tobacco has always been classed among the narcotics; but the paradox disappears when we reflect that differences in degree reach differences in kind, and that what is undeniable of large doses is no longer true of small doses. Nicotine is a narcotic, — excess in smoking will produce narcotism. These facts are indisputable, but they do not imply that moderation in smoking must necessarily produce moderate narcotism, for it will not produce narcotism at all. The difference in degree becomes a difference in kind, as great as when a difference in the degree of heat changes water into ice or into steam. There may be but a slight difference in the weight which bends a steel spring and the weight which breaks it, yet what a complete disturbance of our mechanical devices would result from this difference being overlooked!

The question of quantity, which is here, as elsewhere, of such supreme significance, has been flagrantly disregarded by the antagonists of smoking.

Let us see to what conclusions such a disregard would lead us in other cases. Animal food is largely eaten, and, except by the small sect of vegetarians, is recognized as beneficial to the flesh-eaters; so that a teacher who should exert his eloquence in endeavoring to dissuade men from beef and mutton, because such substances contained a deadly poison, would be received with shouts of derision. Yet the fact is indisputable that animal flesh does contain poison as an invariable constituent, just as tobacco does. This poison — the salts of potass — can be extracted and administered pure, as nicotine can be extracted from tobacco. And, what is still more impressive, recent experiments have proved that the concentrated essence of flesh, when administered in small doses, increases the rapidity and force of the heart's action, but in larger doses acts like a poison, and paralyzes the heart.*

The reader is requested to consider the striking parallelism between the effects of flesh-eating and tobacco-smoking, and the effects of the poisonous elements in both. Not only can we eat with benefit an amount of flesh which contains poison enough to destroy us if administered in a concentrated form, — as we can smoke with impunity an amount of tobacco which contains enough nicotine to poison a family, — but the effects of meat-essence and of nicotine are singularly alike, the small dose stimulating and the larger dose paralyzing the heart. Nor does the resemblance end here. After the administration of meat-essence in small doses the pulse rapidly rises, and in the course of half an hour or more it again sinks to its normal rate. Let any smoker time his pulse before, during, and an hour after his cigar, and he will observe a similar rise and fall. When larger doses of meat-essence are given, the animal rapidly becomes depressed and stupefied; precisely the effects observable after an overdose of tobacco. Still larger doses in both cases produce convulsions and death.

This example suffices to enforce the proposition that the effect of a poison depends on the amount of that poison which, at any given moment, is acting on the organism; and likewise to enforce the proposition that impunity in smoking results from those causes which prevent the amount of nicotine at any given moment from passing the limit which separates a stimulus from a disturbance, excitement from paralysis. Physiology is in a condition to give the rationale of this. That the Indians first kill wild animals with poisoned animals, and then eat the poisoned flesh with safety, has long been known; that the poison may be injected directly into the stomach without perceptible injury, although a quarter of that amount would in a few minutes kill the animal into whose veins it had been injected, was also known; and these two facts seemed to point to some property of the mucous membrane of the stomach which prevented the poison being absorbed. But this conclusion proves to be inaccurate. The stomach is quite capable of absorbing the poison, but it absorbs it slowly compared with the rapidity of the process by which the poison is excreted; and in consequence of this greater rapidity of excretion, although all the poison may be absorbed, yet at no one moment is there sufficient quantity in the blood to produce injury. "Spread out the thunder into its minutest tones," says Schiller, "and it becomes a lullaby for children." Spread out the deadliest poison in minute doses, and it becomes a medicine, — as we know from the daily use of strychnine, prussic acid, and other energetic poisons, in medical practice. Now when a poison is rapidly excreted by the skin, lungs, and kidneys, so that an accumulation in the blood is prevented, all injury is avoided, a succession of minute doses not being the same as one concentrated dose. But if from any cause the rapidity of excretion be arrested, an accumulation takes place, and thus a small dose comes to have the effect of a large dose. This is not hypothesis; it has been proved by Hermann, of Berlin,* who found that the dose of curare which was quite innocuous when injected into the stomach of a rabbit became almost immediately fatal if the vessels of the kidneys were tied, thus preventing the excretion from taking place through the kidneys. Hermann also found, — what, indeed, Brown-Séquard had long ago proved, — that the dose of alcohol which was fatal to an animal when left exposed to the cold, passed away without serious effects when the animal was kept very warm, — the heat accelerating and the cold retarding the excretion from the skin.

* See the experiments of Kemmerich: "Untersuchungen über die physiologische Wirkung der Fleischbrühe," in the "Archiv der Physiologie," edited by Pflüger, 1868, i. 120.

* In Reichert und Du Bois Reymond's Archiv, 1867, p. 68.

If, then, we understand that a poison which is absorbed in minute quantities is also excreted with sufficient rapidity to prevent there being at any given moment an accumulation in the blood, the effect of which would be excessive stimulus, large amounts of such poison may enter the system without toxic influence, — the thunder is spread out into its smallest tones. But now look at the other side. If the excretion from any cause be retarded, then an accumulation takes place which is injurious, and may be fatal.

The two results expressed in the preceding paragraph enable us to give a rational explanation of the seemingly contradictory evidence respecting tobacco. We shall best understand this by comparing the facts which prove immunity with the facts which prove injury. The massive evidence in favor of immunity only proves that smoking in moderation — and the majority of men are moderate — has no appreciably injurious effect. The evidence of particular cases, the pathological evidence supported by physiological experiment, proves that smoking when excessive produces serious evil. And it will presently appear that excess is a term of fluctuating application, the amount which is moderation to one organism being excess to another.

I have been up to this moment opposing the arguments of the opponents of tobacco, because those arguments seem not merely fallacious, but eminently ill calculated to screen from the public what is the real danger; but I must now call attention to the serious warning which medical experience furnishes respecting the danger of too much smoking; for it is one thing to deny the misrepresentations of the danger, another thing to deny that there is any danger at all. There may be, and assuredly often is, both imperfect observation and imperfect reasoning at the basis of the denunciations; but medical experience is not always at fault in its vision of a causal nexus between a particular disease and tobacco. Valueless as are the unverified inferences from statistics or vague observation, that madness, angina pectoris, or any other malady, will be produced by smoking, — valueless as are the inferences from experiments on animals in which nicotine is administered in a state of concentration wholly dissimilar to its state when smoked, — there is valuable evidence to show that in particular cases a malady suspected to be due to tobacco diminishes or ceases with the diminution or cessation of smoking, and returns with its resumption. I will select an example or two from the work of Dr. Druhen,* an uncompromising opponent of tobacco.

Case I. — M. T., an advocate, aged thirty, of athletic frame, began in 1840 to manifest symptoms of a spinal affection, which continued till the summer of 1845. These symptoms fluctuated considerably, but they resisted all treatment. At last Dr. Druhen, suspecting that the disturbing cause was excessive smoking, persuaded his patient to give up this bad habit. All the symptoms disappeared as if by enchantment, and at the end of one month the cure was complete. M. T. enjoyed excellent health for some time, but one day, dining with the Doctor, he entreated to be allowed to indulge in a cigar. The permission was refused, but he persisted and smoked. "No sooner had he finished his second cigar than I saw him hastily quit the table. I rose also in some anxiety, and he confessed that all his old sensations had returned. This indication was decisive. M. T. henceforth entirely gave up his cigar, took steel tonics for a month, and has ever since enjoyed robust health."

Case II. — M. observed that for some years his energies had been declining; he was excessively thin, ate little, and only found comfort in smoking very strong cigars. He complained of acute abdominal pains every afternoon, which only ceased at night; tremblings of the limbs, palpitations, and sometimes sickness. He was advised to relinquish tobacco during one month; did so, and all the symptoms disappeared; but he afterwards declared that he would rather endure the sufferings than be deprived of tobacco. He resumed his old habit, and the old pains returned.

Case III. — A man aged forty-five, of lymphatic temperament, extremely sober, and very regular in all his habits, was troubled by the premonitory symptoms of melancholy mania. He was perfectly aware of his hallucinations, but could not escape them. After two or three weeks' medical treatment they passed away, and he resumed his labors at the bank, where he held the post of cashier. M. Druhen accidentally learned that his patient was a smoker, — a moderate smoker, — and that during his treatment the desire for tobacco had not made itself felt, but on his recovery he again resumed his cigar, and once more the old symptoms appeared. Warned thus by experience, he renounced tobacco entirely, and from that day has had no recurrence of the symptoms.

Case IV. — Dr. Turck has published a case of a peasant who became deranged in consequence of excessive smoking, and who was cured by the accidental diminution of his supply of tobacco.

It is needless to multiply examples, the injurious effects of excess being beyond dispute. What concerns us here, is the rational interpretation to be put upon the fact. When we see that millions of men daily smoke without appreciable injury, we may safely conclude that the cases, however numerous, in which injury is distinctly traceable to tobacco, are to be ranged under two heads, cases of excess and cases of idiosyncrasy. A word on both may be desirable.

We have seen that the nicotine, which is a poison in certain quantities, is only a stimulant in minute doses. We have also seen that the impunity with which nicotine can be taken into the system depends on the rapidity with which its excretion prevents an accumulation of it in the blood at any given moment; the same amount which is harmless when the normal rate of excretion is maintained, becoming fatal when the excretion is retarded. It is clear, therefore, that inasmuch as different organisms vary greatly in their power of getting rid of the poison, the question of excess is one of personal idiosyncrasy. To some men one cigar is excess; to others half a dozen is moderation. Some men can smoke mild tobacco who are immediately disturbed by the same quantity of greater strength. A friend of mine, who for many years has smoked on an average ten cigars daily, assures me that he left off smoking during a period of six months, and could not detect the slightest change as a result of the absent stimulant, — clearly proving that the ten cigars were to him a scarcely appreciable stimulant, whereas to many men such an amount would be disastrous. I find that I cannot now smoke two cigars, one after the other, without decided excitement and malaise if an interval of two or three hours elapse, the sec

* "Du Tabac; son Influence sur la Santé et sur les Facultés Intellectuelles et Morales." Paris, 1867.

ond cigar is less operative, but it is still appreciably operative, whereas after each meal a single cigar is borne with comfort.

It is on a similar principle that men drink half a pint of wine, slowly in sips, with but a slight acceleration of the pulse, whereas that same half-pint swallowed like beer would intoxicate them. The limit of moderation can easily be determined by each man for himself. He ought to know how much tobacco he can take without disturbance, as he knows how much wine or beer he can take; and, having determined his limit, he should rigorously confine himself to it, for there is a lurking Danger in tobacco which only foolhardy men will play with. Let him, above all, get rid of the notion that because his friends can smoke without injury three or four cigars he also must be able to do the same, — or that there is any inferiority in his greater susceptibility. There is no such thing as absolute parity between any two organisms, — each has its own individual constitution, and according to this will be the limit of endurance.

And we are thus led to the cases of the second class, which involve the peculiar idiosyncrasy of the individual. Physiologists are familiar with abundant examples in which articles of food, eminently nutritious to the generality of human beings, act as poisons upon some exceptional organisms. There are many people who cannot eat fat, others who cannot eat butter, or eggs, or mutton, game, or peculiar sorts of game, without the most distressing effects. The late Dr. Prout knew a person on whom mutton acted as a poison. "He could not eat it in any form. This peculiarity was supposed to be owing to caprice, and the mutton was repeatedly disguised, and given to him unknown; but uniformly with the same result of producing violent vomiting and diarrhœa." Tissot says he could never swallow sugar without vomiting. Hahn found that seven or eight strawberries sufficed to send him into convulsions. In presence of such examples, how can we help concluding that tobacco also must to some organisms be of quite peculiar dangerousness? If the excretory action be not rapid, we know that tobacco will be a poison to all men, and inasmuch as there are varying degrees of excretory vigor in different organisms, it is clear that the effect of tobacco will be strictly dependent on this varying susceptibility.

It is in every man's power to answer very decidedly for himself the important question whether tobacco is injurious to him. Does he suspect any evil influence? Let him abstain, and closely watch the result. If, with no other change in his way of life, he can detect the disappearance of any marked symptom, which reappears whenever he resumes his cigar, then he may be sure that he is wrong to smoke, or that he smokes too much.

The argument closes here, but I will add a detail or two which may not be uninteresting. The state of health and external conditions necessarily influence the amount of tobacco which can be taken with impunity. Active exercise in the open air necessarily increases the activity of excretion, and therefore renders a larger amount of nicotine endurable. Avoid smoking on an empty stomach, unless you have one of those organisms which are eminently insensible; for not only does the absorption of nicotine under such conditions take place more rapidly, whence the injurious accumulation results, but inasmuch as in most cases the salivary secretion is stimulated, this brings with it a stimulation of the gastric glands, and gastric juice is poured into the empty stomach, producing a feeling of nausea and constriction. Smoke slowly: the enjoyment is prolonged, and the danger of accumulation is lessened. Let your tobacco be dry. Nicotine is volatile at the temperature of combustion, and the greater part contained in a cigar evaporates in the air; but nicotine is very soluble in water, and what is thus dissolved, instead of evaporating, enters the system. The practice of wetting the cigar all over before lighting it should therefore be avoided. Those who are susceptible should be careful in their choice of tobacco, the different kinds of which have widely different amounts of nicotine. In that of Turkey, Greece, and Hungary there is scarcely a trace of the poison. In that of Brazil, Havana, and Paraguay, the amount is 2 per cent. In that of Maryland, 2·29; of Alsace, 3·21; of Kentucky, 6; of Virginia, 6·87; and of France, 7·30 per cent.

I have left myself no space to speak of the Delights after having discussed the Dangers; but every smoker is sufficiently enlightened on that point, and all eloquence would be thrown away on those who cannot discover the reason why men should make "walking chimneys" of themselves, and who know nothing of the vague diffusive pleasure which steals over the mind at the first whiff. That tobacco has its Delights is too obvious for remark; that these are so potent as to make men reckless of its Danger is a fact to be deplored; but its opponents have singularly failed in their well-meant efforts to arouse men to the consciousness of these Dangers, because they have made the common mistake of supposing that exaggerations will continue to appall. Every wise man desires to know the perils which surround him, and to know these is neither to underrate nor to overrate them.

CONTRADICTION.

THERE is a story told of some queen — we think Queen Anne — that, walking in Windsor Park with one of her maids of honor, she condescended to remark to her companion, "There is a man." "May it please your Majesty," the lady ventured to say, "I think it is a tree." "No; it is a man," was the confident reply; and they walked on till they reached, in fact, the stump of a tree. "I *said* it was a man," was the Queen's satisfied conclusion, in the unshaken conviction that it was impossible she should ever be mistaken. We can only expect to meet with so complete a victory over fact and common sense, so sublime a reach of self-reliance, in kings and queens whose word has been law from their cradle; but most of us have had experience of persons nursed by adulation into such a habit of self-confidence, that, if they once took a stump of a tree for a man, they could stand by their mistake, to the extent of maintaining it the right thing to have done.

They would persuade themselves that it argued nobler powers, a loftier imagination, a more comprehensive glance, and a finer sense of the picturesque than to take the thing for what it was; that, in fact, the real blunder lay with the prosaic nature which saw a stump and nothing more. The practical use of such experience may not be very agreeable to our self-love at the moment, but it helps to reconcile us to contradiction, as an indispensable corrective to human pride and necessary to sanity. People who are never contradicted, or who resolutely resent and reject any forcible opposition to their ow