

Original Articles.

ON THE HABITUAL USE OF POISONS.¹

BY A. H. JOHNSON, M. D., SALEM.

IN consenting to present a paper to this Society on the Habitual Use of Poisons, I had little thought of the difficulties in the way of obtaining facts from which to derive any valuable conclusions. Otherwise I should have declined to attempt what must inevitably prove a work of little value.

The learned works of Taylor, Woodman and Tidy, Reese, and many other toxicologists, give brief space to the discussion of our subject, not because of its relative unimportance, but manifestly because of a lack of such knowledge as would justify them in more positive statements. The nature and magnitude of the questions involved give it an appalling intricateness and extent. These questions will probably never admit of more than an approximate solution, and such a solution is to be reached through years of laborious research and experiment. With no practical knowledge of toxicology or chemistry, beyond what is common to nearly every regularly educated general practitioner, it is not to be expected that I can contribute anything to elucidate a subject which such experts find themselves compelled to treat meagrely. Therefore in what follows you will find rather a statement of a subject for investigation than its discussion. Whatever of good may come from such a paper as the present must result indirectly from its exhibition of such ignorance that the feeling of dissatisfaction it creates may awaken a profitable spirit of inquiry.

The numerous definitions of the term poison illustrate Dr. Taylor's statement that "in legal medicine it is difficult to give such a definition of a poison as shall be entirely free from objection." In popular parlance a poison is a substance which, when taken into the human system *in small quantities*, will impair health or destroy life. But many poisons, like nitre or oxalic acid, prove fatal only when taken in doses of from one half an ounce to an ounce. All writers on toxicology that I have consulted, apparently agreeing with the statement of Woodman and Tidy, that "half an ounce can hardly be called a small quantity," avoid the exclusiveness of the popular idea by using in their definitions terms so general that they cease to define.

Webster declares a poison to be "any agent capable of producing a morbid, noxious, or dangerous effect upon anything endowed with life." Dr. George M. Beard, in his work on stimulants and narcotics, adopts this definition as his own, saying that "the qualification 'in comparatively small quantities' or 'in quantities not very bulky,' might be added, but it is not essential to the definition." According to this the term poison is made to include heat and cold, and the most harmless articles of food. For the most simple food, if used to excess, may prove "capable of producing a morbid, noxious, or even dangerous effect upon" the body. Thus Dr. Taylor tells us of a young woman who died in consequence of a peritonitis brought on by over-distention of the stomach, produced by eating a quantity of raw rice mixed with milk, yet neither rice nor milk nor the two combined are poisons. Reese, in his work on Toxicology, defines a poison to be "a

substance capable of producing noxious and even fatal effects upon the system, no matter by what avenue it be introduced, and this as an ordinary result in a healthy state of the body, and not by mechanical action." Chloride of sodium has proved a fatal poison in doses of from one half a pound to a pound, yet this is not an ordinary result of the use of common salt. It is one of the constituents of the body, and health cannot be long maintained when it is excluded from the daily food. The same objection also applies to this definition as to the one already quoted, namely, that some of the simplest articles of food are, when used to excess, "capable of producing noxious and even fatal results." Dr. Taylor gives the following comprehensive definition: "A poison is a substance which, when absorbed into the blood, is capable of seriously affecting the health or of destroying life." This also includes so much as to lack definiteness, for excessive use of food may seriously affect the health. Dr. Lethely's definition, adopted by Drs. Woodman and Tidy, is as follows: "A poison is anything which otherwise than by the agency of heat or electricity is capable of destroying life, either by chemical action on the tissues of the living body or by physiological action from absorption into the living system." This, the least objectionable of the definitions with which we are acquainted, is still too inclusive for the reason already frequently repeated.

There is a truth in the popular idea of the meaning of the word poison which a correct definition of the word will preserve. The truth, namely, that evil resulting from the physiological action of some substances is so frequently seen that it is their most conspicuous attribute. The idea of possible impairment of health or of death resulting from their use should always attend their administration, and lead one to carefully restrict the quantity and frequency of the doses employed, and to seek their earliest possible discontinuance. Their use for physiological purposes is warranted only in conditions where their power to exalt or depress special functions may be used to regulate functions already disturbed by morbid action.

I submit the following definition, which sufficiently limits, at the same time that it explains, the application of this word poison: A poison is a substance which, when in any way absorbed into the human system, has so dangerous a power to pervert or arrest the bodily functions that to avoid these evils its entrance into the system must be carefully restricted. This definition, while sufficiently elastic to include all substances properly treated in a work on toxicology, also excludes the innocuous articles of food which can become injurious only when used to gluttonous excess. It also keeps prominent the baneful action of certain substances which secures for them the name "poisons." It is this well-known characteristic which leads us to notice with astonishment and curiosity that some persons habitually use them.

By habitual use we mean a use which is continued at frequent intervals, through many months or years, in obedience to a constitutional or acquired craving, originally begotten by the action of the substance taken.

Conspicuous among the drugs thus used are opium and its derivatives, alcohol, absinthe, tobacco, chloral, and arsenic. It will be with special regard to the action of these articles that the statements of this paper will be made. It certainly would be a waste of time to take space to prove that each one of the above-

¹ Read before the Massachusetts Medico-Legal Society, February 1, 1892.

named drugs has been and is habitually used. Concerning the first four of them the fact is too patent and familiar, and abundantly attested by many medical writers. Concerning the remaining two, we have for one, namely, chloral, the recent thorough investigation of Dr. Kane, published in his book entitled *Drugs that Enslave*, and for the other the statements of Drs. Vogt and Von Tschudi, substantiated by Mr. Heisch and Dr. Von Vest, and confirmed beyond a peradventure by the investigations and statements of Dr. Roscoe, Dr. Knappe, of Styria, and Drs. Rutter and MacLagan, of London, in 1864. So that Dr. Taylor, who, in an earlier edition of his work on *Medical Jurisprudence*, styled the accounts concerning arsenic eating as absurd and exaggerated, in his last edition admits that they are founded on respectable authority. The testimony with reference to the existence of the arsenic habit is succinctly stated by Dr. Stillé in his work on *Materia Medica*.

Nor would it be in place here to enter upon a statistical investigation to show the extent to which these habits prevail. For in the first place such statistics have been already presented by recent writers, conspicuous among whom are Drs. Calkins and Kane, and in the second place it cannot be claimed for such statistics that they present the facts with more than a very rude approximation to accuracy, owing to the secrecy with which these habits are indulged, the untruthfulness of the parties addicted to them, and the reluctance of dealers to acknowledge the extent of their illicit traffic in these drugs; and third, because the practical result of such an investigation for this Society would simply be to prove, what needs no additional proof, namely, that many powerful narcotics and stimulants are by many persons habitually used. Moreover, the work of gathering such statistics belongs rather to the sanitarian, the philanthropist, and political economist, who seek to adapt corrective measures to the magnitude of the evils they seek to reform.

We propose simply to comment upon some of the questions to which the well established fact gives rise.

First, concerning questions relating to the physiological action of poisons. It is evident that this question cannot in all cases be answered by our present knowledge of chemical action. One of the most inexplicable marvels among physical and vital phenomena is the contrary effects which are produced by changes in the adjustments of the molecular constituents of elements. Carbon, hydrogen, oxygen, and nitrogen are each essential components of healthy living tissue, yet a minute quantity of hydrocyanic acid, composed of the apparently harmless elements, carbon, hydrogen, and nitrogen, proves a poison so instantly deadly as to allow no analysis of the method by which it arrests life. Atropine, morphine, strychnia, nicotine, nitroglycerine, alcohol, chloroform, etc., prove fatal in small quantities, although composed of carbon, hydrogen, nitrogen, and oxygen, elements which we must breathe, and eat, and drink in gross measure each day of our lives. Hence the fitness of any substance which is habitually used, to be esteemed valuable as an article of food, is not to be determined by the fact that chemical analysis shows that it is composed of the very elements which the body requires. Only the most careful and prolonged observation of the effects produced upon human tissues and functions by the use of a given substance can warrant us in declaring for or against its harmlessness, its usefulness, or its baneful character.

Nor can the fact that there is a general craving for certain articles correctly indicate that they are, aside from a medicinal use, promotive of health and longevity. One might think that it was superfluous to make this statement, yet we find writers appealing to this fact to prove that the widely extended use of certain narcotics and stimulants indicates that they meet a want which is instinctive, and hence whatever is used in obedience to an instinct is not only safely but needfully appropriated.

Anstie in his work on *Stimulants and Narcotics* says, "It is idle to urge that the subject of a carefully prepared experiment can be made to live in apparent health without the use of any of the substances vulgarly called narcotics, if the practical fact be that *nations cannot* and never have been able to do without them." If by this we are simply to understand that national laws have not availed to abolish the use of narcotics, we can receive it without objection, but at the same time fail to see that this fact indicates that nations *need* to use narcotics to maintain their physical or moral health. If on the other hand it is asserted that nations are, and always have been, unable to keep their people up to their largest measure of vigor without the habitual use of narcotics, the assertion is open to quite as much evidence against as in favor of its truthfulness. Nor is it quite in keeping with the experience of a multitude of intelligent observers, that those who use none of the so-called narcotics, are simply made to live in apparent health. For often the fresh vigor and endurance of one who strictly avoids all narcotics and stimulants contrasts most favorably with the physical powers of those who use them.

Among some statistics, Anstie quotes from Von Bibra the statement that all the known nations of the world are addicted to the use of tobacco. But it is scarcely three centuries since Sir Walter Raleigh and others at the court of England, by using the tobacco brought from Virginia by Sir Francis Drake, fairly introduced to Europe the custom of tobacco-smoking. Since then these nations cannot do without it, but none would think of claiming that tobacco has given modern nations any intellectual or physical superiority over the ancients. What one writer says of tobacco is probably true of all other narcotics, aside from their medicinal use, namely, "Moderation is always safe, and total abstinence can do no harm."

Moreover, there is a great error in concluding that an instinctive desire will always express itself in healthful customs. The pleasure associated with the gratification of the appetites, while it secures the use of the means for preserving and procreating life, is always a temptation to over-indulgence. Reason and virtuous resolve restrain many from an injurious stimulation of their nerves. But the tendency and practice of by far the larger number of men is to gratify their appetites with more regard to present pleasure than to possible results. Especially is this true if the evil of any practice has only an insidious and protracted approach, and in persons with exceptionally vigorous constitutions is unapparent.

Among some of the natives of tropical regions, there is a widely prevalent custom of eating certain varieties of earth or clay. Of the Otomoes on the Orinoco Humboldt says, "They undoubtedly consume large quantities of clay, without injuring their health." We have similar accounts of tribes in Western Africa, in Eastern Asia, and in northern parts of Sweden and Finland. This

practice, once formed, we are told, is tyrannical, so that in many cases no punishment is sufficient to restrain those addicted to it. It is referred to by Ribot as presenting a curious instance of morbid heredity. The children of these earth eaters, according to A. von Humboldt, have often to be locked up to prevent them from running out after recent rain and eating clay. "He saw an Indian child at the mission of San Barjoe, who would eat hardly anything but earth; the child in consequence looked like a skeleton." This custom illustrates, first, the fact that the instinct to gratify natural hunger may misdirect to the use of materials which chemical analysis shows have no properties essential to nutrition. And, farther, that inherited instinct may involve a passionate fondness for substances the eating of which begets emaciation and weakness. In the same way, the widely prevalent use of narcotics simply shows their fascinating effect upon the nervous system and the great power of the artificial appetites they create, qualities which would insure their extensive use, even were the evil effects much more conspicuous, prompt, and certain.

As already remarked, the useful or baneful effects of certain substances when absorbed into the system must be determined not merely by the fact of their chemical constitution, nor from the existence among many nations of cravings for the effects they produce, but from a study of their action upon the bodily functions and tissues.

The results of such a study of the poisons we have enumerated have been presented by many competent scholars and observers, and are accessible to each member of this Society in the many modern works on *materia medica* and toxicology. With the statements of these writers we assume your familiarity. We do not propose to recapitulate them in detail. By them we are made acquainted with two conspicuous facts. One that they all have power, and most of them in very small quantities, to pervert or even arrest the bodily functions. The other, that most of them have been and are, by some persons, habitually taken for years in doses ordinarily fatal to one unaccustomed to use them.

Are we therefore to conclude that these articles have two methods of action? or is the difference in these instances simply due to greater or less degree of action, and to greater or less constitutional power of resistance? To determine this point we must have regard to the facts by which we determine the action of poisons. These facts are of two characters; first, those which reveal a modification or disturbance of function; second, those which reveal actual changes in tissues. We find with reference to most of the poisons habitually used, that their special effects upon the tissues, in cases of acute poisoning, elude the eye even when aided by the microscope; and that in chronic poisoning from the same drugs, the post-mortem appearances are those due to a general perversion of nutrition. Even alcohol may destroy life, and leave no organic traces of the method by which it proved fatal, although in chronic alcoholism many structural changes due to its action are found. Even arsenic when fatal by no means always produces destructive changes of tissue to indicate how it destroyed life.

From these facts it is quite evident that as chemistry cannot instruct us as to the safety or danger of taking any substance, without regard to its previous trial upon the living subject, so neither can the microscope tell

us what the action of a poison has been without reference to the symptoms it has evoked. But inasmuch as in the grosser action of some poisons like alcohol and arsenic we find organic changes which underlie the symptoms exhibited, and in the action of opium and tobacco detect first, derangement of function, and later, wasting of muscular tissue, which express the direct and indirect action of these drugs; I think we are right in inferring that poisons, in whatever quantities used, powerfully pervert the normal cell life of the body.

In these days we all conceive of functional activity as due to vital changes in cells, to whose activity the different organs, tissues, and fluids of the body owe their special character. So that there is no change of thought, sensation, or motion, or of nutrition, or general condition, which the physiologist does not recognize as an expression of the vital changes in the myriads of cells of which the body is composed. Yet we cannot demonstrate to the eye the differences in the functional properties of cells. These we must learn from the special work of the organ to which they belong. This is peculiarly true with reference to the various nerve centres, whose intricacy and delicateness of structure and function not only remove them from exhaustive examination, but even if every cell of every nerve ganglion could be inspected, its normal or its pathological condition might prove as invisible as the magnetic or non-magnetic condition of the molecules of a granule of iron. So although we cannot demonstrate the physical changes produced by a poison in the cell life, which is essential to the performance of any function, we feel no less confident that these changes are present, and that they may often more seriously compromise healthy nutrition and function than some grosser forms of organic disease.

With these facts before us we regard the action of poisons as of the same nature under all circumstances; namely, as due to the molecular changes produced in the fluids and solids of the body, and in the cells which compose them. When these molecular changes reach a sufficiently high degree, they may reveal their existence by structural changes discoverable by the microscope or plain to the unaided eye. But long before this may occur life may cease to be possible.

The extent to which such agents do harm cannot be in every case demonstrated. But that they have in all cases the same power, through strictly physical action, to pervert or modify function, must be borne in mind.

Inasmuch as we must in most instances learn their action from the symptoms they evoke, rather than from visible structural changes, we should study the tendency of their effects upon those sensitive yet healthy constitutions which best reveal them,—as the electrician makes use of the galvanometer to detect the existence and character of the galvanic current. This class, comprising as it does nearly all the female sex, and nearly all who have not passed the period of adolescence, and a very large proportion, if not the majority, of the mature males, forming as it must so large a majority of the human family, should really be the standard by which we pronounce upon the safe and beneficial employment of narcotics and stimulants. When tested upon such constitutions we learn their alarming power to limit and derange healthy bodily life.

That in certain peculiarly robust constitutions, the evil of their working may be masked by an appearance of

great health and energy is by no means conclusive evidence that the narcotic or stimulant used has done no harm. The word often used concerning such cases expresses the truth. We say such an one tolerates a large quantity of his favorite narcotic. That is, the system sustains a burden imposed, and is not being supplied with that which best supports its energies. From the existence of physical evil, produced from the known action of a poison in thousands of persons who would be otherwise healthy, we rightly infer the power of the same agents to produce evil effects in all. The statement of Dr. Beehm well expresses the truth; namely, "the tolerance of a poison indicates a permanent change in the activity of organs which at first resisted its administration."

We all know that it is possible for extensive impairment of important structures to occur without such failure of psychical or motor powers as to destroy clear thought or vigorous action. The degree to which such impairment of powers can be tolerated by any constitution depends upon its measure of reserve force. Compensations for injuries sustained, and readjustments of the relative activity of different organs, can occur very often in some persons, not only without arrest of life, but without great curtailment of its useful activity. But on the other hand, troubles long concealed may at last express themselves, as it were, explosively, when the limit of comfortable endurance is passed. This is illustrated by a remark of Mr. Travers when giving testimony as a witness, and quoted by Dr. Taylor, — to the effect that a man may have pursued an intemperate course for some time, and yet his appearance indicate the plenitude of health, even when he is liable to an immediate attack of delirium tremens. This fact is also illustrated by the period of incubation of specific diseases, during which we have no knowledge of the injurious working of the poison, which nevertheless goes on until its intensity is such as to give rise to disturbing symptoms. Even after apparent health is restored, the existence of an irreparable injury to his constitution may confront one in perversions of development in his children. In like manner the fact that the stimulant narcotics have done their evil work in any person's system may become first apparent in some disturbance of the nervous system in children's children, so that the remark is frequently quoted, "Gout is a disease which the fathers have all the fun of acquiring, and the children all the misery of suffering." And Ribot, after remarking that the passion known as dipsomania, or alcoholism, is so frequently transmitted that all are agreed in considering its heredity as the rule, quotes the instance of a man belonging to the educated classes, and charged with important functions, who succeeded in concealing his alcoholic habits from the eyes of the public, while his family were the only sufferers by it.

The medico-legal importance of a correct knowledge of the action of poisons which are habitually used appears in their effects upon longevity.

Whether aside from a medicinal purpose they can be wisely used, and if so, to what degree, before the boundary of temperate use is passed, and health and length of life are imperiled, are questions to which men of different customs and opportunities for observation return different answers. But it is a very significant fact that sound life insurance companies require an answer from applicants to some form of the question, "Are you now and have you always been of

temperate habits of life?" A question which is understood to have special reference to the use of stimulants and narcotics.

If the medical expert is required to testify as to what constitutes a temperate use of these articles by a healthy person, he finds himself unable to give any precise reply. The degree of toleration of these powerful agents must be determined by the result of individual experiment and not by any precise rule.

The popular definition of intemperance exhibits the most ludicrous variations. To many it is simply a question of the quantities in which, and the frequency with which, a stimulant is consumed; to others, a question of ability to take large amounts of stimulants without apparently losing control of their faculties. Illustrations of absurd testimony as to the meaning of intemperance may be found in Dr. Taylor's work on Medical Jurisprudence.

But the expert very well knows that such is the power of these agents that to a very large proportion of human beings the smallest indulgence in their use, except as a medicine, is injurious, and therefore intemperate; and that what to a very large class of men appears to be moderate indulgence, is too great to remain without effect in seriously perverting nutrition.

The popular judgment seldom considers a man intemperate until he begins to show the evil results of the habitual use of some poison by his slavery to his appetite, and neglect of business duties or social proprieties. But this popular judgment is far too tardy. The injury to the nervous system, of which such injurious practices are the expression, is being slowly wrought for years before the popular verdict is pronounced.

Estimates of the effect of stimulants and narcotics upon longevity are generally based upon their excessive use. But this excess is a result of their peculiar power and special action. The symptom of excess is so frequent a product of their moderate use that it should itself affect our judgment as to the perils which any degree of moderate use may bring to health and length of life.

It is customary with some writers when discussing the effects of poisons that are habitually used, to adduce many instances in which, notwithstanding a liberal use of narcotics and stimulants, life with a large measure of vigor has been protracted to great age. But the weight of such evidence is impaired from the fact that we are not made acquainted with the family history of such persons. As Ribot tells us: "It is now generally understood that longevity depends far less on race, climate, profession, mode of life, or food than on hereditary transmission. We find centenarians among those who have led the hardest lives, as well as among those who have taken the greatest care of their health. A collier, in Scotland, prolonged his hard and dreary existence over one hundred and thirty-three years, and worked in the mines after he was eighty." Inherited longevity will assert itself above many influences generally fatal to a high average duration of life.

By application of this law of nature the number of those whose health and life have not been limited by the habitual use of poisons would probably be so reduced that the remaining number would have but small significance against the multitudes of sensitive constitutions which have been and are sure to be shattered by such habits.

Our conclusions, therefore, respecting the effects of the habitual use of poisons on longevity are more likely to be correct when based upon the known power of these agents to pervert nutrition, than when based upon appearances of undiminished health in some users of them. Whatever may be our doubts about the injurious effects of small quantities of narcotics and stimulants upon the system, we should have little hesitation in declaring that when they are long used, and in large doses, they must, in the vast majority of cases, impair health and shorten life, so that the life of any person addicted to such habits is exposed to such additional risk that it cannot be safely insured without great increase of the normal rates. And should an applicant for insurance, when required to state his habits with reference to stimulants and narcotics, conceal the fact that he is an habitual user of them, his executor may justly find, as several have *actually* found, payment of a policy so obtained, refused.

Medico-legal questions of grave importance are likely at any time to arise from the effects which the habitual use of poisons may have upon mental disposition and capacity, with special reference to management of trust property, legal responsibility, and testamentary capacity. Some of these questions were so recently clearly treated by an associate member of this Society that I limit myself to one phase of this prolific theme, namely, to the power of the habitual use of a poison like opium, or absinthe, or alcohol, to imperil public and private interests, long before either mental capacity or moral responsibility, according to the ordinary use of these terms, is extinguished. The psychical effects of these drugs exhibit protean forms. But underlying these expressions is the fact that by their physiological action they may control mental disposition and character more effectually than the weightiest moral precepts or social interests. While we cannot hold that all mental life is the product of physiological action, we are called daily to recognize the fact that physical agents, when taken into the system, suppress, or exaggerate, or distort the normal mental faculties. It is evident that they must do this by entering the circulation, and by quickening or retarding physical or nutritive changes in the nerve cells of the brain to which the blood is distributed.

It is a familiar fact that the automatic actions of the different cerebral centres, thus awakened or depressed, may, to a greater or less degree, exceed the power of the will to reasonably coördinate them. No previous perfection of mental poise, or reliability, or moral self-control, can give assurance that the *automatic* action of the brain under the influence of drugs will conform itself to the habits in which it has been trained. This action is mechanical, irresistible, often tumultuous. The centres of thought may be stimulated, or unevenly excited, or depressed, and this not in obedience to a volition based upon judgment, but by reason of a physical agent which may keep in dominant activity suggestions and inclinations ordinarily repressed. The result is to pervert mental and moral character by a twofold action; one direct, the other indirect. *Directly*, by the immediate influence of the poison on cerebral action, and the morbid craving for a repetition of its use which it creates; indirectly by the violence to the moral sense, which consciously or unconsciously occurs when once the controlling power of an appetite becomes apparent to its victim, and he realizes that he has educated a constitutional craving into strength, by which

it actually cajoles and dominates his will. When one perceives that the inclinations and deeds called forth by the effects of drugs are departures from the ideals of living which his conscience approves, yet still in obedience to habit incites their repetition, each successive fall brings the conviction of moral cowardice, and remorse, and loss of effort to maintain former standards of prudence or morality. Transformations of character thus produced may proceed until a man's disposition and conduct have undergone a complete reversal before either mental capacity or moral responsibility are extinguished. Especially does this change appear in his disregard of the wise public sentiment which condemns the surrender of his powers to the habit by which he is controlled, and in his indifference to, and sacrifice of, the domestic comfort and social interests of his family.

Suppose the case of one, who, by reason of an established character for business ability and probity, has been selected by a testator to manage, as trustee, a large property. Should this trustee subsequently, by the habitual use of some stimulant or narcotic, change from a watchful, prompt, enterprising business man, of equable character, into a slack, indifferent, negligent, moody, unreliable person, it is manifest that he is no longer the man selected for the trust he holds, although his capacity to transact business may be simply dormant or perverted, unexercised, not destroyed. The removal of such a trustee for a substitute whose characteristics should be like those of his predecessor when first appointed, may be properly prayed for, and the prayer sustained by the most positive medical testimony concerning the power of drugs, when habitually used, to *pervert* the use of the mental faculties, which is often worse than their abolition. Even when the perversions of character are transient, as happens more or less frequently during indulgence in the alcohol or opium habit, the perils from the acts of one under the influence of his favorite poison should insure his displacement from positions of trust.

The effects of the habitual use of poisons or a poison on testamentary capacity may frequently prove a subject for examination by the courts, and is likely to meet an unjust decision unless a more liberal construction of the term "capacity" be allowed than at present prevails.

We are told that a person is considered to be of a sane and disposing mind who knows the nature of the act which he is performing, and is fully aware of its consequences.¹ And again, as in a case decided by Sir H. Jenner, "a person has testamentary capacity who has conducted his affairs with great shrewdness and ability, who does not labor under imbecility, and who has been treated during life as a person of indisputable capacity by those with whom he had to deal."² In cases of habitual intoxication, testamentary capacity has been allowed provided the mind has not been sufficiently enfeebled to render the man incapable of exercising his judgment.³

A similar decision was given quite recently in a suit against the estate of John Hooper, of Marblehead, by Judge Choate, of the probate court of Essex County.

That gross injustice may occur from decisions based on these grounds is apparent from the fact that great estrangement of affection and perversions of natural

¹ Taylor, page 824.

² *Ibid.*, page 827.

³ Taylor, page 829.

character may take place without imbecility or limitation of shrewdness. This may be shown to have resulted in some instances as the direct consequence of the alcohol or opium habit. It may be shown that slavery to some stimulant or narcotic has turned a devoted husband and exemplary father from a lovely wife and children to live with harlots. It may be shown also that the kind efforts of wife and children, continued with much long suffering and patience, to turn him from his habits, have only served to intensify feelings of hostility toward those who have the strongest natural claim to his love and help. If, then, as the result of such an estrangement from his family, he should will his property to comparative strangers and companions in vice, why should not the court decide that a mind not enfeebled but controlled by the perverting influence of a drug cannot hold the legal right to alienate the property interests of legal heirs without just cause. If a will may be set aside on the plea of undue mental influence, why not also, when the undue influence comes from a physical agent like opium or alcohol. If also during life it is lawful to protect the property of an inebriate's family, by putting him under guardianship, why shall not the law exercise the same judgment concerning the justice of his acts when, owing to the action of poison in his blood, he makes an unnatural will, although no mental imbecility, in the technical sense, can be proved.

In addition to the medico-legal questions which arise from the direct effects of some poisons, when habitually used, grave legal complications arise as an indirect result of such habits. First, the acquired toleration of a poison, like opium, or chloral, or arsenic, in doses greatly exceeding those ordinarily fatal, might cause the system to successfully resist a dose given with murderous intent. In such a case if it be shown that the preservation of the victim was due to an acquired habit, and that the drug administered would in the great majority of instances produce fatal sickness, the immunity of the person poisoned would not palliate the felony of the poisoner.

On the other hand, concealment of the opium or chloral habit may lead to the innocent administration of a fatal dose by some friend or physician who is unaware of the quantities already taken.

Questions of malpractice might easily arise from the peculiar susceptibility which the habitual use of one poison may beget to another. Thus one addicted to the chloral habit may become specially sensitive to the effects of alcohol or opiates, while the power of chloral and morphine to intensify each other's action may cause an otherwise innocuous dose of chloral to arrest life.

The degree to which one poison may limit the action of another may assume a very critical importance in cases where a poison has been habitually used. Thus, while the extreme limit of time before the special effects from a poisonous dose of arsenic should appear is sixteen hours, Dr. Taylor quotes a case reported by Mr. Clegg in the *Medical Times* for October, 1848, of a girl who showed no symptoms of violent irritation from arsenic until twenty-three hours after the dose was taken.

Those who are habitual users of some poisons are more liable than others to sudden death. This may be due to the so-called accumulative action of poisons, or to the exhaustion of the power of functional compensations, or to the acquirement of susceptibility to a

poison, or to the advanced destruction of tissue due to the habitual use of a poison which has been apparently well tolerated, or to a rash increase of the dose beyond the system's power of resistance.

In many such cases a suspicion of suicide or murder is likely to arise. The fact that the deceased was in the habit of freely using a poison in doses ordinarily fatal, may either divert suspicion from an actual murderer or unjustly fasten a suspicion of crime on an innocent person. If the habits of the deceased are known, the possession, use, and fatal effects are reasonably accounted for without necessarily criminating others who may nevertheless be guilty. On the other hand, if the deceased has concealed his habit, the presence of poison in his tissues after death, as when arsenic has been taken, and in the possession of one associated with him during his last illness, may lead to the arrest of an innocent person for murder. The general principles controlling such cases have received discriminating comment from Dr. Taylor, but each case will produce its interesting complications to be unraveled in the light of its special circumstances.

Our treatment of our theme thus far includes the following items:—

(1.) A definition of poisons designed to make the danger from their use conspicuous.

(2.) Recognition of the fact that they are largely habitually used.

(3.) That their fitness for such use cannot be determined by chemical analysis.

(4.) That a widely prevalent craving for them cannot indicate that they have value as food.

To which we might have added that did they contain the constituents for nutrition, the quantities in which they are taken would give them trifling value in comparison with ordinary food.

(5.) That as the physiological action of poisons cannot be determined by chemistry, so neither can it in all cases be determined by the microscope, but that

(6.) Reasoning from the gross changes of tissue they often produce, and from physical analogies, we rightly infer their power to pervert or control the cell life of the body.

(7.) That their real effects and power must be determined by the symptoms their physiological action evokes.

(8.) That our generalization from such symptoms should be made from their effects upon the more sensitive constitutions, which form the vast majority of the human family.

(9.) That tested thus, they reveal such evil power that we conclude they must have a similar influence upon all, and that in more robust constitutions the evil they work is masked by compensations made possible by a higher degree of vigorous life.

(10.) The medico-legal importance of our topic is noticed (a) in comments upon the method of examining the effects of an habitual use of poisons upon longevity, with special reference to life insurance; (b) in comments upon the effects of an habitual use of a poison upon mental disposition and capacity, with special reference to management of trusts and testamentary capacity.

(11.) As the indirect result of the habitual use of poisons we noticed:—

(a.) That acquired toleration of a poison in doses ordinarily fatal may cause the system to successfully resist a dose given with murderous intent.

(b.) That the concealment of a habit of using a poison may lead to the innocent administration of a fatal dose.

(c.) That the degree to which one poison may limit the action of another may have great importance in determining whether or not a poison has been feloniously used.

(d.) That in the case of the sudden death of an habitual consumer of poison, the habit, if known, may conceal an actual murder by poison, or, if unknown, may give rise to unjust suspicion.

With this fragmentary and very general treatment of our topic, which has exceeded the limits custom assigns to papers for these meetings of your Society, I leave it to receive more instructive elucidation at the hands of those who have better opportunity to give to it the thorough investigation it deserves.

THE WORK OF THE BOSTON BOARD OF HEALTH.¹

BY S. H. DURGIN, M. D.

THE Board of Health as at present constituted was provided for by City Ordinance in December, 1872, was appointed in January, 1873, and has therefore been in existence little more than nine years.

It consists of three members, appointed by the Mayor for three years each, and confirmed by the City Council.

The establishment of this Board was to a large extent brought about by members of this Society, while the small-pox epidemic of 1872-73 furnished the immediate cause. It derives its authority from the statute laws and city ordinances, and under the former it is instructed to make such regulations as it judges necessary for the public health and safety respecting nuisances, sources of filth, and causes of sickness.

Its duties are to enforce the health laws and ordinances, and to make and enforce such regulations of its own as will secure the greatest comfort to the inhabitants and immunity from disease.

The office, in Pemberton Square, is open for the transaction of business from nine A. M. till five P. M. daily, except Sundays and holidays, when it is open from ten to twelve A. M.

The officers and employees of the Board are as follows: There are four clerks and a messenger in the office; a city physician and assistant; a port physician and assistant, with ten officers and employees in quarantine; a superintendent of health, with four hundred and seventy-six officers and employees; one medical and nine other inspectors; eight superintendents of burial grounds; five attendants for public bath-houses; a superintendent of the city morgue; one inspector of live animals and meat at the abattoir in the Brighton District, and a changeable number of nurses and attendants at the quarantine hospitals, at Gallop's Island, and the Small-pox Hospital in the city.

The duties of the City Physician and assistant are to render all necessary medical aid required at the Jail, the Court House, and Temporary Home in Chardon Street; to vaccinate and re-vaccinate all who apply for it at the office in Chardon Street from ten to twelve daily; to examine all applicants for appointment in the police and fire departments; to investigate and report

the cause of death of persons dying without a physician in attendance; to examine cases of reported small-pox before sending to hospital, and to perform such other duties as may from time to time be required by the Board of Health.

The Port Physician and assistant are stationed at Deer Island and have the immediate charge of quarantine, and have additional work in the institution hospitals at Deer Island.

The Superintendent of Health has charge of cleaning the streets, collecting offal, ashes, and house-dirt, and performs such other duties as may be required by the Board of Health.

The functions of the Board as prescribed by the laws and ordinances may be classed under two heads, special and general. Under the head of special we may mention that the Board provides and operates a quarantine for infected vessels in the harbor, hospitals for quarantinable diseases at Gallop's Island, and a hospital for small-pox in the city. It has the care and custody of all the public burial grounds in the city (fifteen in number), must keep them in good condition, free from nuisances and trespassers, and may point out the place, depth, width, and range of all graves therein.

It has the special care and regulation of the Brighton Abattoir, and provides an inspector to see that none but healthy animals are slaughtered, and that the regulations of the Board are strictly obeyed.

It has the oversight and regulation of lying-in hospitals, which are licensed only on the recommendation of the Board of Health, and of the baby-farms, and prosecutes those who attempt to maintain such institutions illegally. It has the care and maintenance of the public bath-houses (sixteen in number), and provides them with superintendents for the care of the bathers and the enforcement of its regulations.

It provides the public urinals and closets along the streets and in the public inclosures, and furnishes them with the supervision necessary for cleanliness and the convenience of the public. All licenses for collecting grease and bones, peddling fish and lobsters in the streets, removing stable manure, storing and curing hides and horns, and keeping cows, goats, swine, and fowls, are granted by the Board of Health, and conditions are imposed with each license in the interest of cleanliness. All contracts with the city for the removal of night-soil and cess-pool contents must be approved by the Board, and the execution of the work as well as the cleaning of the streets, collecting of ashes, offal, and house-dirt must be done to the satisfaction of the Board.

It must assign places for the exercising of offensive trades, and may prohibit the same in places not so assigned.

It must provide immediately for any person who falls ill with a disease dangerous to the public health, and may enforce the vaccination or revaccination of all such persons as cannot furnish satisfactory evidence of successful vaccination within five years.

It approves the certificates of the causes of death, and furnishes such certificates when they cannot be properly obtained elsewhere.

It reviews the acts of the Inspector of Provisions, who is appointed by the Mayor, and decides all cases of appeal from his acts.

Under the head of general duties, a very large number and variety of nuisances are comprehended by the

¹ Read before the Suffolk District Medical Society, May 10, 1882.