the temperature gradually falls to death, at which point it is many degrees subnormal. Clinically, this is shown by cold extremities at the commencement, followed by general coldness of the whole body-surface. I have never seen shivering excited by cold air, however: a fact not without interest.

It is difficult to express, by *seriatim* discussions of aberrant functions, the full force of the symptoms exhibited after thyroidectomy; but those conversant with the appearance and bearing of myxœdematous patients will have no difficulty in recognising a parallel condition, in which, however, some symptoms, for example, the tremors, are more exaggerated than in the human being.

Possibly, the mere rapidity of death may seem to some the most striking result, considering the hitherto undreamt-of importance of the thyroid gland; but, although the *post mortem* appearances about to be described may seem inadequate, it must not be forgotten that the perversion of nutrition indicated thereby is really profound, and is the result of a small but constantly acting force.

THE PLACE WHICH ALCOHOLIC DRINKS SHOULD OCCUPY IN THE TREATMENT OF DISEASE.

Read at the Hunterian Society.

By ALFRED CARPENTER, M.D., M.R.C.P. Lond.

I NEED not apologise for bringing this subject to your notice. It is one of the burning questions of the day, and likely to stand in the first rank, both politically and therapeutically. As citizens of a free country, we must not refuse to look at its political aspect, and to form our opinions according to the evidence which may be forthcoming as to the conditions under which the sale of such articles as wine, spirits, and beer may be carried on; but I shall avoid that side of the subject on this occasion, and restrict my observations as much as possible to the therapeutic value of these agents. I cannot shut my eyes to the necessity which exists for accurate information upon this point; a fearful responsibility rests upon our profession in this matter, and it must be faced. Our duty is threefold.

First, as members of a great commonwealth, which must override every other consideration, we must be just and honest men first, we must be true citizens. We must not do evil that good may come, in spite of any teaching to the contrary. The end will never justify the means, if the means be wrong.

The second duty is to our patient. He engages our services for a twofold purpose; first, to cure him of his disease; and, in the second place, to prevent its recurrence. The therapeutic duty is not the only one which we have to perform. If a workman be sent for to stop a leak in a water-pipe, and he content himself by plugging it with some material which stays the leak, but which is dissolved by the water, so that the waste is, sooner or later, renewed, that workman fails in the duty for which you employed him. He must not only stop the waste, but prevent its recurrence. It is so in the treatment of disease. The physician has only done a part of his duty who limits his work to the removal of the present set of symptoms, but gives no instructions for the purpose of preventing their recurrence. If he give advice which may be beneficial for to-day, but which is certain to be pernicious if it be persevered with beyond a stated time, he has only done half his duty, and that half badly.

The third and last duty of a physician is to himself, as regards pecuniary reward. He must place this in the last rank, and not in the first position. Self must be put aside. The man who follows these rules will be a blessing to his patient, and will assist to guide his country through one of the greatest dangers which can possibly beset a nation in its battle with the drink evil.

Having made these few observations upon duty, I will go to the special object for this evening's discussion.

It is now nearly seven years since I had the privilege of delivering the oration to the Medical Society of London. In that address, I endeavoured to show that alcohol in all its forms was unsatisfactory as a diet, and that its daily use by men in health ought not to be encouraged by the earnest followers of the healing art. I was then supported by one of the greatest authorities of the time, who wrote to me a few days afterwards, and said "that he agreed with every word that I had spoken in that address, excepting, however, two lines," in which I had stated that I could not advise an old man accustomed to take wine daily to give it up. That same authority has reiterated his

view within the last month. I refer to Sir A. Clark. He says, "a healthy man is better without alcohol, which agent is not a helper but a hinderer to work." I am glad to find that Sir Andrew is very decided upon this point, as decided now as he was seven years ago. The experience of the past seven years has not led me to modify the view that I then held, but, on the contrary, to render it even more decided than it was in 1878. A close observation of effect, on families and individuals, tells me that my views, as then expressed, are essentially right on this point. I propose on this occasion to consider the position which alcohol should occupy in the treatment of disease. Before, however, we can thoroughly assess its value in the cure of disease, we must be quite certain as to its physiological action in healthy tissue. I shall, therefore, ask you to allow me to trace its physiological effect, then to consider the pathological consequence which may result from its regular and irregular use, and afterwards detail the class of cases in which it is accustomed to be used, and in which it may or may not produce beneficial effect. Having considered the physiological action, we shall then be able to say whether it does good or evil as usually presented. Finally, I propose to point out the cases in which it may be of inestimable benefit, if rightly used, and if rightly discontinued when its effect has been secured.

Physiological Action.—Take absolute alcohol, its formula being C_2H_5O ; it is an oxide of the radical ethyl. It is not met with as such in ordinary circumstances, but it is better known to us as proof-spirit. This is defined by law as a mixture of water with 49.24 per cent. of alcohol. Every 0.5 per cent. of alcohol above this corresponds to one degree over proof. Concentrated alcohol acts as a poison in whatever way it may be administered, and numerous instances are on record in which death has been rapidly produced by it, its attraction for water being the real cause of this effect. Half a pint of gin has proved fatal to an adult. Works on toxicology give numerous instances in which death has been brought about in from two to six hours, and in some cases it has been almost instantaneous in its effect.

There may be intense coma; convulsions are not uncommon; and occasionally the symptoms have all the characteristics of an irritant poison, according to the tissue affected by it. Indeed, an early, free, and active vomiting, succeeded by a sound sleep, especially if it be accompanied by profuse sweating, may be the saving of the patient's life when a deadly dose has been given.

The symptoms of alcoholic poisoning vary somewhat according to the habit of the person affected. They are immediate and decided in the total abstainer, whilst, in the habitual drunkard, at one time a large quantity produces but little effect, but at another, especially after a time of abstinence, a much smaller quantity of liquor sets up a series of symptoms which end in delirium tremens and death. I need not give you all the points in connection with this side of the subject. I cannot do better than refer you to Dr. V. Magnan's work on *Alcoholism: the various Forms of Alcoholic Delirium, and their Treatment*, which has been translated by Dr. W. S. Greenfield, entirely without reference to the temperance-question. If you will study that wonderful work, and follow the thirty-nine separate cases which are given in minute detail, and in which the symptoms have varied considerably, you will be perfectly satisfied as to the toxic character of alcohol in all its forms. The perfect pictures which the author has drawn of its numerous phases, and the ramifications which arise in its development as an irritant or narcotico-irritant poison, are described by a master hand.

Dr. Tidy says, in his *Handbook of Forensic Medicine*, "Alcohol acts as a true poison, whether the vapour be respired or the liquor swallowed, or injected into the cavity of the chest or into the cellular tissue" (p. 498).

It is certain that children at the breast have been killed by imbibing it with the mother's milk, and that convulsions have been but too often caused by an infant being nursed by a drunken mother. I labour upon this point, for recent sensation-writers have tried to altogether ignore the toxic effect of alcohol. They have tried to make out that, as wine and beer, it is not the same thing; forgetful, or rather, anxious to put the analogy which exists in nature altogether out of sight.

Morphia, however diluted, is morphia still, if it can be recovered as such from its solution. Strychnine is not altered in its constitution or its effects by subdivision; and arsenic is arsenic still, though it may be subdivided into doses of 100,000th of a grain. Two of the poisons I have mentioned are also cumulative, and will, in time, produce certain effects if the minutest doses be persevered with; and those who have thoroughly looked into the daily use of intoxicants, but too well know that there is a result from even a single glass of wine, which is shown at once by the feelings of those who, long

accustomed to take the glass, are suddenly deprived of their daily quantity. They miss it, and the feeling of deprivation or want is more or less persistent, according to their ability to stand against the renewal of the habit. I well recollect this feeling in my own person. When I first started in practice, I was accustomed, about 11 A.M. every day, to take a glass of ale and a sandwich; sometimes I was prevented from going home at the ordinary time, and took my sandwich with me, and did without the glass of ale. Whenever this happened, I did not feel up to my work in the middle of the day; I missed something, and it dawned upon my mind that I was becoming a slave to a glass of beer. I gave it up, and that act of self-denial was the commencement of experiments upon myself, which ultimately led me to abstain altogether from the daily use of intoxicating liquors as a diet, because I found, by clearly defined observation, that I did my work better without them.

But alcohol is not the only poison which alcoholic liquors contain. The hydrate of ethyl changes into aldehyd and acetic acid when it is exposed to the action of certain oxidising agents. Aldehyd, itself an irritant poison, is capable of setting free metallic silver from its nitrate, and various radicals may be formed, each of which has its specific power, and may set up different kinds of toxic results, accounting for death. It is also known that all new spirits contain more or less minute quantities of amylic alcohol ($C_8H_{18}O$), which goes by various names, as fusel-oil, potato-spirit, or oil of grain. It is less volatile than ethylic alcohol, and only comes over at the end of the distilling process. It is a virulent poison, producing extreme irritation, and acting at once on the brain-cells in a most energetic manner, giving rise to violent delirium or temporary insanity. How far it is possible for these compounds to be formed within the body itself, and thus for oxidation to produce still more poisonous agents than is alcohol, is not positively known; but that there are ethereal products, must be manifest to all who come into personal contact with drunkards. The breath of a drunken person, or of a person who has been drinking, does not always give out the vapour of alcohol, but other vapours allied to the ethers, or easily recognised by the nose. The oxidation of alcohol, as it takes place in the human tissue, does not give rise to materials capable of being used in the production of force, but the results are allied to acetic acid, acetal, acetone, and other matters which have passed out of the range of force-producers as much as carbonic acid itself has done. We have also to recollect that the quantity of carbon compared with hydrogen in alcohol brings it into a different category from that of sugar, starch, and oil.

It is true that vinegars may be useful in dietaries as adjuncts to something else, but I have never heard it stated that they were beneficial in themselves, but only as agents to bring about some other effect, enabling a man to take more of a given article, or to turn the change in another direction for the time being. It is possible that, under some conditions of the digestive function, the acetic acid passes out of the system as an acetate, producing a diuretic effect on the kidneys, by means of which the toxic action of alcohol is diminished. It is said that drunken soldiers will steady themselves by a glass of vinegar when going into barracks after a debauch. If this be so, it must be by changing the character of the oxidation, and arresting for a time the poisonous effect of the intoxicant; but is not a constant result, and cannot be depended upon. Vinegars, as diets, are dreadfully injurious, if persistently taken. The chemical action of alcohol must be the same, in one way or another, whether it be in the laboratory or in the stomach of the drinker, either as regards itself or its component parts. Its effect upon protoplasm is easily seen; its action upon the blood-corpuscles is very manifest, and can be shown by means of the oxyhydrogen microscope. The blood-cells of the decided toper are many of them altered, irregular in shape, have lost some of their plastic character, so that the contour which is seen, and the *rouleaux* which form in healthy blood, are less definite than those. The nose of the toper, the face and eyes of the habitual drunkard, tell us, in most conclusive terms, that effete matter has not been oxidised, but is retained in the capillaries. Harley proved before the Royal Society that fat is increased in quantity by wine and spirits in the serum of the blood. The ordinary chemical changes are partially arrested, and there is no doubt that, when full doses are given to a healthy person, the temperature of the body falls within a defined time. Stress is sometimes laid upon Dr. Dupré's experiments, published in the *Proceedings of the Royal Society*, in 1872; and it is argued, in consequence, that alcohol is oxidised in the system with a corresponding liberation of force; but, as one of Dr. Dupré's conclusions is contrary to common observations, namely, "that the amount of alcohol eliminated by the breath is a minute fraction only of the alcohol taken," I feel sure that his other conclusions are also erroneous. Ask any police-constable you like, as to

why he knew that the man in custody had been drinking, he will say, "by his breath;" and I never yet came into close contact with a man accustomed to take wine, and who had taken wine or spirits within an hour or two of my interview with him, without being able to smell the result in that individual's breath: so that one feels sure that immense quantities of the constituent atoms of alcohol, in some form or other, do pass away through the lung-tissue, in spite of Dr. Dupré's observations to the contrary. Dr. de Chaumont says that a fall in temperature has been conclusively proved by the experiments of several noted physiologists, whom he names in his edition of Parkes's *Hygiene*. It is manifest that the action of alcohol upon the blood-corpuscles is to diminish or arrest their oxygen-carrying power by a change in their plasma. The effect of alcohol upon membrane is easily seen in both plant and animal life; it soon puts a stop to the action of endosmose and exosmose, by altering the elastic and physical state of the membrane by which the process is carried on, so that it soon ceases; its influence upon the blood-corpuscle is similar in effect. Professor Marshall, in his *Outlines of Physiology*, sums up the properties of alcohol thus:—"The administration of alcohol does not increase, but diminishes, temperature, and also the quantity of carbonic acid gas evolved." I want this fact to be kept fairly in mind. "The quantity of urea excreted is likewise diminished. The effect seems to be due to the lowering, in some manner, of all those organic processes which lead to the formation of carbonic acid by the disintegration of blood and tissue" (vol. ii, f. 543).

Dr. W. B. Carpenter fully supports these views, and Dr. J. H. Bennet, who does not seem to recognise the fact that heat is not generated by it, nevertheless says: "Its combustion interferes with the combustion of the disintegrated and effete tissues of the economy. The pernicious influence exercised on the brain and liver is thus increased by the physiological influence which alcohol exercises in arresting the destructive metamorphosis of molecular tissue." (*Nutrition in Health and Disease*, f. 65.)

The array of names given by Professor Marshall, the consensus of opinion as to the material facts which are probable, are overwhelming as to the true physiological action of alcohol; diminished temperature, decreased excretion of carbonic acid and urea; whilst its effect upon the liver is so undoubted, that I need scarcely argue that acholia is a consequence of its use. Yet only the other day I read in a new work "that much nonsense has been written on this point, even by such men as Dr. A. Carpenter, as if this process (that is oxidation) could not be too active," and the writer then proceeds to class alcohol with the ordinary fat-producers, the hydrocarbons, apparently forgetful of the point that the fat which alcohol produces is a fatty degeneration; it is found in a different position from the fat which starch, sugar and oil, or nitrogenous food, will put aside when the latter are taken in excess, whilst the fat which arises from excess of alcohol is not obtained from the alcohol itself, but by reason of changes, arrested in the *débris* arising from the ordinary act of living, which were already there, and which were being oxidised. Alcohol takes away the oxygen, and leaves the rest *in situ*. Consider its chemical composition, and the reason for this is manifest. This is very different from the fat which excess of ordinary hydrocarbon produces, and which is obtained from the hydrocarbons themselves.

Let me give, in a few words, its effect on each organ, as detailed by eminent physiologists.

The Stomach.—It reddens the mucous membrane, produces a chronic catarrhal condition, and increases the connective tissue between the glands. Dr. Wilson Fox likens the result to cirrhosis of the liver. Its first effect upon the stomach in small doses is increased secretion, by paralysing some of the capillaries, and delaying the progress of the blood into the venous channels. As a consequence, it may for the moment increase appetite, because there is more gastric juice at hand for digestive purposes; but let the dose be repeated, and the result is as Dr. Wilson Fox describes it. No one doubts the first result; drop a few drops into the eye, even in a very dilute form, and there is an increase of tears. This may be all very well for a temporary purpose; but continue the application day by day, and we may feel quite certain as to its effect upon the mucous membrane of the eye; though the eye itself may have become accustomed to it, and not then perceive its application, it will become less equal to its duty. So, I believe, is the day by day application of small doses of alcohol to the mucous membrane of the stomach. As a consequence, there is a necessity for an increase in the quantity to obtain the same result.

The Liver.—It causes enlargement of the gland by producing albuminoid or fatty deposit; it arrests the change which should take place in the amyloid, or whatever name you like to call the material which is compounded out of chyle, a change which is a duty devolving

upon the liver to perform; or else it increases the supply of material in the connective tissue of the gland, which sets up irritation by its presence because it is not in accord with the wants of the tissue. The result of that irritation is so called chronic inflammation of the organ; then follows contraction of the new tissue and cirrhosis.

The Lungs.—It lessens the amount of carbonic acid, and the watery vapour, which ought to be excreted. It alters the molecular constitution of the lung-tissue, giving rise to chronic bronchitis and emphysema.

The Heart and Blood-vessels.—It first quickens the action of the heart, by altering the balance of power. The blood-vessels all over the body are more easily dilated, so that the *vis à fronte* has not to be overcome, and blood is pumped into the tissues more easily than before. The period of rest which the heart requires is shortened, and its nutrition is interfered with both by pressure on the nutrient vessels and shortened time for recovery. After a time there is defective muscular power, whilst the quantity of work to be performed is really increased.

The Skin.—The superficial capillaries become dilated, a turgescence is produced which soon subsides, unless the dose is repeated; if it be a continuous repetition the turgescence becomes permanent. The skin alters in appearance, loses its smoothness and proper colour, becomes liable to disease, partly in consequence of the non-supply of lubricating material by the sebaceous follicles, and partly by interference with sweat-glands. Cold is felt more intensely than is the case when intoxicants are not habitually taken.

The Nervous System.—The symptoms which arise prove very conclusively that alcohol interferes with nerve-currents. At first it increases the discharge of energy, but at the same time producing a larger quantity of *débris* which remains more or less *in situ* in consequence of the semi-paralysed state of the vaso-motor system, and probably gives rise to the languor, headache, depression, and fatigue, which follow upon the excitement which alcohol has produced.

Kidney.—This is at first stimulated into increased action by the turbid vascular tissue, but the ultimate result is precisely the same in effect as arises in the liver; there is first enlargement, then a cirrhotic state. It is usually styled Bright's disease, and appears in several forms.

Muscular System.—Voluntary muscular power seems to be diminished, and the finer combined movements are less perfectly made. So says Professor de Chaumont in his splendid edition of Parkes's *Hygiene*, from which work I have extracted the major portion of these references to its physiological action on particular organs. Personal experience in my own case tells me very conclusively that, if I were to take three glasses of wine or beer to-day, I should feel tired, and not up to my work to-morrow; and this is the general experience of the abstainer.

How are the conditions which give rise to these morbid changes produced? My contention is, that there is arrest of the changes by which healthy functions are promoted. Those functions, and the ordinary faculties which belong to life, require that those changes be carried on regularly. Some are fond of calling them metabolism. The waste material which results from the performance of either function or faculty must be removed as fast as it is formed, if the body is to remain in a healthy state. If the change be interfered with, if the alcohol which is imbibed seize upon the nascent oxygen just at the moment when the latter is about to oxidise the resultant waste, that is left *in situ*, in a form which ultimately starts the degenerative stage, such as is found in the first stage of fatty degeneration, in cirrhosis, in atheroma, in emphysema, in Bright's disease, and all the class of maladies which are connected with the abuse of intoxicants. This is called nonsense by some of the supporters of the so-called temperate use of intoxicants, yet it is in accord with the views expressed by all the leading physiologists of the day; that which is nonsense in my writings must be as much nonsense in theirs; the grand physiological principles upon which these statements are based cannot be put out of sight by abuse.

(To be continued.)

BEQUESTS AND DONATIONS.—The Hon. and Rev. William Henry Lyttleton, Rector of Hagley, has bequeathed such a sum not exceeding £1,300 as will produce £40 per annum, to be called "The Emily Lyttleton Fund," for providing a nurse in midwifery and non-infectious cases for the parish of Hagley.—Mr. George Bond, of Richmond-on-Thames, has bequeathed £1,000 to the Richmond Infirmary, in default of any of the children of his son attaining 21 years of age.—Sir Thomas Fowell Buxton, Bart., has given £200 to the Norfolk and Norwich Hospital.—The Corporation of the City of London have given £105, and the Goldsmiths' Company £50, to Queen Charlotte's Lying-in Hospital.

THE LUNACY LAW: ITS DEFECTS; AND A SCHEME OF REFORM.

By WILLIAM R. HUGGARD, M.A., M.D., M.R.C.P. LOND.

THE lunacy law has lately given rise to much discussion; and as fresh legislation on the subject may be expected, the points wherein the present law is defective deserve to be carefully examined.

The points to which attention will here be chiefly directed are, first, the means of ascertaining and determining insanity; and, secondly, the custody and general supervision of the insane, especially in private asylums. The outlines of a scheme of reform for giving the public greater protection from insanity on the one hand, and for giving the alleged lunatic more efficient safeguards on the other hand, will then be put forward.

Let us see what would be accomplished by a perfect law—by a law that should give complete expression to recognised principles; and let us put in contrast what is accomplished by our present law. Under a perfect law, every insane person—that is, every person who, through mental defect, is unable to conform to the requirements of society, and whose inability is not curable by punishment—would be under efficient supervision and control, though not necessarily in an asylum; and the interference with individual liberty would not be greater than absolutely necessary for the protection of society. A good law would also see that its provisions are not evaded either intentionally or unintentionally.

Now, what are the provisions of the present law, and how far do they give effect to the intention of the legislature?

The means for ascertaining insanity—that is, the means for bringing all cases of insanity within the knowledge of the authorities—are not at all complete. This incompleteness is, in one case, intentional. Thus a lunatic, provided he be not kept for profit, can be confined in the house of a relative or friend. Although this may be a defect, any remedy for it would probably be worse than the original evil; and so long as the lunatic is under proper control, probably no great harm is likely to arise. But if the lunatic be not under proper control, there is no adequate provision for dealing with the case; and this incompleteness is probably unintentional. If the case come to the knowledge of any constable, overseer, or relieving officer, such officer is bound immediately to take the lunatic, or cause him to be taken, before a justice of peace, whose duty it is then to take proper steps for placing him under control. The weak point is that it is nobody's duty that the case should come to the knowledge of any constable, overseer, or relieving officer. Our coroners' courts and our criminal courts testify only too plainly to the number of insane people not under proper control, and to the enormous preventable waste of human life through insanity in consequence—a waste of life that might readily be prevented by proper precautions; for warnings are rarely lacking beforehand which, to a trained mind, would indicate the event about to take place. It is not necessary to speak of the many cases that do not come directly before courts of law, but which cause a great deal of misery and anxiety, and do not fail, indirectly, to furnish their quota of crime.

The next point is the certifying of insanity—the procedure by which a lunatic is put under proper care and control. There may be said to be four methods of procedure, according as the lunatic is—1, a private patient (paid for by himself or by his friends); 2, a pauper patient (maintained wholly or in part out of the parish rates); 3, a Chancery patient (that is, found lunatic by inquisition); 4, a criminal lunatic. In every one of these cases, the procedure is more or less unsatisfactory.

These various methods need not occupy us in detail. The important point in which they all agree is, that not one of all the persons engaged in certifying insanity is required to have any acquaintance, practical or theoretical, with insanity. The medical men, the Master in Lunacy (at any rate, till he have acquired some experience), and the jury, may all, in the respective cases where their services are required, be absolutely incompetent to determine the precise nature of the individual case on the one hand, and may be absolutely ignorant of the nature of insanity generally on the other hand. Not one of them may be able to discriminate between the forms of mental defect that jeopardise the peace and security of society from those forms of mental defect that neither annoy others nor endanger the person himself. On the one hand, melancholia, though fraught with danger, may be regarded as a mild ailment, not requiring vigilant supervision; on the other hand, a harmless though absurd belief may