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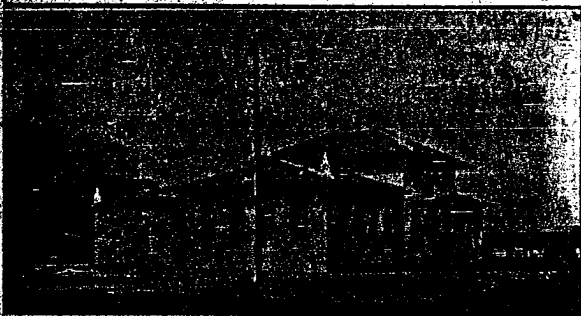
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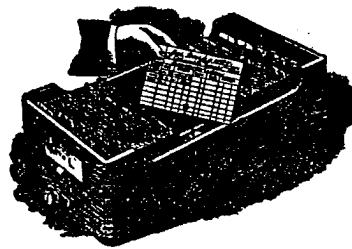
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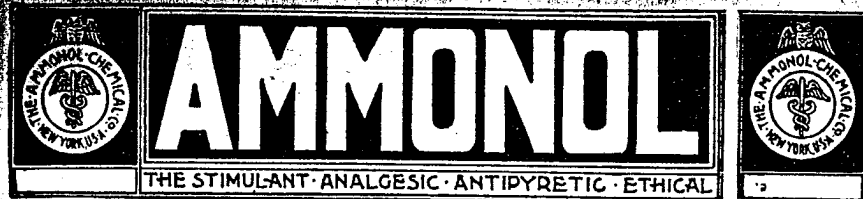
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SHALL WE CONTINUE STRIVING TO IMPROVE
THE ENVIRONMENT OF THE POOR AND
RENDER STERILE BY MUTILATION, OR ELEC-
TROCUTE, THE DEGENERATES TO PREVENT
THEIR PROPAGATION OF THEIR KIND, OR
SHALL WE MORE DIRECTLY PREVENT BOTH
POVERTY AND DEGENERACY BY REMOVING
THEIR CHIEF CAUSES?

ADDRESS BY DR. N. S. DAVIS, M.D., LL.D., OF CHICAGO,

President, American Medical Temperance Association.

Members of the American Medical Temperance Association: Though not retaining sufficient physical strength to be with you at your present annual meeting, I nevertheless send you cordial greeting, and ask your patient attention to the following subjects at this beginning of the twentieth century of the Christian era: During the last few months the literature of Christendom, and especially that of our own country, has been filled with eulogistic notices of the remarkable progress made in every department of literature, the

sciences, arts, industries, and facilities for intercourse during the century just closed. The general correctness of the eulogistic notices, so far as they relate to discoveries in science and their practical application to improvements in every department of human industry and intercourse, is universally admitted.

While it is thus freely admitted that the applications of steam and electricity have made neighbors of the most distant nations, and multiplied many times the products of human industry, and the application of the facts and principles of sanitary science, evolved by our own profession, have so far limited the prevalence of epidemic and infectious diseases as to add one-third to the average duration of human life, it is very generally conceded that poverty, imbecility, epilepsy, insanity, criminality, and other diseases of degeneracy have been increasing faster than the increase of populations. So true is this that human degeneracy, both physical and mental, has become a subject of frequent discussion by sociologists, physicians, and legislative assemblies, and many remedies have been suggested. As nearly all the writers on the subject allege poverty with its environments and heredity as the chief causes, so all their remedies have for their object the improvement of the first, and the prevention of transmission by the second. We are told to improve the tenement houses and ensure for them more light and air, more cleanliness and ventilation, and already millions of dollars have been expended in such work in the larger cities of this and other countries.

And to prevent the propagation of degenerates hereditarily, we are advised to prohibit by legal enactments the marriage of the feeble-minded, the epileptic, and the insane, and to render impotent by surgical operations convicted criminals of both sexes. And some have even suggested that the modern care bestowed upon the defective classes in providing for them hospitals, asylums, and charitable support, and for the criminals comparatively comfortable prisons, has been an

important cause of their continued increase and corrupting influence upon the body politic. Careful examination will show that nearly all the remedies proposed are aimed at the removal of the effects of degeneracy instead of their causes. It is true that poverty is prone to create an environment of dirty streets; small, over-crowded and ill-ventilated houses that favors the prevalence of typhoid fever, tuberculosis, and other infectious diseases, by which the ratio of mortality is increased. But simple poverty aided even by dirty and over-crowded tenements has no more tendency to create either mental or physical degeneracy than do mansions and palaces filled with all the luxuries of the rich. True degeneracy, whether mental, as manifested by the different grades of mental impairment and disorder, or physical, as seen in defects and deformities of body or limbs, or in simple defective vitality, is the result of causes capable of directly impairing the vital properties of the protoplasm and corpuscular elements of the blood and tissues of which the living body is composed; causes, therefore, that enter into the system and either remain or are repeated daily through considerable periods of time.

Consequently they do not exist in the environments of either poverty or riches. Neither are they to be found as elements of any variety of true food. Simple food, whether solid or liquid, satisfies the appetite in about the same quantity through life; and if too much is taken it produces not degeneracy, but indigestion or other temporary sickness.

There are, however, a large number of well-known substances which, when taken into the living body in small doses, are neither digested, assimilated, or used to repair the natural waste of the tissues, nor to evolve any known natural force or energy, but are soon eliminated through the various secreting or eliminating organs, either unchanged or in a state of oxidation. While these substances are in the system they exert a modifying influence on the metabolic processes and functions

either of particular organs or of the system as a whole, and consequently are always injurious to persons in health.

If given in large doses, or in moderate doses, through long periods of time, they cause tissue degenerations or even death. Therefore by chemists and toxicologists they are classed as poisons. But physicians using them in small doses and for brief periods of time can and do avail themselves of their power to modify the vital processes in such manner as to correct morbid conditions of diseases, and thereby classify them as medicines. But every intelligent physician knows that if he gives real medicine to persons in good health it only helps to make them sick, in strict accordance with the ancient proverb — "The well need not the physician, but only those who are sick." Clear and definite as are the foregoing distinctions and relations between food, poisons, and medicines, we are still compelled, even at this commencement of the twentieth century of the Christian era, to witness their confusion and practical intermixture by large portions of both the profession and the community. Thus we see on the dining tables of many in all grades of society, and still more in the social banqueting halls, not only food, but a variety of anæsthetic and narcotic substances also, that the chemist calls poisons and the physician calls medicines. The substances thus used all belong to the anæsthetic and narcotic classes, as opium, cocaine, tobacco, ether, and alcohol, all of which, when taken internally, either by the stomach, lungs, or hypodermatically, directly diminish the cerebral and nerve sensibility, muscular strength, tissue metabolism, and protoplasmic vitality in direct proportion to the quantity used. By directly and quickly lessening the cerebral sensibility, which is man's seat of consciousness, they lessen his consciousness of all mental impressions, whether of heat, cold, pain, strength, or weakness. And this is the true secret of their deceptive and destructive influence over the human race. While they thus lessen the man's ability to judge correctly,

either of his own condition or of the condition of his environment, they are equally retarding and perverting the vital processes of cell growth, nutrition, disintegration, and secretion, and if continued for any considerable period of time, inevitably lead to physical and mental degenerations in both parent and offspring. By the people of Asia and the East Indies opium is the chief agent used, while in Europe and America alcohol and tobacco take precedence in all grades of society.

But what is the real difference between the Chinaman's opium siesta and the European or American's banquet of food and alcoholic drinks in an atmosphere blue with tobacco smoke; or his modern after-dinner "smoker?" As a mode of speedily getting into the land of dreams with the material world shut out, the Chinaman's method is doubtless superior.

However, as a mode of overcoming man's sense of propriety and self-control and of materially depressing all his vital functions without actually destroying his ability to find his way home some time before the next morning, the European and American plan succeeds best. Both are deliberate indulgences in the use of subtle poisons that deteriorate health and morals in direct proportion to the quantity used.

That the daily or habitual use of alcoholic drinks, even in moderate doses, not only impairs both health and morals and leads to slow tissue degenerations, but also so impairs the metabolic and nutritive processes as to render the individual more liable to attacks of all acute infectious diseases, and more liable to die when attacked, has been fully demonstrated not only in the laboratory of the scientists, but also in every field of human labor and in every variety of climate.

The experiments of Doyen, Abbot, Ridge, Verlaguss, Rannelli, and Goldberg, the annual reports of the registrar-general of Great Britain, and the records of life insurance companies all prove this so completely as to leave no room for doubt or cavil. And by thus diminishing the vital resistance and promoting tissue degenerations, the alcoholic liquors

equally diminish the vitality and promote both physical and mental degeneration of their children, and yet, in a paper presented to this society by me in 1885, I no longer waste time and money in efforts to reform the habits of the poor; in obtaining laws for securing sanitary marriages; and in devising surgical operations for rendering both degenerates and criminals incapable of extending their hereditary influence; and yet leave the causes of seven-tenths of all pauperism, crime, and degeneracy that afflict the people of this country and of Europe in the form of alcoholic drinks, tobacco, and other narcotic poisons untouched or even fostered by governments for the sake of the revenue they yield. It is a striking example of economic inconsistency when municipalities and governments issue a license to sell alcoholic liquors and tobacco for a money fee, in aid of the public revenues, when the use of those same articles results in compelling the same municipalities and governments to pay out for the support of the resulting pauperism, insanity, crime, and degeneracy ten dollars for every one dollar received as license fee without counting the \$2,000,000,000 paid by the consumers in our country annually without getting in return the value of a loaf of bread or a shirt to cover their nakedness. It is more than sixty years since my mind was compelled by the inexorable rules of logic to adopt the conclusion that if alcoholic liquors are legitimate articles of commerce and popular use, the traffic in them should be free to all, rich and poor alike, or if they are really subtle, deceptive, and dangerous poisons they should be placed on the statutes of the several states with arsenic, corrosive sublimate, strychnine, and other poisons, to be sold and used under the same regulations as the other articles named. It is puerile in the extreme to admit the truth of the ancient proverb that "wine is a mocker, and strong drink is raging, and whosoever is deceived thereby is not wise," and yet talk of both as stimulant, restorative, and even nourishing, and to be licensed for general use. It is still

more puerile to freely admit the poisonous and destructive influence of alcohol, as it exists in fermented and distilled liquors, and yet for a paltry money bribe for the public conscience, license its general use under the pretence that the influence cannot be wholly suppressed, and therefore it is better to regulate it by a license. On the same basis licenses should be issued to a sufficient number of men to do all the stealing and murdering according to legal regulation, because both have been continued throughout the history of our race in defiance of the prohibitory laws of both God and man. The paramount question before the intelligent men and women of Christendom to-day is not one of politics or of political parties or of social classes; but one solely pertaining to public health and morals.

It is whether alcohol and other well-known narcotic drugs are really wholesome articles of drink or food, safe for general use, or are they absolutely subtle, deceptive, and dangerous poisons, stealthily destroying both public health and morals, and constantly multiplying hereditary degenerates in all classes of human society? If the former, they are entitled to the same treatment as other articles of commerce and general use. If the latter, then their regulation belongs exclusively to the police and sanitary authorities aided by the courts. They cannot be both. That alcohol, as it exists in fermented and distilled liquors, is a positive protoplasmic poison, directly impairing every natural structure and function of the living body in proportion to the quantity used, and the length of time its use is continued is proved by the results of every experimental investigation concerning it, instituted by eminent scientific men, both in this country and Europe.

And their verdict is abundantly confirmed by the history and condition of the inmates of every asylum for the poor, the feeble-minded, the epileptics, the insane, and the inebriates; those of every reformatory and prison; and by the records of every police and criminal court; and by the details of every

well-kept registry of vital statistics. As concerns danger to human life, every intelligent reader of the public press knows that the ordinary use of alcoholic liquors by persons claiming to be in health, is the direct cause of more suicides, homicides, and murders every month than is produced by all the other poisons known to toxicologists in a year. Then why not now, at the beginning of this twentieth century of the Christian era, cease calling alcoholic liquors stimulants or restoratives, and not only speak of them as subtle and dangerous poisons in every household, but also concentrate all the facts known of science, clinical experience, and of economic and criminal records, in favor of having alcohol and all liquids containing two per cent. or more of it, placed on the statutes of the several states along with arsenic, strychnine, etc., to be sold and used under the same regulations and penalties as other poisons dangerous to the public health and morals? If this were accomplished it would soon remove one of the chief corrupting influences from the general field of politics, and place it under the domain of the police and health authorities aided by the courts, where it legitimately belongs. And it would do more to prevent tuberculosis and all forms of human degeneracy than all the other measures combined.

CHICAGO, Ill., April 29, 1901.

“The fact is, all this talk about the nutritive value, the strengthening and curative properties of alcohol, is nothing but a cloak the drinker employs for concealing his appetite. If people did not care about drinking, nobody would concern himself about the trifling nutriment claimed for alcohol.” — *P. J. Moebius, M.D., Nerve Specialist, Leipsic.*

“The battle against alcohol is the most significant phenomenon of our age; more important than all political action, wars, and treaties of peace.” — *Adolf Fick, M.D., Professor of Physiology, University of Wurzburg, Bavaria.*

MODERN EXPERIENCE *vs.* ANCIENT TRADITION
CONCERNING ALCOHOL AS A BEVERAGE AND
MEDICINE.*

BY H. D. DIDAMA, M.D., OF SYRACUSE, N. Y.

The evolution of Medical Science through the elimination of error, and discovery of truth, has been continuous, although sometimes restrained by conservatism and hampered by prejudice.

Many theories which were once regarded as Gibraltar principles have been consigned to merited oblivion.

One of the beliefs handed down from former generations was, that venesection is not only beneficial, but absolutely indispensable in the treatment of almost every disease. This tradition has gone to its death. Indisputable proof was furnished by a few most worthy practitioners who had broken away from the universal practice of phlebotomy, that blood-letting is useless in most diseases, if not positively harmful.

But arguments, however unanswerable, which tend to undermine or overthrow a long-established belief or practice, are not always hailed with delight; and retraction of expressed opinions is a virtue which few persons manifest immoderate haste to exemplify.

So it is not strange that some of the most eminent authors and practitioners in England persisted for many months in adhering to the moribund Sangrado system, and in denouncing those who had found and followed the better way. Truth, however, was triumphant at length; and who cries for the lost lance now?

* Address to the American Medical Temperance Association at St. Paul, June

Another of the traditions, one which dates back to almost prehistoric times, was that alcohol in the form of beer, wine, whisky, or brandy, is harmless and a useful beverage, important in the management of illness, and *sine qua non* in the treatment of dangerous ones.

Regarding the use of alcohol as a beverage, opinions have changed radically. The advocates of the canteen claim that in the past soldiers could buy wine, beer, and other "soft drinks" and that there was little or no drunkenness, but that now, since the abolition of this great temperance promoter, the men resort to saloons, and buy whisky as well as beer, and get drunk.

It is well enough to remember that the alcohol content of the soft drinks is identical with that in the grog shop. Whisky contains an indefinite amount of alcohol, from five to forty per cent.; beer ranges from four per cent. to ten per cent.; claret, nine per cent.; champagne, eleven per cent.; cognac, the favorite prescription of some physicians, twenty per cent.; port, eighteen per cent.; and sherry, another favorite, twenty-two per cent. People can and do get drunk on any one of these beverages, and a high authority holds that beer rather than whisky is the cause of certain forms of drunkenness.

The canteen is the primary school, the grog shop is the saloon. Many a new recruit tasted an "old-fashioned beverage" for the first time in the canteen. The regulars introduced him with boon companions to the grog shop. Many newspapers advocate the restoration of the canteen ostensibly on temperance reasons, and at the same time advertise in another column some favorite brand of whisky side by side with an account of an assault or horrible murder committed by an inebriate.

Some of you may remember that Dr. H——, claimed by a leading daily paper to be one of New York's most eminent medical authorities, read an essay advocating the daily use of *old* whisky as a stimulant, an excellent predigested food, and a healthful beverage.

A New Jersey judge in granting licenses to saloons declared that the craving for alcoholic liquors is as natural as the craving for food, and that, if it had not been the Divine intent that these liquors should be used as drinks, God would not have made the alcohol to gratify this appetite.

Lauder Brunton, M.D., F.R.S., in his great classic work on Pharmacology and Therapeutics, enumerated thirty-seven diseases for which alcohol had been and still was commended, while only two remained to be mentioned in which its use was proscribed. Let me mention a few of the thirty-seven: Acute rheumatism, Asiatic cholera, cough, convulsions, delirium tremens, diphtheria, pericarditis, suppuration, mania, vomiting, ptyalism. Although its employment was generally forbidden in gonorrhoea, the prevailing practice was to use it in leucorrhoea.

Holt, a modern writer and a professor in a polyclinic, while admitting in his valuable volume on Diseases of Children, published five years since, that "alcoholic stimulants are, no doubt, greatly abused in the hands of many practitioners," insists that they are "well tolerated even by very young infants." "There is no question," he declares, "in regard to the value of alcohol in diphtheria."

For a child four years old he thinks that an ounce of whisky or brandy is enough to begin with, but that in very bad cases five or six times as much may be given.

Most of you may recall the candid admission of the late highly esteemed Keating, who was a firm believer in the necessity of crescendo doses of alcohol in children's diseases. He relates that he gave whisky in moderate amounts to four children suffering from diphtheria in the Foundling Hospital. The ages of the children were from four to seven years. Deriving no benefit from the small doses, he increased them to a teaspoonful every twenty or thirty minutes, — nine ounces in twenty-four hours. All the children died.

Another defender and zealous advocate of alcohol is the

eminent scholar, teacher, and practitioner. His birthday anniversary was celebrated with a special laudation in New York. A few months ago he gave an address at a meeting of the New York State Medical Society. The address may be found in the Albany Medical Annals for May, 1900. The genial doctor, after speaking favorably of silver in diseases containing pathogenic germs, and disfavoring acetanilide in any circumstances, introduced his discussion of his favorite topic. I quote from his words: "A dose of one-half ounce of alcohol is liable to prove fatal to a child below ten, the question whether it should be used at all is a grave one." He disposes of this question, which is considered by the medical profession a very serious one, in a manner remarkable for its urbanity than for its emphatic positiveness. He said "there have been fanatics like a professor of physiologic chemistry in Switzerland, who is opposed to the use of alcohol under any circumstances."

I will venture to cull a few of the doctor's assertions.

"There is no better antiseptic than alcohol." "I claim as one of the most meritorious uses of alcohol in professional life, to have proclaimed long before the eyes of most of you, the necessity of giving large doses of alcohol in the grave forms of diphtheria. There is alcohol in the system that is not well tolerated." "What I have observed and written these forty years still holds good." "Septic cases that will not improve after three to six ounces of whisky are apt to do well with six to sixteen ounces. Indeed I have seen such septic children of three or four years take fifteen ounces of whisky a day, which had no bad influence on the brain."

Poor Keating confessed that he was not so successful with his big doses of Bourbon! And the critical doctor himself admits, as has been quoted, that "half an ounce of alcohol — an ounce or so of whisky — is liable to prove fatal to a child of ten."

Osler, the leading medical author in America, calls it

attention in the first edition of his Practice of Medicine to some of the results of alcoholism. He mentioned irritability of temper; impaired judgment, enfeebled will; a change in moral character; catarrh of stomach; diseases of liver and kidneys; and he showed by statistics that drunkards are specially liable to acute and chronic tuberculosis. And yet he added — still clinging to wornout tradition — that alcohol may be given when the pulse flags in delirium tremens, and that “in moderation, wine, beer, and spirits may be taken throughout a long life without impairing the general health or causing disease in any organ.” He did not stop to consider that “moderation” is a word of dangerous elasticity, and that it is the early step in the downward course of every inebriate. I learn that in the third edition of his scholarly, scientific, admirable work the worthy, well-qualified, and progressive author has modified his opinion, or at least withheld its injurious expression. For, as it stood, unguarded, this apparent approval of the drinking habit might have had a pernicious influence upon the thousands of young physicians who read it, and who might have commended it to their patients and to the community.

Every day we read accounts of men who tarry long at night and spend their money in those restaurants clerically christened “poor men’s clubs,” where the precious Atwater liquid food is furnished, and who then go home and, in their hilarity, abuse, beat, and maim their half-starved wives and children.

The unanimous testimony of those who train for athletic exercises, football, foot races, rowing matches, pugilistic contests, is very emphatic that alcoholic drinks are always harmful. It is ancient history that Kane, Nansen, and other Arctic explorers gave to their men not a drop of alcohol — this so-called king of stimulants — although the thermometer in those long frigid nights sometimes indicated a temperature of eighty degrees below zero. We all remember that General Kitchener, who fought and destroyed the army of Dervishes

at Omdurman, determined to test the effect of total abstinence on the behavior of his soldiers. He knew that the Dervishes, who were famous for their fearlessness, their endurance, and their fighting ability, used no alcoholic drinks, because they were forbidden by the Koran. He cut off entirely the grog ration. And he reports that in that long march of weeks and months over the hot sands of the desert his men endured fatigue and exposure better than they did when they drank the customary ration, and that in rapid marching, in attack and defense, they were quite equal to their total abstaining enemies.

Business men also, and employers of laborers, testify that the abstainers in their service not only endure cold and heat, hunger and exposure and fatigue better, but they recover sooner than those who indulge in intoxicants. This testimony of practical men who know what they are talking about would seem to overbalance the statements of a few tippling surgeons, that alcoholic drinks are indispensable in hot climates.

Brunton asserts that the action of alcohol upon psychic processes is curious; for while it renders them much slower, the individual under its influence believes them to be much quicker than usual. He also states that alcohol is antagonistic to strychnine.

An important lecture was delivered in London by Victor Horsley, who is acknowledged to be a great authority on the brain, and who is known not only as a fearless investigator for truth, but as the servant of Science. The lecture is published in the British Medical Journal of May 5, 1900. Horsley's experiments demonstrated that the effect of alcohol on the brain was first an apparent quickening of the cerebral act which lasted but a few minutes, and then for a period of two to four hours this cerebral activity was diminished. That is, it took longer for a person who had had a small quantity of alcohol to *think*. And he asserted that the evidence was over-

whelming that alcohol in small amounts had a most deleterious effect on voluntary muscular work.

Up to seven years ago alcohol was employed in the treatment of diphtheria by nearly all physicians in Europe, and by a majority in our own country. The mortality abroad was sixty-eight per cent., but was not so great in America; and this lessened death rate here was attributed by many practitioners to the use of Rhine and domestic wines which contain but a small percentage of alcohol. After the introduction of Behring's antitoxin the mortality in Europe was reduced to thirty per cent.; this still enormously high rate continuing, in spite of, if not in consequence of, the persistent employment of the accustomed alcohol. At home the early use of antitoxin *sine* alcohol brought the mortality nearly to the vanishing point.

Notwithstanding the evolution, resulting from scientific experiments, observation, and experience, of the conviction that alcohol is harmful as a beverage, promotive of many diseases, and useless in medical practice, it is to be regretted that a large number of authors — especially those who have already embalmed their opinions in printers' ink — still adhere to their ancient views and advocate them vehemently. Many teachers in medical colleges — the number it is to be hoped is growing beautifully less every year — follow their leaders, the book-makers, who, in too many instances, are not so much original idealists as transcribers.

And not a few of the worthy rank and file of the profession, who have little time and few conveniences for experimentation, are content to adopt as their excuse for administering alcohol, the one given by a candid young practitioner at a discussion of the subject in New York city: "I use it because *other* doctors do."

The number of careful and scientific observers at home and abroad who have proven that alcohol is an anæsthetic and depressant instead of a stimulant, is rapidly increasing. The

small army of physicians who have had the courage to relinquish the use of alcohol in the treatment of disease have cause to rejoice at the daily addition to its list of recruits.

"The acorn is small, but it has in it the potentiality of the giant oak."

The science of medicine is intimately associated with its practice. As a rule those who best *know best do*. Their philanthropy, instead of halting at easy benedictions, passes forward to practical benefactions. Their delight, as well as their duty, inspires them not only to alleviate suffering, but to anticipate and ward it off. They endorse the popular maxim: "An ounce of prevention is worth a pound of cure" — 16 to 1.

In conclusion: Those of us who neither use alcohol in so-called moderation as a beverage, nor prescribe it in large or minute doses as a medicine, and who have personal experience for our belief that the *non-alcoholic* treatment of any disease is far more satisfactory than the alcoholic management which we formerly employed are likely to have many pleasant and gratifying experiences.

For instance, gastric catarrh is a complaint abundantly prevalent among those who use beer, wine, or whisky in asserted moderation.

The statement of not a few of the victims is possibly well-founded, that the whisky was prescribed by a reputable physician to improve digestion. A careful investigation of the case results in the regulation of the diet and the exaction of a promise to abstain permanently from the use of every form of alcoholic beverages. And it is not an uncommon occurrence for the patient to return after a week or two to express his gratification, to inquire why other doctors had not given him the same counsel, and to renew his pledge to be a life-long abstainer.

Satisfactory experiences like this, which any physician

may possess, are already enjoyed by a rapidly-increasing number of medical men who are counted among the most eminent in this country and abroad — in Germany and France, as well as in England.

Alcohol is the most important factor in acquired degeneration. The disastrous effects of alcohol upon the developing egg has been proved experimentally. Féré found that the injection of a few drops of an alcoholic solution beneath the shell was followed by a great variety of developmental defects. It is rather difficult, however, to determine the relationship in which idiocy and alcoholism stand to each other. Drunkenness of a parent at the time of conception has long been regarded as a fertile cause of imbecility. "Young man," said Diogenes to a stupid boy, "thy father must have been very drunk when thy mother conceived thee." My experience teaches me that the drunkard is *per se* a degenerate; that the acquisition of an uncontrollable alcoholic habit is in itself a sufficient indication of an enfeebled or perverted nervous system.

When, therefore, the child of a drunkard turns out feeble-minded, it seems as though there may well have been a cause antedating the alcoholism. Certain it is that alcoholic persons are frequent among the forbears of idiots. Ireland, in his "Mental Affections of Children," expresses himself as believing that "idiocy is not the ordinary legacy which drunkards leave their children." I think this view is correct. In my experience the child of the drunkard is apt to have a nervous system of poor resistance and great excitability. Epilepsy, chronic chorea, morbid impulses, and bad habits frequently overtake him. These affections, rather than primary idiocy, seem the common legacies of alcoholism. They may well bring all varieties of mental defects in their train. — Pearce Bailey, M.D., in *Philadelphia Medical Journal*, May 11, 1901.

A RECRUDESCENCE OF ALCOHOLIC WORSHIP

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When this association honored me with an invitation to address it upon some phase of the alcoholic question, the one which alcohol plays in the production of degeneracy at once occurred to me as a fitting subject for an occasion of this kind. It is an important problem and as fascinating as it is important. Besides the paper which I have prepared for the section on physiology of the American Medical Association now in session here, deals with the education of the degenerate; and, in the preparation of it, involving an examination of the evidence showing the responsibility of alcohol as the prime cause in the production of degeneracy, the subject was brought again fresh to my mind.

Upon second thought, however, it has seemed to me that there is another phase of this burning question still more important, at this time, than the subject of alcoholic degeneracy.

It shall not profit us much to discuss alcoholic degeneracy here. It is well known to us in all of its phases and there shall be no disagreement among us as to its extent and potency. Indeed, it is quite likely that the best I could do in this direction would be to arrange the facts in such a way that they would make a clear indictment against alcohol as the most potent factor in the production of degeneracy, and if I should succeed in presenting any evidence unfamiliar to you it would be only cumulative in its character.

Recent agitation of the alcohol questions shows an attitude by the laity toward the drinking of alcoholic beverages

which may be stated in the following proposition: "Alcoholic beverages, under certain circumstances, are of the greatest value to the human organism, they are among the most important remedies in the physician's armamentarium, and they do harm only when taken in excess or when they are impure or adulterated." Now, it would not be easy to discover the evidence upon which the public bases this verdict. It is a belief deep-rooted, cherished, and as permanently fixed as many of our religious tenets. Evidence of the most direct kind does not prevail against it; and whenever one supposed to be clothed with authority to speak upon the subject issues a pronouncement that alcoholic beverages are good, wholesome, and necessary, a million voices re-echo it. Nor is it necessary that the one who thus assumes to speak *ex cathedra* should present credentials proving his right to the title he assumes. As a result the public often gives an importance to pro-alcohol opinions absurdly lacking in scientific force, while contrary opinions, which deserve the confidence of all men because they rest upon the firm foundation of experimental knowledge, are passed over in silence.

But alcohol has its advocates within the profession as well as without. There are still those who regard it as a remedy of prime and wide-spread usefulness. Such a one gave voice to his sentiments at a meeting of the New York State Medical Association about a year and a half ago in the following remarkable panegyric: "Alcohol is the sheet anchor of the intelligent and conscientious physician. It may be stated without likelihood of contradiction that if whisky was sold in its proper state, two-thirds of the crimes and four-fifths of the insanity charged to the account of alcohol would disappear from the indictment, so bulky and terrible, that stands against it in the statute books of society. . . . Alcohol in the banquet hall, in the beer garden, and at the domestic hearth makes hundreds merry for every ten it makes miserable and for every one it destroys." (*The Medical Record*, November

11, 1899). In spite of the fact that it called forth a public protest from well-known men in the profession (Dr. J. M. Didama, Dr. H. O. Marcey, and Dr. Frank D. Keyes, one of whom characterized it as "utterly lacking in new information and thoroughly unscientific," it was eagerly seized by the manufacturers of a certain brand of whisky to advertise their wares. We heard something of the doctor beginning an action for damages against the dispensers of the whisky in question, but do not know whether or not he proved any damage to his character by them. Equally absurd was the opinion expressed not so very long ago on the floor of the New York Academy of Medicine, during a discussion of stomach troubles in children, that "the candy shops do more harm than the saloons."

Pro-alcohol opinions as extreme as these, however, are rarely expressed by medical men. Indeed, one rarely sees alcohol spoken of in medical gatherings as a remedy or a food. The majority of medical men, without making any personal investigation into the abundant recent literature on the subject, are disposed to regard it with less and less favor than years ago, while those who have closely followed the thorough investigations into the physiological action of alcohol recently made by scientists of all nations have repudiated it altogether.

If I were permitted, therefore, to formulate another proposition, but which should be the best informed physician's, not the layman's, estimate of alcohol, I do not think that I should err if I should say: "Alcohol is an irritating narcotic of very limited value as a remedial agent; practically valueless as a food because of its poisonous properties, its exhibition is always attended by danger of producing the alcoholic habit; and it fulfills no therapeutic indication which may not be better fulfilled by some other remedy." I am aware that a certain proportion of honorable, conscientious, and intelligent members of the profession may find this opinion too extreme.

sive; but those whose thorough, searching investigations into all phases of the subject give them authority to speak, those who obtain their knowledge by accurate experimentation, will not hesitate to subscribe to this proposition.

If it were possible to give the public the physician's viewpoint, to put the average layman in possession of all the facts relating to the alcohol question, and to educate him up to the point of understanding them — to make, in short, an expert physiologist, biologist, and chemist of him — all difficulty of seeing the alcohol problem in its true light, all difficulty in bringing about a revulsion of feeling which would at once sweep alcohol as a beverage into oblivion, would be cleared away.

It is not, however, the layman alone who needs this education. A teacher in one of our medical colleges, a man of wide reading and superior to the average physician in general intelligence and judgment, recently declared upon the floor of a medical society that no one but the expert physiologist had any right to an opinion as to the food value of alcohol, that it was a question presenting so many intricacies as to make it beyond the ordinary physician's grasp. While it is clearly evident that the majority of the medical profession is not in possession of the facts making up the alcohol question to the degree that entitles them to an opinion, it is by no means impossible for those to fully inform themselves, for there is nothing in the evidence which may not be understood by the physician of ordinary attainments.

It is encouraging to know that whenever a physician puts himself in possession of all the facts relating to the effects of small or large doses, or any quantity, of alcohol upon the human organism, he almost invariably discards alcohol as a medical agent of value. A notable example of this kind was Krepelin, who began his investigations with a bias in favor of "pure alcoholic beverages," but ended in discarding them in toto. In my own case, if I may be pardoned for mentioning

it, my intention at the beginning of my work on the alcohol problem was to demonstrate the good in alcoholic beverages, especially in good beers. The evidence, however, led to conclusions diametrically opposed to what I had hoped to demonstrate. It is, then, a lack of information upon this vital subject — together with the fact that alcohol has been used as a therapeutic agent for hundred of years, during which it has formed the basis of all tonic or stimulating treatment that gives alcohol its present hold upon a part of the medical profession.

The present status of the alcohol question, then, may be summed up as follows: There is an evident and very outspoken desire, an aggressive desire, upon the part of the laity as a whole, that alcoholic liquors of the so-called "best kind" should be regarded as beneficial to man, when used in moderation, and an equal eagerness to have this opinion bolstered up by scientific authority. The division of medical opinion upon the subject enormously strengthens the lay advocates of the alcoholic doctrine; but their influence is made still greater from the fact that they are supported by a majority of the great journals of the lay press and an occasional journal of the religious press.

These facts being held in mind it is easy to understand the recent recrudescence of alcohol worship which swept over our country two years ago. A chemist in the employ of the United States government, who is a teacher in a college and the author of several works on chemistry, issued a pronouncement (at least it had the effect of one upon the people) that "alcohol is a food and not a poison," and that this opinion was the result of experiments which he himself had carried out. The announcement created an enormous amount of interest. The sensational journals had flaming red head lines, announcing the important "discovery," with a picture of the discoverer and the calorimeter he had used in his experiments. The principles involved in the construction of

the latter were, of course, not understood by the average lay reader; but this made the machine only the more impressive, for it is the mysterious things in medicine which impress the unscientific.

It was not, however, in the sensational press alone that Professor Atwater's conclusions were received with so much apparent satisfaction. Some of these to whom a vast number of scholarly readers look for information on topics of current interest displayed scarcely less satisfaction in the pro-alcohol evidence resulting from Professor Atwater's experiments. The *Outlook*, a quasi-religious journal published in New York, received his conclusions as final, not omitting, at the same time, to severely arraign temperance workers as a class for teaching false doctrine. The *Outlook* told its readers "The intensity of their" (the temperance people's) "hatred for drunkenness has blinded their judgment. They have attempted to build reform on indiscriminate generalizations. The most important service that can be rendered to-day to that reform is to demonstrate the erroneous character of these indiscriminate generalizations and substitute for them carefully considered and scientifically accurate statements of principles." What would this journal teach its readers as "scientifically accurate principles?" This is one of them: "It has been asserted that alcohol is never a food and always a poison. This is scientifically erroneous. It is sometimes a food and sometimes a poison." Of course, we see here the echo of Professor Atwater's conclusions and the absurdity of accepting them unconditionally, as being in the nature of a scientific *ex cathedra* dogma, is not less than the absurdity of the opinion which states that alcohol is "sometimes a food and sometimes a poison."

This was nearly two years ago, but the *Outlook* probably still maintains its position both as to untrustworthiness of the average temperance advocate and the infallibility of Professor Atwater; for a gentleman recently addressed that jour-

nal to be informed as to who were the recognized authorities on the subject of alcohol and he was referred to Professor Atwater as "the highest authority."

The mischief which an influential lay journal does by misinforming its large clientage of intelligent influential lay readers is simply incalculable; for they are unacquainted with the work done by scientific men and do not have access to the literature detailing the results of scientific experiments. Too often these are buried in society reports or published in specialized scientific journals which are read by very few scientists and no laymen, and generally they are clothed in the technical language of science, making them unintelligible to the lay reader when he does happen to see them.

The journal just mentioned, however, was not the only influential journal to support Professor Atwater's thesis. There were others who disseminated his views, accepting him as an infallible guide. Some medical men occupying places of importance are also his supporters. One of these writing to the layman seeking for information upon the subject of authorities, mentioned above, declares that Professor Atwater is the highest authority, as his researches are "now in the publications and standard science to-day." It is natural, to say, however, that had Professor Atwater's experiments been given to the world in the way that scientific men usually give their results, embodied in a society report or in the columns of a scientific journal, they would have created absolutely no excitement and little interest, the interest which conclusions unwarranted by the evidence upon which they are based naturally arouses.

That Professor Atwater appealed to a prejudiced public through the medium of a lay journal is "significant of much." What motive prompted him to do so is known only to himself. His conduct, however, was unusual; for scientific men almost invariably give the first fruits of their purely scientific

labors to their scientific brethren through the columns of appropriate special journals.

After all, what did Professor Atwater have to give to the scientific world as the result of his investigations into the food value of alcohol? Only this, that when alcohol is taken into the human body by way of the stomach, in small quantities, it is almost completely oxidized, and that from two to two and one-half ounces of absolute alcohol may thus be disposed of in twenty-four hours "without apparent damage to the organism." That when thus taken and oxidized it gives rise to bodily energy, resembling in this respect carbohydrates and fats. For these reasons, therefore, alcohol is a food. Moreover, he has told his interested lay readers that alcohol in certain cases is the only food which can be digested; that it is, therefore, absolutely indispensable for the saving of human life. More than this, he would have those text-books which now teach our children that alcohol is a poison and not a food revised so as to teach that it is a poison only when taken in large quantities; that "temperance is always advisable. This we may emphasize strongly, but whether we shall teach the necessity or duty of abstinence is another matter."

Now, Professor Atwater is an eminent chemist, and whenever he speaks as a chemist he is entitled to our respect. He had a good calorimeter, carefully constructed under his own supervision. When, therefore, he tells us that fully ninety-eight per cent. of those small quantities of alcohol were oxidized, we feel sure that he knows what he is talking about, for he has demonstrated that point. When, however, he says that from two to two and one-half ounces of alcohol may be ingested every twenty-four hours without doing any harm, he speaks without warrant, for there is nothing in the report of his experiments which shows that he did anything to demonstrate this point. Besides, we have an abundance of evidence from other investigators, notably from Kræplin and Dr.

Herman Frey, which shows that these quantities of alcohol are injurious, markedly so, to both mental and physical functions.

In detailing his experiments (see Harper's Magazine, October, 1900, p. 680 *et seq.*), Professor Atwater asks the following question: "Is the energy of alcohol used for heat and work?" This question he answers affirmatively. Let us see through what mode of reasoning he reaches this conclusion. After reciting the fact that alcohol causes dilatation of the surface vessels, thereby increasing heat radiation by bringing a large amount of blood nearer to the surface, that, therefore, alcohol cools rather than warms the body, Professor Atwater continues: "This theory is based upon two kinds of evidence which are well attested and make it plausible. One is the distension of the blood vessels which cause the flush of the skin when alcohol is taken. The other is the lowering of the temperature of the body, which is shown by many hundreds of experiments and is explained by the loss of heat. But when we come to examine into this matter closely we find that although the temperature of the body falls considerably after very large doses of alcohol has been taken, and especially under exposure to great cold, the fall of ordinary doses is slight and often imperceptible. In the rest of this remarkable statement I emphasize, for I wish the closest attention given to it. "When, further," says Professor Atwater, "we take pains to calculate how much heat the body would have to lose in order to reduce its temperature as much as is done by a bottle of wine or one or two glasses of whisky, we find that it would correspond to only a small fraction of the heat which the alcohol yields to the body." This is in reply to those who claim that the excess of heat radiation after taking alcohol is more than the potential energy of the alcohol ingested. In other words, when a quantity of alcohol is taken, the amount of heat radiated is equal to the potential heat of the alcohol plus the normal heat radiation. This cannot be to

according to Professor Atwater, because the temperature of the body is not lowered sufficiently to indicate a loss of so much heat. Now, if the human body were an inert mass it would be proper to proceed as he has done to determine this question of heat radiation; but with the human body it proves nothing. The amount of heat radiated from the body on a winter's day may be twice or thrice that radiated on a summer's day, yet the temperature of the body remains the same, while according to Professor Atwater the temperature of the body ought to fall whenever the heat radiation increases above a definite rate. If he were a physiologist he would know that there is a nervo-vascular mechanism which looks after the temperature of the body with great care, closing up the chief exits of heat and ordering the consumption of more fuel when the loss of heat is great and throwing open the heat exit and ordering the consumption of less fuel, as well as providing for the evaporation of water on the surface of the body to further cool it when the surrounding atmosphere is hot and the bodily temperature liable to become too high.

Another test applied by Professor Atwater to determine this question of increased heat radiation was to measure the total latent energy of food consumed by a man in a calorimeter and the amount of this food converted into kinetic energy, both when no alcohol was taken and when alcohol formed (displaced) apart of the carbohydrate food, when the subjects were at rest and when they were engaged in active physical exercise. His proposition is this: "If alcohol increases heat radiation the total quantity of heat radiation after its ingestion, in a given time, must be greater than it is when no alcohol is taken. If the total quantity of heat radiated is greater, then more fuel must be burned to supply it; therefore, the ingestion of alcohol must be followed by an increase in the total output of heat and an increase in the consumption of food materials, or if only just enough food is taken to supply the energy required of it with a non-alcohol diet, the substitution

of an isodynamic quantity of alcohol for some of the carbohydrates would be attended by evidence of a consumption of part of the stored bodily fat, a decrease in the individual's weight. Professor Atwater, however, informs us that, in spite of those things happening, that the output of kinetic energy corresponded closely with the latent energy of the food consumed, and was practically the same with as without the alcohol, both when the body was at rest and when engaged in work.

Now, there is one fact which Professor Atwater mentions only casually, as if indeed it were a matter of no importance whatever, but which is, as a matter of fact, of sufficient importance to entirely nullify his results, to set at naught his conclusions in toto. That fact is this: Professor Atwater tells us: "The most of these experiments were made with subjects who had been accustomed to the occasional use of alcoholic beverages in moderate amounts" (*Harper's Magazine*, October, 1900, p. 683). How much was this "moderate amount"? Two or three glasses of whisky, as many bottles of beer, or a quart of wine daily? These are moderate amounts, even from the non-user's point of view, but they contain more alcohol than was used in these experiments; and, as is well known to every tyro in medicine, immunity against alcohol, as against all other narcotics is quickly established so that intoxicating quantities to the non-user may be taken by the habitue without apparent effect. What would you say of an experimenter who would undertake to demonstrate the physiological action of morphine with a subject who was in the habit of taking two or three or more grains daily and had been doing it for years?

Let us assume, however, that Professor Atwater has not invalidated his experiments by taking as a subject one habituated to the use of alcohol, and we shall see that the evidence adduced by him does not necessarily lead to his conclusions, indeed does not support them. In order to have a greater

amount of heat radiated more fuel must be oxidized, therefore, more oxygen must be at hand to effect the oxidation, and this increased supply of oxygen must come by increasing the respiratory rate; but alcohol does not increase the respiratory rate. When taken in quantities to have a perceptible effect, it decreases the respiratory rate. Moreover, alcohol like all other narcotics temporarily interferes with the oxidation of food material. It is possible to conceive of a condition in which the radiation is slightly above the normal while the heat production remains the same. This would, of course, lead to lowering the temperature of the body temporarily; but the process could not go on indefinitely, for it would finally lead to the abstraction of so much heat that death would result. We must not lose sight of the fact, however, that the abstraction of heat from the body when the heat production is not distributed leads to an immediate diminution of its output, constricting the surface vessels and keeping as much as possible from radiating. We thus see that an increase in heat radiation may be followed by a compensating decrease, and the sum total of heat radiation indicates no increase for the whole twenty-four hours. Indeed, we have good reason to believe that alcohol acts precisely in this manner, that there may be a temporary but decided increase in heat radiation followed by a decrease, so that for the whole twenty-four hours no increase in heat radiation would be apparent.

To sum up, then, Professor Atwater has produced absolutely no evidence to combat the fact that ingestion of alcohol is followed by an increase of heat radiation, in spite of his statement that this fact is no better than a "plausible theory," in spite of the fact that he complacently remarks: "The theory that the energy yielded by alcohol is lost by increased heat radiation, like the theory that alcohol is not oxidized in the body, was suggested by observed facts. In each case the facts were suggestive rather than conclusive. Under crucial tests both theories are found to fail."

In dealing with the question as to whether the alcohol oxidized in the body is used in the performance of work, Professor Atwater is still more unfortunate. "It is reasonably clear," he says (*loc. cit.*, p. 682), "that alcohol can supply the body with heat. It seems probable that it also yields energy for muscular work, but to prove this absolutely is not easy. The difficulty is to make experiments in such way as to show conclusively that the energy used by the muscles comes from alcohol and not from other materials of either the food or the body itself. When a man takes beer, brandy or other liquor with his ordinary food, the proteids, fats, sugar, starch, and alcohol are used together for fuel, and we cannot say just what is done with the energy of each. It is a case of pooling. *If the experiment were made with lean meat and alcohol — that is, a diet containing protein and no other fuel but alcohol — it might perhaps be more decisive, but it would probably be difficult to find a man who could do hard work day after day on such a diet without drawing upon the material of his body, at least such experiments have, to my knowledge, never yet been carried out.*"

Let us see what the result would be if we should make alcohol take the place of carbohydrates and fats of ordinary diet: Moleschott's dietary calls for 40 grams of fats and 550 grams of carbohydrate food. Atwater's dietary calls for 125 grams of fats and 400 grams of carbohydrates. Each gram of fat yields on combustion 9312 gram calories, and each gram of carbohydrate food yields 4116 gram calories. In Moleschott's dietary are, therefore,

$$\begin{aligned} 9,312 \times 40 &= 372,480 + \\ 4,116 \times 550 &= 2,263,800 \text{ grams calories.} \\ &\underline{2,636,280 \text{ grams calories.}} \end{aligned}$$

Now, alcohol yields, in round numbers, 9,000 gram calories, on combustion; therefore, to supply an isodynamic amount of alcohol for the fats and carbohydrates would require $\frac{2,636,280}{9,000} = 293$ grams — or 9.1 ounces of absolute alcohol

or eighteen ounces or more of strong brandy or whisky. Taking Professor Atwater's dietary, the amount is even greater, 9.7 ounces of absolute alcohol, or about twenty ounces of strong brandy or whisky. Now, anyone who can see no greater harm in these enormous poisonous quantities than that "*it would probably be difficult to find a man who could do hard work day after day on such a diet without drawing upon the material of his body*" is not a competent physiologist, is not a safe guide, and is assuming too much when he presumes to speak to the lay public for the medical profession of America.

Having disclosed what seems to me to be Professor Atwater's greatest errors, from the physiologist's standpoint, I shall, or at least ought to, consider my task done. It will be seen that these are the mistakes of a great chemist when he undertakes to deal with physiological questions, and that these mistakes are sufficient not only to give him absolutely no standing in the court of physiological opinion, but to notably strengthen the hands of those who are trying to make the public see as the profession sees, that alcohol is not a food but a poison. Elsewhere (see *American Medicine*, May 4 and 11, 1901), I have fully discussed this aspect of the question, showing how unanimous is this opinion with medical men who are competent to speak, but I have no time to discuss it here if I would.

It is very difficult, however, to read the two papers published in the lay journal mentioned and not see that Professor Atwater acts the part of the advocate rather than the part of the unimpassioned, unprejudiced seeker after truth. His second paper (*Harper's Magazine*, November, 1900) is perhaps the strongest plea ever made in America for moderate drinking — strong because the public which does not know is in a frame of mind to believe everything that may be said in favor of alcoholic beverages, and is delighted with the fact that these beliefs are supported by the, to them, highest scien-

tific authority. Surely the acme of power for any man is reached when this man who assumes to be the highest authority on the subject and is accepted by the public at his own estimate, when such authority tells his hearers that while we may emphasize the fact that temperance is always desirable "whether or not we shall teach the necessity or duty of abstinence is another question." A wholesale liquor dealer at a recent gathering of men devoted to the interests of what recently earned the deprecation of all men by advising his hearers to teach the growing boy to drink, "for that is the only way to make future customers." Put this advice beside Professor Atwater's and try to discover how much they differ.

An expert's knowledge of physiology is not necessary to understand that the wine making, the brewing, and the distilling interests could ask for nothing better than that our children be taught that to drink "in moderation" is different from temperance, that total abstinence may not be, probably is not, as wise as a moderate use of alcoholic beverage. With this doctrine thoroughly inculcated, customers for alcoholic drinks will be made fast enough to suit the most business-like wine or beer dealer.

There is some comfort, some encouragement, in knowing that at least a part of the public is awakening to the dangers of Atwater's teaching. A little more than a year ago he addressed a convention of school superintendents, and suggested to them that the text-books which deal with the subject of alcohol and its effects upon the human organism be revised to make them conform more closely to what he had discovered to be the truth about alcohol. A committee of seven was appointed from the association to examine into the matter and report at its next annual meeting. The report of that committee, in which the teachings of Professor Atwater were repudiated in toto, is known to all of you. Here is a part of it: "The question of the supposed food value of alcohol is a technical one for medical experts to determine, not one which

needs to concern the man and woman who are engaged in the work of public instruction of children and youth. For them it is enough to know that its use as a beverage is injurious and that all authorities agree in deprecating the formation of the drinking habit and in commending all practicable efforts, through public instruction, to promote the cause of temperance." Let physicians be untiring in their efforts to show up the falsity of such plausible but pernicious doctrine as that promulgated by Professor Atwater, and let them not confine their efforts to the pages of medical and scientific journals, the readers of which are in little danger of being led astray by scientific sophistry. Let them write for the influential secular journals, striking at every error, bolstered up by pseudo-scientific or assumed scientific authority, just as soon as it shows its head.

A SUBSTANCE THAT IS POISONOUS IS NOT FOOD.

In discussing "Some Questions Relating to the Scientific Investigation of Alcohol," Dr. Wulfert of Berlin says, in the November (1900) *International Monthly*:

"From the hygienic standpoint only such substances can be considered food as (1) furnish vital energy to the body, and (2) do not encroach upon the cells and tissues of sound men even when in greater concentration and amount. Though alcohol may, according to the opinion of most authorities, meet the first requirement, it fails indeed in the second, the important property of harmlessness. A substance which is able to cause most serious pathological and anatomical changes in most of the physical organs, though direct toxic action can never be looked upon as food in the hygienic sense, whatever amount of energy it may liberate in the body or however much it may increase the storing up of fat.

"How absurd it is to class alcohol among the foods is evident from the fact that the higher alcohols, glycerine, the organic acids, and, if I am rightly informed, ether also, burn in the body as well as ethyl-alcohol, and consequently they are equally entitled to be reckoned as food substances."

SOME RECENT RESEARCHES ON ALCOHOL,
AND THEIR BEARING ON TREATMENT.

By J. MACKIE WHYTE, M.D.

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During the latter half of the nineteenth century, the movement in favor of temperance in the use of alcoholic liquors has been steadily growing in extent and power. This movement is quite as evident among members of the medical profession as it is outside of it, and it is by no means confined to the English-speaking nations. The medical journals of Germany, France, and all the other nations of Europe have been much taken up of recent years with the subject of alcohol. It is not to be wondered at that a subject so intimately connected with such vital relations to the welfare of humanity should be so frequently discussed, even in scientific societies. It is not, however, of that Olympian calm which is characteristic of the physical sciences. In the following paper, I wish to adhere as closely as possible to the scientific side of the question, to give a resume of some recent work on the action of alcohol, and to estimate the effect of this work on our use of alcohol in certain classes of disease. While many experiments and observations seem at direct variance with one another, some important points are apparently fairly well settled; on these I wish to lay stress.

1. Let us consider alcohol as a stimulant, an agent for increasing the functional activity of certain organs or systems. Schmiedeberg of Strassburg holds strongly that alcohol acts on the nervous system as a paralyzing agent, and not in any true sense as a stimulant. He places it in the class of narcotics.

and muscle poisons of the fatty series, in the special group containing such hypnotics as paraldehyde, chloral hydrate, sulphonal, and anæsthetics, such as chloroform and ether. They have, in common, a marked effect in lowering the functional activity of the central nervous system, brain, cord, and medulla. Reflex excitability is also lowered or done away with, this being an essential distinction from the morphine group. While we speak, in a general way, of the strengthening, stimulating, and animating effect of alcohol, Schmiedeberg and others show it is very difficult to prove this on any definite organ of the body. In the mental sphere, the finer degrees of attention, judgment, and reflection are lost first. Hence Dutch courage and the self-confidence of the afternoon speaker. Great numbers of experiments as to reaction-time have been made by Kraepelin and others, with the result that mental processes are shown to be slowed by even moderate doses of alcohol, while the person experimented on believes he has been working much more quickly. Thus Ach, working under the direction of Kraepelin, has studied "the influence of alcohol upon perception, the person under experiment being required to read through a small slit a continuous series of meaningless syllables and monosyllabic and dissyllabic words, which were written on a revolving drum. The administration of 30 c.c. (about 1 oz.) of alcohol greatly retarded the perception." In the paper from which I have taken the account is given of some much more elaborate mental experiments, all pointing in the same direction. No doubt, within certain limits, the brain may become used to the presence of alcohol, so that such derangement of function is less apparent, and individuals vary very greatly in their susceptibility. But many men, accustomed to the moderate use of alcohol at night, find that even a glass of beer in the middle of the day unfits them for doing their best mental work. Welsh has called attention to the recent work done on vascular arrangements in the substance of the nerve cell. He says: "It

is apparent that, to meet the extraordinary demands of the most highly functioning of the animal cells, an elaborate arrangement of lymph canaliculi and blood vessels is provided. As nutriment is by this means diffused through the cell protoplasm, so also are deleterious and noxious substances.

It is probably through the nervous system that the paralyzing effect of small dietetic doses of alcohol is exerted on muscle. Laboratory experiments in proof of this are tolerably easy to carry out, and the conclusions of different observers (Deladrier, Kraepelin, Frey, Destrée), though differing in details, are, on the whole, much alike.

The dynamometer is sometimes used, but more satisfactory is Mosso's ergograph. In this apparatus "a special arrangement prevents the action of any other muscle than those which bend the middle finger of the hand. By means of a small cord passed around a pulley the finger raises vertically a weight, to the cord is attached a needle, which records on a dial the height to which the weight has been raised." A weight of, say, four or five kilos is raised perhaps every two seconds for a given time. After taking alcohol, even in doses of one-sixth to two-thirds of an ounce (90 per cent.) there is a favorable effect for about fifteen minutes; the paralyzing effect then sets in, so that the total work product obtained with the use of alcohol is less than that obtained without it. One example may be given from Destrée's paper: without alcohol the product is 22,330 kilogram meters; with alcohol, 15,935. Loss, 6,395 kilogram meters. The same result, in a much more impressive form, was recorded by Parkes, from his observations on the marching of soldiers in the Ashanti War.

The stimulating action of alcohol on the heart is popularly supposed to require no proof. But exact observation will not admit such action. Schmiedeberg denies that there is even quickening of the pulse, apart from the stimulating circumstances in which alcoholic drinks are usually taken. Measurements with the sphygmo-chronograph by von der Muhl and

Jaquet on eight young, healthy, or convalescent men showed that amounts of 50 to 100 c.c., diluted to a twenty per cent. mixture, had practically no effect on the heart or circulation. H. C. Wood, experimenting on animals whose heart was failing from advanced chloroform anæsthesia, found that in no case did alcohol, whether in small or large dose, produce any increase in size of pulse or arterial pressure; on several occasions the larger amounts of alcohol appeared to greatly increase the rapidity of the fall of arterial pressure. As to the influence of alcohol in cardiac weakness, Schmiedeberg says it might be advantageous in removing a vascular spasm, and thus making the circulation easier, or a too marked tonus in the cardiac inhibitory nerves might be lowered, or a condition of irritability in the cardiac motor ganglia might be soothed. But a direct stimulation of the heart muscle by alcohol is not yet demonstrated by experiment.

Binz claims that alcohol is a stimulant to the respiratory center. In two papers, published in 1899, he gives an account of experiments by himself and his assistants, which showed that the volume of air passing through the lungs when alcohol had been taken was increased through a greater depth of respiration, or in some cases where the breathing was shallower through a quicker rate. This effect was often seen, even when sleep had been produced through the wine. A wine of rich bouquet had a more marked effect than alcohol combined with water, sugar, and lemon juice. The experiments did not show any regular relation between the amount of alcohol taken and the effect on respiration. In some cases there was a fall instead of a rise of the respiratory curve. Binz does not say how the stimulus is exerted on the center, but he indicates that further investigations are needed to show whether or not there is some paralysis of physiological inhibition. The amount of oxygen absorbed and of carbonic acid exhaled in these experiments is not stated, but others (by Guntz, Geppert, etc.) seem to indicate that there is no constant

difference in the amounts of these gases when alcohol is taken. Hæmoglobin forms a close union with alcohol, and blood with alcohol in it does not part with its oxygen readily. Perhaps this may account for the necessity for increased respiratory effort, a necessity which is noted by Binz to be much greater in tired than rested individuals. The lowering of the body temperature by alcohol has also been suggested as an explanation. It is clear that various points have to be settled before we can accept the stimulation of the exquisitely sensitive respiratory center by alcohol as more than compensatory for other effects, possibly deleterious.

2. As to the effect of alcohol on the tissues of the body there is a striking want of harmony, even among scientific observers, on many points. Whether alcohol is a food or a poison is still a matter of hot debate, as it was twenty or thirty years ago. It is generally admitted that alcohol in quantities up to two or two and one-half ounces is, for the most part, oxidized in the body of a strong well-developed man in the twenty-four hours; at all events, only from two to five per cent. of the amount taken can be recovered from the excretions. Oxidation of alcohol into carbonic acid and water implies the transformation of so much potential into so much kinetic energy, which may be employed to produce heat, or internal work, or external voluntary work. Atwater's experiments appear to demonstrate this view afresh. The general opinion is that alcohol in moderate doses thus saves the body fat, and that it does not save the proteids, in some cases even causes an increase of proteid metabolism. This question is very far from being finally settled; results vary evidently with unknown conditions. The important point seems to be to find out what the alcohol is about in the body before its final oxidation, or during this process. This change must occur, like all metabolic changes, in the protoplasm of the various cells, in the tissues, not in the blood. Physiology throws little light on the point: "the

whole story of proteid metabolism consists at present mostly of guesses and of gaps." (Foster.)

Schafer says: "It cannot be doubted that any small production of energy resulting from the oxidation of alcohol is more than counterbalanced by its deleterious influences as a drug upon the tissue elements, and especially upon those of the nervous system." Morbid anatomy provides us with a superabundance of evidence of these deleterious influences in chronic alcoholism, and between this condition and the merely functional impairment produced by single moderate doses of alcohol, there must be every conceivable gradation. Functional derangement implies a molecular abnormality in the protoplasm, which cannot be demonstrated to the eye, and which can be repaired if the necessary conditions are present; in the absence of these conditions, it may easily pass into organic alteration. The distinction is convenient, but not, strictly speaking, scientific.

The poisoning of the tissues is shown in another way, by the impaired resistance to infectious attack. We are, constantly, seeing evidence of this in practice. Pneumonia and phthisis, for example, have been indubitably proved to occur more frequently, and to be of more serious significance in drinkers than in persons whose blood is practically free from alcohol. Surgeons provide similar testimony in regard to the capacity for healing quickly and soundly. Various recent sets of experiments on animals confirm clinical experience. The most complete and most important are those of Laitinen of the University of Helsingfors. Professor C. Frankel of Halle, according to whose suggestion and scheme the experiments were carried out, gives a brief account of them, with examples and comments, but I may be allowed to quote the abstract given in a recent number of the *British Medical Journal*. There were used "no fewer than 342 animals, dogs, rabbits, guinea-pigs, fowls, and pigeons. As infecting agents, cultivations of the anthrax, tubercle, and diphtheria bacilli were em-

employed. These were chosen as types of acute infection, chronic infection, and a pure intoxication. The alcohol employed was, as a rule, a twenty-five per cent. solution of ethyl alcohol in water. In greater strength the alimentary mucous membranes of birds became inflamed. Some of the dogs had fifty per cent. solutions. It was given either by oesophageal catheter or by dropping it into the mouth from a pipette. The dose varied with the animal, and with its weight, from one one-half c.c. in the case of the pigeon to 60 c.c. in that of some of the dogs. It was administered in several ways and for varying times; sometimes in single large doses, at others in gradually increasing doses for months at a time, in order to produce here an acute and there a chronic poisoning.

Dr. Laitinen found that in all these cases, without exception, the effect of the administration of alcohol, in any form whatever, was to render the animal distinctly, sometimes markedly, more susceptible to infection than were the controls.

One remarkable fact which came out clearly in most experiments was the varying susceptibility in regard to the intoxicating effect of alcohol among animals of the same species, size, weight, age, sex, and condition of nourishment; nevertheless the diminution in natural resisting power to the infection seems to have been independent of this variability. Frankel holds that even when necessary allowances for differences are made, one is bound to draw the conclusion that the employment of alcohol in the treatment of infectious diseases in man is not by any means to be lightly resorted to. And although the doses are large, they can be paralleled in medical practice, one instance being quoted where the patient, suffering from anthrax of the nose, got daily two whole bottles of red wine, champagne, and cognac, and was thus saved! This, he says, is surely using Beelzebub to cast out Satan. Whether alcohol lowers the power of resistance through interfering with leucocytosis, as Woodhead maintains, or diminishing the

alkalinity of the blood, or in some other way, is not yet settled.

From the foregoing, these conclusions seem justified. The stimulant effect of alcohol on brain, heart, or muscle, if existing at all, is very brief, lasting probably only a few minutes. Its apparent effect in stimulating respiration needs further investigation as to its mode of causation. On the tissues, alcohol acts as a protoplasmic poison, and this must be borne in mind if we use alcohol for its nutritive value.

Clinical observation has been, on the whole, moving along parallel lines with the researches in the laboratory, the marked tendency in recent years being to restrict the administration of alcohol as a medicine. The influence of authority and tradition, even when supported by "clinical experience" must inevitably be diminished through counter-results obtained by purely scientific methods. However stoutly clinical observers may appeal to the results of treatment, we are all too painfully conscious that the history of medicine consists largely of the substitution of one set of erroneous deductions for another, and we gladly welcome the aid of the pharmacologist who is giving us a basis for more reliable observations.

As regards the whole class of diseases of the nervous system, there are few, I suppose, who would expect any benefit from alcohol except of a sedative or narcotic character.

Alcohol will give temporary relief in worried states, in hypochondriasis, in neurasthenia, in neuralgia of women, in dysmenorrhoea, but the cautious physician must hesitate long before taking the responsibility of prescribing it. In insomnia, the narcotic effect of alcohol is sometimes very marked, both in young children and adults, and it may be given disguised with a bitter or bromide. As Yeo says: "If we could be sure that there was no danger of producing the habit of alcoholic indulgence, we might find in it one of the least objectionable of narcotics. But except in large quantities it has little influence over obstinate cases." The great

mixed mass of mental diseases, as found in asylums, are best treated without alcohol, whatever the cause or nature of the case. Men like Forel of Zurich have entirely banished alcohol from the asylums they control. Forel says the distinction between the use and abuse of alcohol, difficult as it frequently is with ordinary men, is quite obliterated with the mentally unsound. Every use is misuse. Alcohol, he thinks, while directly responsible for a large proportion of insane, injures many more through its effect on the germ plasm. According to him syrups, juices of fruits, lemonade, tea, and, above all, good water should be substituted in all asylums and institutions for the treatment of nervous disorders.

I have not much to say about alimentary diseases. In some cases of simple dyspepsia a little alcohol with a meal well diluted, is found to give relief, often, no doubt, through its sedative action on the nerves, or it may be through increasing the secretion of the gastric juice, and thus aiding digestion. There are excellent substitutes for it, and I do not wish to improve on my own practice of treating the case without this aid. I am perfectly satisfied with my results. Other gastric conditions, catarrhs, ulcers, and so forth, also all intestinal disorders are, I think, better treated without alcohol.

Still, it is likely the relief given in colic and some cases of diarrhoea by the home use of brandy will favor its continuance. I need not say that liver disorders are probably in all cases prejudicially influenced by alcoholic beverages.

In kidney diseases of all kinds alcohol should be rigidly withheld. We ought to protest against the popular use of gin as a diuretic. Glasser, working under von Jaksch, made 106 observations on fifteen individuals, and found that alcoholic drinks in relatively moderate quantities showed their irritating effect on the kidneys by the presence of leucocytes and casts, and uncommonly large numbers of crystals of oxalate of lime and uric acid, these latter being, no doubt, due to the prejudicial influence of the drug on metabolism. The effect of a

single excess was not discernible after thirty-six hours, but continued use of drink was cumulative.

In no class of disease is alcohol more generally considered indispensable than in septic cases, puerperal perhaps above all. A. Martin of Berlin, the distinguished gynæcologist, is (or was, eleven years ago) a strong advocate of this treatment, pushing the drink till diarrhoea set in. One of his patients in the course of six weeks got seventeen bottles of cognac, thirteen of Burgundy, thirty-seven half-bottles of champagne, four and a half of other strong wines, and six of porter, and she recovered. The virtue of alcohol consists, he holds, in its strengthening the action of the heart, and raising the resisting power of the individual to the attacks of the infection. The best comment I can make on this is to ask for proof in face of the experiments alluded to earlier in this paper. It must be borne in mind that all the other resources of modern medicine, including as concentrated and nutritious a dietary as possible, were employed.

Pneumonia may be taken as the most convenient example of acute infectious disorders. We all see many cases of acute lobar pneumonia, and its treatment has for long reflected the prevailing views of the physicians of the time. Many living men recall the huge doses of twelve, eighteen, and even thirty-six ounces of brandy in the twenty-four hours, which were considered necessary in many cases, and it is quite possible that the results, as shown by statistics, might not look very bad. Statistics are really of small value in helping us to a conclusion. The mortality, in different localities, differs quite independently of treatment from the class of patient, habits of living, vitality, and so forth. Even from the same records it is probable that no two men would deduce the same inferences. Moreover, as Aufrecht puts it, "in one and the same town, in one and the same hospital or medical district, among people who on the whole have experienced no change whatever in their social environment throughout a series of

years with a treatment of pneumonia by one and the same physician with exactly the same methods, the mortality within this series of years may be astonishingly varied." Nevertheless we must look to clinical records for a control test of the value of scientific laboratory work.

Alcohol is recommended in croupous pneumonia as a food or as a stimulant. Lauder Brunton, who is extremely restricted in his advocacy of alcohol, says in his "Materia Medica," it "seems useful in acute diseases running a limited course, where we wish to sustain the patient's strength until the crisis is past, as well as to prevent it sinking from debility afterwards." Further, he says, useful indications may be obtained by the practitioner "remaining beside the patient, counting the pulse, and watching the tongue, respiration, skin and general condition for a quarter of an hour after the dose has been given." Now, I submit that the evidence thus got is not sufficient to demonstrate improvement; on the contrary, it is likely to mislead, for the brief stimulating effect of alcohol, such as it is, is to be measured by about fifteen minutes, after which comes a prolonged period of depression. From this it is very difficult to make a favorable change by repeating the alcohol. The weighing of the depression produced by the first dose against the stimulation produced by the second would be a nearly impossible task, which would become greater and greater as doses succeeded one another. There are, so far as I know, no exact and complete observations on the oxidation of alcohol in a feverish state of body. It is generally believed that much more can then be borne without damage to the nervous system. Certainly the ordinary signs of alcoholic intoxication do not appear so soon; whether that is not in large measure due to the position of the patient, the already existing numbing of his senses, and the delirium which may already be present, I cannot say. It is certain that even a case of acute pneumonia may be made very obviously drunk, and a most dangerous poisoning every one

would admit this to be. It is by no means improbable that many lives have been lost through the tendency to pour in the stimulant when things seemed to be going from bad to worse.

As to the food value of alcohol in pneumonia, I think this need hardly be taken into account. At the best it is in all probability very small; pneumonics usually take true foods admirably; they do not die of starvation; they generally pass the crisis with an excellent reserve of energy, which usually is shown by their eager desire to be up within a week. Once more, listen to Schafer: "Any small production of energy resulting from the oxidation of alcohol is more than counter-balanced by its deleterious influences as a drug."

I have never seen pneumonia treated by the routine administration of stimulants, though I believe some practitioners still favor this method; nor have I seen enormous doses of twelve and eighteen ounces of brandy given in the twenty-four hours in exceptional cases; but as house-physician or physician I have in earlier days often given, or seen given, ten or eight ounces in divided doses. I cannot say I ever saw benefit from those quantities; I believe I have seen harm in a few cases, but this I put down as an impression which none but myself may attach importance. In more recent years, when my practice has been to give little or no alcohol in most cases, but rather to seek for more reliable substitutes, I have been better satisfied with the results. If grave doubts have been thrown on the beneficial action of any drug, still more when there is strong reason to believe it may be deleterious, it is the safe rule in medicine to withhold it. A few years ago a German doctor was tried for malpraxis, for treating a case of pneumonia without alcohol. The judge obtained an authoritative opinion from experts, who said, in the present state of scientific opinion the discretion of the practitioner must be the only guide. A curious parallel this to a prosecution at

Coblenz in 1844, when a Dr. Kirchgasser was tried for treating a pneumonic without venesection.

Aufrecht of Magdeburg, in his recently published volume on Pneumonia in Nothnagel's series, declares himself a decided opponent of the giving of alcohol in any routine way. The majority of his cases, especially in private practice, require and get no stimulant, but to decrepit persons coming into hospital, run down through various kinds of privations, he gives some pure alcohol with orange extract, syrup, and water (about the equivalent of two drams of whisky) every two hours. As a *pro re nata* stimulant in collapse, champagne is best, but he also recommends very strongly camphor in subcutaneous injections (6 to 12 grs. in 24 to 48 minims olive oil). Further, in the course of the disease, indications for stimulants not present at first may crop up, such as pallor, rapid wasting, marked lassitude, slight indifference to surroundings, with no great amount of fever. He is not going to throw out the child with the dirty water.

Stursberg has lately reported on the method of treating pneumonia which is in vogue at Bonn (F. Schultz's clinic). Nothing in the Bonn statistics, he says, is in favor of alcohol, though it is given in special cases, as when there is a suspicion of inebriety, or if the patient is accustomed to a beverage, or if the general state makes one think *à priori* that a stimulating treatment is advisable. Camphor (one one-half gr. to three or more) is recommended as the best analeptic, if the pulse is weak with low tension, or there is cyanosis, or great loss of strength. After it come strong coffee, strong wine or cognac in moderate quantity, not, however, to be preferred to camphor.

Kassowitz of Vienna argues, in a long paper, that alcohol possesses toxic properties alone, that no substance can play the double role of foodstuff and poison, and that camphor is far to be preferred to it as a stimulant on account of its promptitude of action and its freedom from the undesirable

complicating effects (intoxication and stupor). Pneumonics especially do well without alcohol. He believes strongly in giving sugar as a real food. It economizes albumin and fat, and has been proved by the ergograph to act powerfully and rapidly in stimulating muscle, an effect which, no doubt, also benefits the heart. Sugar can be given in various forms, as fruit juices, compot, fruit-ice, sweet lemonade, sweetened tea. He does not understand why alcohol should be used with such enthusiasm as a cardiac stimulant, when we have a thousand times seen what a deleterious effect it has on cardiac muscle.

Barr of Liverpool says the feverish blood in pneumonia is sufficient stimulus for the heart, without alcohol, which may be reserved for convalescence. Alcohol does not increase the power of the heart, but reduces the blood pressure, already too low. In certain cases, as when the pulse is irregular and small, and the vessel walls rather rigid, a small amount may do good. If alcoholic subjects are thought to need something, a good light draught beer or stout containing about four per cent alcohol is safest.

This question of the treatment of alcoholic subjects requires some special consideration. The complication of pneumonia with inebriety is very grave, and it has been a widely-accepted dictum that alcohol must be given in such cases. There is no doubt if a man is habituated to the use of alcohol he can take it without the evidence of functional disturbance produced in the non-alcoholic; the tissues tolerate its presence as they may get used to arsenic, morphine; etc. On the other hand there is a fear that the sudden and complete withdrawal of the stimulant might be followed by a dangerous depression or even by delirium tremens. The analogy with the stoppage of morphine in morphinomaniacs does not hold, for it is the generally-accepted practice that it is best to stop the drug somewhat gradually in the latter, whereas it has been proved best in delirium tremens or habitual alcoholism to stop the alcohol at once and completely.

Aufrecht has extremely favorable results from the use of stopping the alcohol entirely in delirium tremens, when occurring with pneumonia or otherwise. My opinion is that it is bad practice to push the stimulant simply because the patient has been a heavy drinker, but in such cases one must be most anxious to support the strength by beef juice, beef tea, and milk, to stimulate with strong coffee and tea, to procure sleep and rest, and to bring in drugs such as camphor, strychnine, caffeine, carbonate of ammonia, and digitalis, as they seem called for.

I should much like to discuss the employment of alcohol in some other classes of disease, such as wasting diseases (phthisis, diabetes), heart diseases, diseases of children, but I must at present forbear.

My conclusion is that we should clear our minds of prejudices regarding the stimulating and sustaining power of alcohol, and substitute for them more accurate ideas. When we prescribe alcohol, let us endeavor, in the light of the most recent scientific knowledge, to exercise at least as much thoughtful care in regard to our patient's welfare as when we order any other powerful drug such as arsenic, morphia, or strychnine.—*Edinburgh Medical Journal.*

“Where is the boundary between the drunkard and the moderate drinker? Nothing appears to me more ludicrous now than the contemptuous attitude the moderate drinker assumes toward the toper. Are, for instance, all of our staggering officials, professional scientists, artists, and physicians at the close of our official banquets moderate drinkers? Does the official debauch characterize moderation? . . . Do not the number of deaths from fatty degeneration of heart, diseases of the vessel walls, delirium tremens, the hardening of the livers preach loud enough that our drinking customs are ruining our bodies and shortening our lives?”—*August Forst, Professor of Mental Diseases, University of Zurich.*

IS ALCOHOL A TRUE FOOD?

BY CHARLES R. DRYSDALE, M.D.,

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There exists in London a society of medical persons, old and young, ladies and gentlemen, which has the appellation of the "British Medical Temperance Association," the members of which are all total abstainers from alcoholic drinks. Nearly 1,000 persons belong to this association, and I have the honor to be delegated by the council to take part in the discussions in Vienna this year.

Being old, I remember during my life to have seen great changes in the practice of the medical art, since 1840, when I resided in Edinburgh, of which famous medical city I am a native. At that time I well remember that bleeding in pneumonia and pleurisy was commonly practised, while mercury was used in a host of inflammations and in conjunction with tartar emetic was lavishly exhibited in such cases. At present we moderns appear to do less and yet have better results in the treatment of diseases. Again, up to 1840 the use of alcohol in health and in disease was so prevalent that even our life insurance companies refused to insure teetotalers at ordinary premiums.

Practical medicine owes much to chemistry, but in the case of alcoholic remedies I fear we must say that chemistry misled practitioners for a time. To the able German chemist, Justus von Liebig, we owe the dictum promulgated in his "Letters on Chemistry," that alcohol was a food when taken

in moderate quantities, a stimulant, and an "Aliment and d'epargne."

Moleschott, one of Liebig's pupils, called wine a "savings bank," which a workingman must make use of, because his work was hard and his other diet scanty. Here, then, appears the chemical doctrine that alcohol is a respiratory food, a doctrine which was held for many years by some of our ablest physicians. Above all, the Dublin School of Stokes, Graves, and Todd became enthusiastic promoters of Liebig's food hypothesis, and, therefore, "fed" fevers with plenty of that "food."

Dr. Todd was for many years the leading physician in London, and I have had opportunities of watching his practice in King's College Hospital, when he would give as much as twenty ounces of brandy to a young man suffering from acute rheumatism. Sir B. Ward Richardson informed me that Dr. Todd carries out his own views by himself, partaking rather largely of spirits and alcoholic liquor, and I rather think he succumbed to cirrhosis of the liver, as he had the aspect of that disease when I saw him not long before he died. After his death a number of energetic disciples of Dr. Todd, e. g., Dr. Anstie and others, warmly advocated his views as to the value of alcohol as a food in disease, and a host of imitators arose who adhered to this faith. In 1860, however, three able French chemists, Lallemand, Perrin, and Duroy, entirely dissociated themselves from Liebig's theory of alcohol being a food, and alleged that their experiments proved that alcohol left the system unchanged, chiefly in the urine. Thus chemistry again gave uncertain indications.

For my part, I always had a great disbelief in this chemical hypothesis, because I took human milk as a type of what a true food must be, and seeing that milk contained only water, albumen, sugar, butter, and a few earthy salts, but no trace of alcohol, I refused to admit that alcohol should be classed as a food, any more than chloroform, ether, or other

similar compounds of carbon, hydrogen, and oxygen. The proper definition of a food is, I hold, a substance which, when introduced into the economy, is, first of all, assimilated, oxidized, and productive of an effect in warming the body, or giving force to it, and which is indispensable to the maintenance of life. It is necessary, also, that the products of such substances should be capable of deposition in the system, so as to form a provision which may be used and which is not hurtful.

Some recent researches made by Strassmann (*Archiv. fur du ges. Physiologie*, XLIX) and Bodlander (same *Archiv.*, XXXII) would seem to prove that about ninety per cent. of alcohol taken into the system is oxidized into carbonic acid and water, and so as to afford seven calories per gram of alcohol. And it is affirmed that a litre of wine, at ten per cent. of alcohol, would give 700 calories, or a quarter of the total amount of energy required for twenty-four hours. The objection made to this is that alcohol augments the loss of heat from the body by enlarging the capillaries, and that, therefore, there is some fallacy. Milk, eggs, meat, are true foods, and warm the system and repair the muscular waste. But alcohol does not warm the body; on the contrary it is most dangerous to make use of it in polar regions, and Dr. Nansen in his celebrated journey expressly omitted all alcoholic drinks from the list of his stores. Alcohol also tends to cause degeneration of the tissues, and to destroy the health of adults, and even of their offspring. Hence it cannot be admitted to answer the definition of a true food as given above. Alcohol does not warm the body, but allows the heat to escape, by its paralyzing effect on the capillaries of the skin. It diminishes the capacity for muscular exertion by its paralyzing action, in which it resembles chloroform and ether. Trainers for feats of strength and endurance, cyclists, boat-racers, and pedestrians, avoid all alcoholic drinks, as opposed to good training. Many experiments with bands of workmen, such as that of

Dr. Parkes, show that heavy barrow work is far better carried out by workmen without alcohol than with its aid. The experiments of Schmiedeberg (*Lehrbuch der Arzneimittellehre*, Leipzig, 1895) have shown that alcohol does not stimulate but that it paralyzes and that its temporary excitation is caused, as in the case of chloroform and ether, by its paralyzing action on the brain, which is followed by convulsive movements, due to the other nerve centers, which continue until these also become paralyzed.

Alcohol is no true food, for it tends to curtail life and to produce a host of diseases. We moderns are now amply enabled to show this, because since 1840 we have possessed quite a large collection of comparative statistics, concerning the death rates at all ages of abstainers and non-abstainers from alcoholic drinks. We all know that in 1840 the general impression in British assurance companies was that a man who did not use alcohol as part of daily diet was a bad life, and, if insured at all, must pay at least ten per cent. more than the "hearty" British drinker.

The very contrary has now been found to be the truth. Thus, up to 1895, the records of the United Kingdom Temperance and General Provident Institution, which has, since 1866, insured total abstainers in a separate section from non-abstainers, show that in thirty years of its history the mortality expected among its abstainers was 6,542, but only 4,626 died. In the non-abstaining section, 9,235 deaths were expected and 8,987 died. This shows that out of every hundred calculated deaths the abstainers had twenty-six fewer deaths than the non-abstainers. This fact alone has completely revolutionized the views of learned men, and of the intelligent minority of the public, in Europe. If alcohol were a food it would certainly be a most poisonous food, to produce such curtailment of the lives of its votaries, even when using it moderately.

No less convincing are the statistics given by abstaining

and non-abstaining friendly working men's societies, such as the "Rechabites," the "Sons of Temperance," and "Good Templars," when compared with the well-managed, non-abstaining "Foresters" and "Odd Fellows." Even as far back as the years 1871-75 Mr. Neison, in his "Rates of Mortality," showed that expectation of life at the age of twenty was 45.1 years for the Rechabites, 40.2 for the Foresters, and 41.3 for the Odd Fellows; and similar figures at the ages of thirty, forty, and fifty gave proof of the immense advantage of abstinence from alcohol among males of the working classes. Besides this the members of the Foresters, who, like the Rechabites, have to pass an examination as to their health on joining, showed nearly twenty-six weeks of sickness against only seven weeks among the Rechabites, so that probably two-thirds of the cases of sickness in the former were due to alcohol.

In London, as we all know who have been connected with general hospitals, and where wages are higher than in most provincial cities, our hospitals contain a vast number of victims of chronic alcoholism. Gout is extremely prevalent in London, and is caused by the enormous consumption of beer by so many of the workmen. Diseases of the stomach, the heart, the lungs, the brain, the liver, the kidneys, and the bladder, caused by drinking beer and spirits, are extremely prevalent, and carry off great hosts of patients. In London and Paris especially that fatal disease, pulmonary consumption, is greatly spread by the fact that the drinker is less able to resist the attacks of that contagion. Hence men suffer more frequently from phthisis than women in London and Paris.

Another piece of statistics was given some twelve years ago in the British Medical Association concerning the habits of eighty-two persons, all more than eighty years of age each. It was found that thirty-six per cent. of them had been total abstainers, and forty per cent. extremely sober. The abstainers constituted more than a third of these aged persons,

but their probable number should only have been ten per cent. They thus profited more than three and one-half times over the other octogenarians of that group.

The result of numerous discussions in the British Medical Temperance Association was that about 1,000 deaths weekly in the United Kingdom were caused prematurely by the use of alcoholic drinks, and Dr. Lancereaux, of Paris, calculated that in Parisian hospitals one-twentieth of the deaths were due to alcoholism, which was the most frequent cause of death next to phthisis. In London I suspect that alcohol causes even more deaths than phthisis pulmonalis.

As to that unfortunate class of mankind, the inebriated, which this society does so much to study, their chances of longevity are miserable indeed. Neison (*Contribution to Vital Statistics, 1857*) calculated that at the age of twenty, the ordinary expectation of life being forty-four years, the drinkers only lived, on an average, fifteen years. The same results have lately been found true in Switzerland, which has shown that the ninth part of all deaths among males over the age of twenty years was due to alcoholic excesses. Dr. Fournier of Ellicon Lunatic Asylum mentions that ninety per cent. of the insane who have become inmates from alcohol are wine-drinkers or consumers of cider and beer, and only ten per cent. are spirit-drinkers.

Dr. Ogle's statistics (Forty-fifth Report of the Registrar-General) showed that while the death rate of clergymen of the Established Church has a figure of 550, the mortality of innkeepers was 1,521, and that of servants employed in public houses 2,205.

The result of these statistics was the foundation of the London Temperance Hospital, which has since 1873 treated 14,000 patients almost entirely without alcohol as a remedy, since even tinctures of any kind are replaced by infusions, etc. The much-regretted physician of that hospital, Sir B. Ward Richardson, summed up the results of his experience in that

hospital in 1897, when he said: "Sick people have no more need of wine, beer, or spirits than healthy people."

I would point out that at no period in history have the working classes suffered more than they do at present in this country, in France, and in Germany, from alcoholism. Spirits are now so easily manufactured that all classes are tempted to excess, and as the sums spent in the United Kingdom in 1899 was put down at £160,000,000, and about seven millions of our population abstain from alcohol, probably some ten million persons consume nearly the whole of that quantity of beer, wine, and spirits, which shows that each one of them must spend about £16 a head for alcohol yearly.

The percentage of cases of insanity in English asylums due to alcoholism is put down at twenty for males and eight for women, but Dr. Walmesby of Darenth wrote lately that our asylums "scream" with alcohol and our prisons "groan" with its victims. He thinks that seventy-five per cent. of insane cases, hereditary and acquired together, are due to chronic alcoholism. I have myself noted many terrible hereditary histories due to drinking in the parents.

Mr. James Whyte, actuary, of Manchester (Paris Congress contre l'Alcoolisme, 1899), sums up the results of British alcoholic statistics as follows: "We are warranted in concluding that teetotalers at twenty years of age have an expectation of life of at least ten years more than that of alcohol-users." The annual death rate since 1840 has been reduced 4.45 per 1,000, but that improvement took place chiefly among the young. Mr. Whyte tells us that from 1838 to 1854, the expectation of male life at twenty years was 39.48 and from 1881 to 1890 it was 40.27, only four-fifths of a year more. He thinks that this slow improvement is due to alcoholism.

However this may be, I claim to have answered my first question, Is alcohol a true food? in the negative. No, alcohol is certainly not a food, but a slow poison to all who habitually

use it, causing not "a short life and a merry one," as some would say, but a short life and a sickly life. I have fully and liberately after giving these facts.

"Intoxicating drinks never make a man brilliant. The prevailing notion that it does is based on self-delusion, is only a symptom of incipient paralysis; in proportion as self-criticism is diminished, self-approbation rises. A drinking company and a toper never become conscious of vacuity or want of intelligence. They require no interests, nor ideals, they have the rapture, the solace of a narcotic. Nothing is more fatal to the development of a human being, nothing is so undermining, so destructive to the best of which a man is capable. There is nothing that with such unfailing certainty will paralyze every remnant of energy as the habitual all-pelling of tedium by means of alcohol. The Philistine never becomes indignant until after whisky has converted him into a murderer or a thief; the fact that beer renders thousands of men stupid, simple, and ragged does not in the least disturb his selfish complacency. I call that man a toper who is not at ease unless he daily introduces alcohol into his system, no matter whether in the form of beer or wine."
Gustave von Bunge, M.D., Professor of Physiological Chemistry, University at Basle.

"*In vino veritas.* Wine discloses the real nature, enables us to appear natural in each other's society. I dispute the premise of this statement. Wine does not disclose the real nature. Nature robbed of its highest qualities is not real nature. What wine reveals is only a part of nature after that which is best and strongest has been eliminated. What is more powerful than that which eventually directs the entire life, namely, the judgment?" — *J. Gaule, M.D., Professor of Physiology, University of Zurich.*

HYDRIATIC SUBSTITUTES FOR ALCOHOL.

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The question of the use of alcohol in connection with the cold bath when used for the reduction of fever and as a cardiac stimulant is one deserving of most careful thought and attention. The idea upon which this practice is based is evidently the supposition that alcohol is a stimulant, at least that it in some way sustains the heart or the vital powers. But this theory was long ago rendered thoroughly untenable by a multitude of carefully conducted experiments upon healthy subjects, showing that alcohol is always and in all doses a narcotic, and not a stimulant; that it depresses, and does not excite the heart and other vital organs; that it lessens vital resistance to disease; and that it is a toxic agent which the body must cast out, and not a food to be assimilated, nor a source of energy or aid to any vital organ or function.

The relation of alcohol to the heart and the circulation is a matter of most profound importance in the class of cases in which the cold bath is most frequently applied. In relation to this point the fact should be recalled that the heart is not the only force involved in the circulation of the blood. It is doubtless the great engine of the circulation, but it has been clearly shown by Schiff and numerous other physiologists that the movement of the blood is greatly aided by a rhythmic action of the small vessels, both arterioles and capillaries. These contractions are not simultaneous with those of the heart,

hence do not interfere with its action; but as the pressure in the veins is very much below that of the arteries, these contractile movements serve most efficiently in pushing the blood along toward the veins. The heart keeps the large arteries pumped full of blood, while by means of the contractile movements of the peripheral vessels, the blood is, so to speak, milked out into the veins. We may say, in fact, that there are two hearts concerned in the circulation, the work of the central organ being supplemented by the peripheral heart,—the small vessels,—working at the distal end of the vascular loop, where the resistance is greatest.

Active congestion or hyperemia, is simply a state in which the movements of the small vessels are very vigorous, and have a wide swing, so that a large amount of blood is passed through the tissues. In passive congestion there is dilatation of the small vessels without increased activity. One condition results from increased action of the vessels through stimulation of both the vasodilators and the vasoconstrictors, the other from paralysis of the vasoconstrictors, or of the vasodilators, or both, resulting in dilatation of the small vessels, with stagnation of their contents. In active congestion, the aid afforded by the rhythmic movements of the small vessels is increased. In passive congestion this aid is greatly diminished or entirely lost. The difference in the rate of the movement of the blood gives rise to the difference in color,—scarlet in active hyperemia or congestion, cherry red in passive congestion. In the one case a rich supply of fresh, oxygenated arterial blood is passing through the small vessels into the veins, the movement of the blood is rapid, and all the vital processes are quickened; the heart, as well as all other organs, is thus better nourished and energized. In passive congestion and all conditions of the circulation in which a cyanotic appearance is present, the usual condition is slowed circulation. The blood current is slow through cardiac weakness, or the lack of the active assistance of the peripheral

heart; as a consequence, an insufficient amount of oxygen is introduced into the body, the blood is charged with CO₂, and other tissue poisons, and all the vital processes are depressed. To aid the heart and the circulation the thing needed is not simply an increased rate of activity of the heart, or an increased volume of the pulse, but an increased movement of the blood current throughout the entire system.

Pallor is due to contraction of all the vessels of the skin. Local cyanosis is due to greatly slowed movements of the blood, either from passive congestion or spasm of the arterioles, resulting in excessive absorption of oxygen and accumulation of CO₂ in the blood.

In the application of any agent for the purpose of relieving conditions of this kind, the peripheral heart as well as the heart itself must be taken into consideration. In fact, the whole circulatory system must be regarded as one. The heart and the arteries are composed of essentially the same kind of tissue, and have practically the same functions. The arteries and capillaries as well as the heart are capable of contracting. Both the heart and the arteries are controlled by excitory and inhibitory nerves. These two classes of nerves controlling the heart and the vessels respectively are kindred in structure and origin, the vagus and the vasodilators being medullated and of spinal origin, while the accelerators of the heart and the vasoconstrictors of the arteries are non-medullated.

Winternitz and other authorities have frequently called attention to the value of cold as a cardiac stimulant or tonic. The tonic effect of this agent is greater than that of any medicinal agent which can be administered.

The cold compress applied over the cardiac area of the chest may well replace alcohol as a heart tonic. The application consists of a compress applied to the portion of the chest wall over the heart. This comprises the space bounded by the second rib above the right border of the sternum, a line falling one-half inch to the right of the nipple, and the

sixth rib below. The compress should be large enough to cover this space, and to extend at least two inches outside of it. Ordinarily the best effects are produced by employing water at a temperature of about sixty degrees. The compress should be wrung moderately dry, and should be very lightly covered. It is desirable that cooling by slow evaporation should be encouraged, and should continue for some time.

The thing necessary to encourage the heart's action is not mere relaxation of the peripheral vessels, but, as Winternitz has shown, increased activity of the peripheral circulation in the skin, muscles, and elsewhere. Alcohol paralyzes the vasoconstrictors, and so dilates the small vessels, and lessens the resistance to the heart action; but at the same time it lessens the energy of the nerve centers which control the heart, diminishes the power of the heart muscles, and lessens that rhythmical activity of the small vessels whereby the circulation is so efficiently aided at that portion of the blood circuit most remote from the heart. A cold application to that portion of the chest overlying the heart reflexly stimulates and energizes the heart through the cardiac nerves. This reflex action is not confined to the heart muscle; the stimulation of the activity of the cardiac vessels improves the circulation through the heart structure, refreshing and energizing it in the same manner in which a voluntary muscle is energized by a cold application, as is so well shown by the ergograph.

It is well to remember that vasoconstrictor nerves are one in kind with the excitor nerves of the heart, while the vasodilators are in like manner associated with the vagus. With this in mind, it is easy to see that while alcohol paralyzes the vasoconstrictors, it, at the same time, weakens the nerves and the ganglia which initiate and maintain the activity of the heart. Cold, on the other hand, excites to activity these nerves and centers, and thus produces the opposite effect.

The apparent increase of strength which follows the giv-

ing of alcohol in cases of cardiac weakness is delusive. There is increased volume of the pulse for the reason that the small arteries and capillaries are dilated, thus lessening resistance and cardiac work; but this apparent improvement is very evanescent, as naturally results from the fact that while the heart is relieved momentarily by the sudden dilatation of the peripheral vessels, the accumulation of blood in the venous system through the loss of the normal activity of the peripheral heart, gradually raises the resistance again by increasing the load of blood which has to be pushed along in the venous system. This loss of the action of the peripheral heart thus in the end more than counterbalances the temporary relief secured by the paralysis of the vasoconstrictors. This accumulation and sluggish movement of blood in the venous system is shown by the purplish hue of the skin in a person under the influence of alcohol, — a wide contrast to the ruddy glow presented by the skin in which the small vessels are actively engaged in pumping the blood out of the small arteries into the veins, action in which the whole body may be made to participate by a general cold douche or other suitable application of cold water to the surface. Cold applications, general and local, may be safely affirmed to be the true physiological heart tonic.

In Germany and France it is the almost universal custom to administer alcohol to the patient just before putting him in the cold bath. Some practitioners, as Winterniz, administer but a very small amount, as a single mouthful of wine; while others give brandy in considerable quantities. A few American practitioners also employ brandy freely with the cold bath. The unwisdom of this practice will be apparent on due consideration of the following facts:

1. One purpose in administering the cold bath is to secure a true stimulant or tonic effect by arousing the vital energies, especially through excitation of the nerve centers of the vasomotor, sympathetic, and cerebrospinal systems.

Alcohol was once supposed to be capable of increasing the vitality and was used for this purpose in typhoid fever and in many other morbid conditions accompanied by depression of the vital forces. At the present time, however, it is generally known and with practical unanimity admitted, that alcohol is neither a tonic nor a stimulant, but a narcotic; that it depresses, and does not excite; that it lessens, and does not increase, the activity of the nerve centers; and this is true of small as well as large doses, as has been shown by the researches of many investigators. In evidence of the foregoing, the following statements from medical men recognized authorities throughout the civilized world

Harnack says: "It should also never be forgotten that even in small doses, the paralyzing action of alcohol is exerted most rapidly and energetically upon the tonic vessels — the importance of which tonus for the maintenance of the circulation and the cardiac energy is well known."

Victor Horsley, an eminent English surgeon, says: "The old theories of shock have been proved incorrect, and alcohol has consequently become unnecessary. It is less and less used in the future, and the discredit into which it has fallen is justified."

Hermann Frye, by the use of Mosso's ergograph, showed that "in the unfatigued muscle, alcohol lessens the extent of its maximum contraction, owing to a lessening of the peripheral irritability of the nervous system."

The heart is a muscle, and consequently alcohol cannot be expected to increase its working power; and when laboring under the influence of toxic agents, as in a febrile state, it is clearly evident that the effect of this agent must be distinctly and altogether pernicious.

Chantemesse calls attention to the diminished amount of urea in the urine in many cases of typhoid fever, the toxin being

tained in the body during the fever, resulting in an enormous increase of the toxicity of the urine during convalescence. This fact is of great importance in connection with the use of antipyrine and alcohol, which lessens the activity of the kidneys, and so causes still further retention of the toxins.

In a series of physiological experiments conducted by the writer in 1893, and reported at the meeting of the American Medical Temperance Association held at Milwaukee in May, 1893, it was clearly shown that nervous, muscular, and glandular activities are all diminished to a noticeable degree by the ordinary medicinal doses of brandy and other stimulants.

It is clear, then, that those who administer alcohol before the cold bath, by so doing antagonize the therapeutic activity of the measure since so far as alcohol has any effect whatever, it is to depreciate or neutralize the very effect which it is designed to secure by the cold application.

2. The effect of alcohol is to cause dilatation of the peripheral vessels. This it does by paralyzing the vasoconstrictors.

As already stated, paralysis of the peripheral vessels and of the vasomotor centers of the medulla, as shown by Romberg and Paessler, are the real causes of heart failure; hence, alcohol, in its effect upon the vasomotor centers and nerves, can only aggravate the very condition for the relief of which it is administered. Alcohol at the same time exercises a like effect upon the accelerator nerves of the heart, which are both anatomically and physiologically associated with the vasoconstrictors, as Waller has so clearly pointed out. By this means, while the heart's action seems to be freer, the movement of the blood through the systemic circulation is slowed, as is shown the stasis in the peripheral vessels, which is clearly indicated by the dusky hue of the skin in a man under the influence of alcohol. The influence of alcohol is in this respect somewhat akin to that of the warm bath. The effect of a cold application, however, is the very opposite; viz., the stimulation of the vasoconstrictors. At first this effect is

so pronounced that the blood vessels are almost completely emptied of their contents, and the skin becomes blanched in appearance.

As reaction sets in, the caliber of the blood vessels is increased, but stimulation of the vasoconstrictors continues in that wonderful rhythmic activity of the small vessels, the peripheral heart, whereby the blood is steadily pumped from the arterial into the venous system, resulting in a bright red flushing of the skin, which indicates an increased flow of the blood through the periphery, and an increased rate of movement throughout the whole circulatory system.

3. It is not maintained that no preparation for the cold bath is needed, but rather that there is a far better method than by the use of alcohol. The ideal preparation is to be found in the application of heat. If alcohol in any way aids reaction, it is not by augmenting the activity of the nerve centers, but by encouraging the relaxation of the surface vessels. But this can be accomplished far better by either a general or local application of heat, as a foot bath, fomentations to the spine, or when convenient, a general application of heat, such as a hot full bath for one or two minutes, a hot blanket pack, a hot shower, or even hot water drinking, or a hot enema, or wrapping the patient in warm woolen blankets for a half hour or so, with hot bags about him. All these are measures whereby the preparation for the cold bath may be accomplished far more efficiently than by any form of medication.

Heat is a natural preparation for cold. The application of heat to the surface vessels is a physiological stimulus whereby the centers are aroused to activity, and the thermic nerves rendered in the highest degree capable of responding to the reflex stimulus which the cold applications communicate to the skin, and through it to the nerve centers.

4. While it is true that the patient *seems* to bear the cold bath better when alcohol is administered, this fact is the

strongest kind of argument against the use of alcohol in this connection; for the only way in which alcohol can diminish the shock or lessen the discomfort of the patient in the application of cold water, is by lessening nervous sensibility through its narcotic effect; and just so far as this is accomplished, the effect of the bath is neutralized and its efficacy lessened, for the reason that the whole effect of the cold application depends upon the thermic impression made upon the skin. Thus, so far as this impression is diminished, the effect of the bath itself is diminished; the combination of such antagonistic measures as alcohol and cold water can not be regarded otherwise than in the highest degree unphilosophical, and, from the standpoint of rational therapeutics, absurd. The practice is one which appeals strongly not only to the prejudices of the laity, but to the predilections of quite too large a proportion of physicians; but not one scientific fact or even plausible apology can be brought forward in support of this practice.

The utility of the cold bath as originally practiced by Brand cannot be questioned; but Winterniz has shown that the rate of heat elimination may be very greatly increased by rubbing the patient continuously during the bath. At the present time Brand and his followers, who are adepts in the use of the cold bath in fever, uniformly employ vigorous friction during the entire bath. Those authors who forbid friction during the bath because of the supposition that heat production may thereby be increased evidently do not recognize the fact that by the maintenance of a vigorous surface circulation the rate of heat elimination is increased out of proportion to the slight increase of heat production, so that there is a decided gain to the patient by friction employed during the bath; and especially do these writers neglect the important fact that the greatest benefit derived from the cold bath is not the simple heat abstraction, but the general rousing of the

vital powers, the increase of resistance, and the quickening of the recuperative and reparative activities of the body.

Another advantage of this method is that the patient is much more comfortable in the bath, and will tolerate the application for a longer time and at a lower temperature as well as more frequently than when it is administered without friction. As elsewhere shown, friction also averts increase of heat production by preventing shivering.

The claim made by some authorities that friction during the bath lessens the permanency of its effect in temperature reduction, is perhaps correct to a degree, but this only necessitates the more frequent use of the bath, which the friction renders readily tolerable.

How, then, may we explain the good effects obtained by the method of Brand? The explanation is to be found, not in the subtraction of heat alone, but especially in the tonic effects of the cold water, and in the sedative influence upon the nervous reflexes concerned in the febrile process, and in the powerful diuretic effects of the bath.

Ziemssen first, and later Glenard, recommended in their terms the so-called graduated bath, in which the patient is placed in an immersion bath, the temperature of which is 3° to 4° below that of the body. The temperature is then steadily lowered at the rate of about one degree every three minutes, until a temperature of 86° is reached. This method has the advantage that no shock is produced, as when the patient is placed in water at 68° by the Brand method. There is, accordingly, no marked thermic reaction. If desirable, the temperature may be lowered still more, or until the patient becomes slightly chilly, but he should not be allowed to shiver. The bath should be accompanied by gentle friction for the purpose of preventing chill, and to increase heat elimination.

With feeble patients who chill easily, the lowest temperature of the bath may be made 90° or 92° F. in the first application, the bath being more prolonged than when the lower tempera-

ture is employed. In such cases the temperature of the bath should be lowered one or two degrees at each application until the temperature of 70° or 75° is reached.

The graduated bath obviates the danger from syncope, which is one of the inconveniences of the cold bath. It may be employed in cases in which the cold bath is contra-indicated, as in cases of typhoid with serious renal or cardiac complications.

The results in temperature reduction obtained by the graduated bath are more permanent than those obtained from the cold bath of Brand or the cold affusion of Currie; and after several years' experience with this bath, the writer considers the graduated bath one of the most efficient and satisfactory of all the methods employed for reducing temperature in fever. Unfortunately, it is much less convenient for use in the ordinary home or in private practice than in hospitals. There are, however, other means by which very similar, and perhaps equally good, effects may be secured.

When the cooling wet-sheet pack is employed for the reduction of temperature, the sheet should be wet in cold or cool water, and should be wrung out slightly, then wrapped about the patient in such a manner as to come into immediate contact with every part of the body, being tucked in closely around each limb and about the neck. The patient should be covered very lightly if at all. In a few moments the temperature of the sheet will be raised to nearly that of the body, when it should be renewed, a fresh pail of cold water being employed each time for wetting the sheet, which should be wrung out as dry as possible, in order to remove the warm water which it contains, before dipping into the cold water for the second application. It is better to use two sheets, having the freshly prepared sheet on another couch.

The application may be renewed in this manner five or six times in succession, or even more. When the temperature of the body is very high, the sheet is so rapidly heated that it

must be renewed every five to seven minutes, so that the cooling effect continuous. The applications should be renewed until the temperature has been lowered one degree more, or until reduced to 101° or less, each successive application being longer than the preceding. There should be a good circulatory reaction to maintain an active circulation. It is often well to secure this by friction with the hand outside the sheet.

Instead of removing the sheet from the patient, the cooling effect may be accomplished by opening the sheet and applying the body as well as the sheet with cold water. The patient should be made to turn, first upon one side and then the other, so that the back and the whole body may be exposed to the cold application.

A better method still is to place the patient upon a sheet covered with oilcloth, so arranged in relation to a tub placed at the foot of the cot that any surplus water may run off and run away; then the water may be turned upon the patient from a watering-pot or poured over him either from a watering-pot or other convenient vessel. By this means the cooling effect of the sheet may be made continuous and more intense as that of the cold bath.

The late Dr. Austin Flint introduced this form of cooling bath in 1874, when the writer was a pupil under him in Bellevue Hospital. In a paper read by him before the Academy of Medicine at that time he reported several obstinate and protracted cases of remittent malarial fever with very high temperature, that were rapidly cured by this measure repeated daily.

Water at any desired temperature may be used. If the patient does not well tolerate cold applications, water at a temperature of 80° or even 85° F. will be found efficient in lowering the temperature, provided the application is continued for a sufficient length of time.

The cold towel bath is essentially the same as the cold

sponge bath, only applied somewhat differently. A towel of ordinary size is wrung out of cool or cold water, and spread out quickly over as large an area as possible. The hands are applied with a rubbing movement, outside, not under the towel, first one part then another, until the whole towel is slightly warmed, when it is quickly renewed by dipping in cold water and wringing slightly, and applied to an adjacent or corresponding surface; and so on until the entire body has been gone over, the operation being continued as long as may be necessary to procure the desired results. This method is applicable only to cases in which there is but a slight rise of temperature, or where the patient is too feeble to be subjected to more vigorous measures. Each part must be quickly dried, rubbed, and covered after the application before proceeding to the next.

The cold-towel rub, the towel being wrung as dry as possible, is of great service in cases in which the patient is in a dynamic state, with cold extremities, pinched features, and marked depression. Especial attention should be given to the limbs, and the application must be short and instantly followed by vigorous rubbing. Partial cold rubbings test the patient's reaction and preparation for more vigorous applications, such as the cooling pack and the graduated bath.

The cold wet friction bath, administered by means of the cold friction mitt, is a most useful measure in cases of fever in which the condition of the patient demands a cold application to lower the temperature, energize the heart, and increase vital resistance, but in which there are conditions that contra-indicate the ordinary cold immersion or Brand bath. It is a most valuable antipyretic measure, and is always indicated in fever, except in cases in which cold applications must be forbidden altogether, as when the patient is perspiring freely. It may even be employed when the skin is cold or anæsthetic. It is possible to use water at a very low temperature, even ice water, in administering this treatment. It is of

the greatest possible service in the adynamic or ataxo-adynamic conditions of typhoid fever, in cases in which serious cardiac or renal complications have appeared in intestinal hemorrhage, and in collapse from hemorrhage or perforation. It rouses the vital powers in a wonderful manner, brings to the surface the blood which is stagnating in the viscera, awakens the lethargic brain, slows and strengthens the fluttering pulse, and completely changes the aspect of an apparently desperate case, and often in a very brief space of time, a few hours, even. The bath may be perfectly graduated. At first the mitt should be only moistened. As the circulation improves, it may at the next application be saturated, and later it may be filled.

After twenty-five years of extended experience in the use of baths of all temperatures, the writer feels justified in taking a most uncompromising stand against the use of alcohol in any form in connection with hydriatic procedures. If there are any two agencies in the world which are absolutely irreconcilable, they are alcohol and water. Their application in conjunction gives, not the sum of two co-operating or complementing agents, but the difference between two neutralizing and antagonistic measures. In any case in which alcohol may seem to be indicated as a means of preparing the patient for the application of a cold bath, heat may be employed to far better advantage, with the certainty of better results, and with absolute physiological consistency.

ALCOHOL IN HIGH ALTITUDES.

BY E. STUVER, M.Sc., M.D., Ph.D.,

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etc., Fort Collins, Colorado.

Twenty-five years ago alcohol, in some of its many forms, was regarded by the great majority of physicians as an almost indispensable agent in the treatment of a large number of diseases. It was considered to be not only *the* stimulant par excellence, but also a food of the very highest value. Its use in the sick room was almost universal, and he who had the temerity to suggest any doubts as to its beneficial effects was regarded with ill-concealed contempt.

At that time it was believed that the use of alcohol increased muscular power and endurance; that it assisted digestion, rendered the perceptive faculties more acute, and gave power and brilliancy to the mind. Thanks to the careful, painstaking, and accurate investigations made by many scientific and trained observers, by means of modern instruments of precision, it has been demonstrated that these widely-accepted beliefs are almost entirely without foundation and are erroneous. It has been proven that alcohol instead of aiding the normal functional activities of the body and being a valuable adjuvant in the treatment of disease has a decidedly deleterious effect in both these spheres of activity.

First. Alcohol passes directly from the stomach into the circulation and in a few minutes is swept through the entire system. If present in sufficient amount its strong affinity for water leads it to absorb moisture from the red blood corpuscles, causing them to shrink, change their form, harden, and lose some of their ability to carry oxygen.

Second. All the cells and tissues of the body are surrounded by membranes on the integrity of which the silent work of building up the body depends. Alcohol, by its power to coagulate albumen, condenses, thickens, and clogs these dialyzing membranes, thereby hindering the endosmosis and assimilation of nutrient materials and the exosmosis or excretion of broken-down, retrograde products and toxins from the body.

Third. Alcohol retards rather than facilitates digestion. This fact has been demonstrated by a large number of the most eminent and competent observers, and the old popular notion that wine and spirits aid digestion has been proven to be a fallacy.

Fourth. Alcohol lowers muscular force and efficiency. This is conclusively shown by the fact that those who engage in athletic sports must stop drinking if they expect to excel. No prize fighter, ball player, oarsman, or any kind of athlete can keep up drinking habits without so injuring himself in a few years that he is relegated to the rear as "a back number."

Fifth. Alcohol reduces the power and functional activity of the special senses; the acuity of vision is lowered, the power of hearing reduced, the sense of smell blunted, and the taste so obtunded that fiery and even caustic liquids can be swallowed without wincing.

Sixth. But while alcohol retards digestion, impedes assimilation and excretion, reduces the oxygen-carrying power of the blood, and inhibits the nutrition of the cells and tissues of the whole body, still it is on the nervous system that its most far-reaching and malign influences are exerted. As Dr. N. S. Davis has well said: "Alcohol diminishes the nerve force, sensibility, and action of the nerve centers in direct proportion to the amount entering into the blood."

Seventh. Alcohol exerts a peculiarly pernicious effect on the mind and the moral nature. The will is weakened, the judgment obscured, and the memory impaired. The finer

sensibilities and moral perceptions are so blunted that the regard for truth, justice, and the rights of others is greatly lessened. Indeed it is a common observation that old habits are entirely unreliable, and in many cases their most sacred pledges are absolutely worthless.

Eighth. Recently the food value of alcohol has aroused a spirited, and in many cases acrimonious, discussion. Alcohol diminishes the excretion of CO_2 . Through its influence on the nervous system it lowers cell activity and by retarding or diminishing oxidation favors the accumulation of fat and protein within the cells. This so-called conservation of the tissues, instead of being a help, is really a serious menace to the system, because of the constantly accumulating products of retrograde metabolism. As very cogently pointed out by Professor Winfield S. Hall, morphine similarly conserves the tissues and if on this account we designate alcohol as a food, morphine should be placed in the same category. Both are oxidized and yield a certain amount of heat, but neither is assimilable nor a tissue builder.

A wonderful change has taken place among physicians during the last twenty-five years as to the value of alcohol in the treatment of disease. At the beginning of that period nearly all physicians used and recommended alcoholic liquors in some form in acute and wasting diseases and wherever a stimulant was indicated. Owing to the magnificent work of Drs. B. W. Richardson, N. S. Davis, T. D. Crothers, and many others, both in this country and in Europe, it has been shown by careful statistical investigations from both hospitals and private practice that many of the diseases which were thought imperatively to demand the use of alcohol get along better without it. While this is true of ordinary altitudes, it applies with still greater force to the high altitude, 4,000 to 10,000 feet, of the Rocky Mountain region. I confine my statements to the Rocky Mountain region because my data have been obtained from twenty-one years' practice in this section of

the country. In this connection I desire to state that I began the practice of medicine quite strongly prepossessed in favor of the use of alcohol in the treatment of disease, and a firm believer in its stimulating powers. As the years passed by, however, and my experience became larger and more mature, I was forced by the observation of many unpleasant and unfavorable effects and results, both in my own and the practice of other physicians, to the conclusion that the use of alcohol, save in rare and exceptional cases, is, to say the least, of very doubtful utility. In addition to retarding digestion and interfering with the assimilative and excretory functions, it excites and irritates the nervous system, sleep is disturbed and rendered less refreshing, and the patient often awakens with a decided feeling of *malaise*.

As is very well known, the normal functional activity of the heart is more easily disturbed in high than in low altitudes. There is a pronounced tendency to neuralgic pains in and about the heart; and *myasthenia* and irritability of its muscular structure are very prevalent. "Tobacco heart," that is, peculiar weakness, irregularity, and irritability of the organ caused by the use of tobacco, is often encountered by the observant physician, who obtains brilliant results by limiting or interdicting the use of the filthy weed.

In my experience, alcoholic liquors have a very unfavorable effect on the heart; they make it irritable and irregular and weaken instead of strengthening its action. Their peculiar physiological effects are produced by smaller quantities than in low altitudes.

Whether our highly ozonized atmosphere has anything to do with producing these results I cannot say for certain, but I am inclined to think that it has.

From a personal experience in the treatment of about seventy-five cases of typhoid fever I am convinced that this disease can be more successfully treated without than with alcoholic liquors in any form. In the few cases where it was

given it produced nervousness, a tendency to delirium, and irritability of the heart; in short, did harm and no good in every instance. The same may be said of the treatment of pneumonia. Since discarding alcohol my patients get well more promptly and are in better condition on getting up than when it was used.

It is needless for me to detain you with details of the treatment of the various forms of disease. Suffice it to say that I have almost entirely abandoned the use of alcoholic liquors and find that all kinds of cases met with in a general practice get along better without them than when they are used.

“ Among the crimes against the person and the life, all the wounds inflicted on the body, nearly all physical injuries resulting through carelessness, and with few exceptions the cases of manslaughter, and of death by accident can be traced to spirituous liquors. In very many cases of murder, liquor is also the cause of the crime. Crimes against property nearly always have their occasion in some momentary or permanent want of money. But in some eighty per cent. of these cases this lack results through the fault of the perpetrator, or his relatives, and almost always whisky is the agent. Almost without exception the crimes against chastity have their occasion in whisky. This has been my observation for twenty years in Oldenburg, Schleswig-Holstein, Hessa, and Brandenburg. Seventy per cent. of all the crimes and misdemeanors can be traced more or less to the use of spirituous liquors.” —
Adolf Fick, M.D., Professor of Physiology, University of Wurzburg, Bavaria.

THE PATHOLOGY OF CHRONIC ALCOHOLISM

BY HENRY J. BERKLEY, M.D.,

Clinical Professor of Psychiatry Johns Hopkins University

In very recent years studies of the pathological brain, pathological in the sense of having during life undergone some morbid process that ended in the evolution of an insanity, have been pursued with a vigor and thoroughness before unknown. While the results obtained from these researches have not been altogether constant in their character, large additions to our knowledge of numerous morbid conditions have been obtained, sufficient to place some of the diseases on a comparatively firm anatomical foundation, as well as to separate a few, that have common clinical symptoms, from each other and allow of a differential classification. Thus the arterio-sclerotic atrophy, the diffuse syphilitic processes affecting the brain cortex, the endarteritic lesions ending in focal erosions of the cortex, have all been differentiated and distinguished by the aid of the microscope from the true forms of dementia paralytica. Many of the degenerative psychoses begin in vascular alterations, in other proliferation of the neuroglia seems to be an essential factor in the evolution of the alienation, while in still others the brain cells undergo a degeneration apparently caused by the presence in the circulation of an irritant toxine, which destroys the perfection of cellular metabolism. Again, two, or even three, of the essential component elements of the brain may be involved at the same time, the issue being an alteration of the cerebral tissues, which, while fairly readily recognizable, admits of doubt as to

the origin of the primary one involved and incidentally which were the ones secondarily implicated.

In respect to the lesions induced by chronic alcoholism, between the ideas of Alzheimer, who believes he is able to detect the presence of a morbid process in the alcoholic brain before intellectual and moral defects are clinically recognizable, and the majority of pathological investigators, who are unable to find any essential difference in the brain substance of the alcoholic and non-alcoholic subject, there is a deep chasm which seems impossible to bridge at the present time. That comparatively gross histological changes are now and then met with is evidenced by many examinations, such as the present one, in which extensive lesions both of blood vessels and epiblastic elements are to be found. I am inclined to believe that many observers are too skeptical as to what they see in the brain tissues, and pass by lesions, which, because they are fine, and their correlation to mental functions is uncertain, are discarded as of no value, while in truth they are the necessary feature of the process.

J. K., male, æt. fifty-three years, laborer, was admitted to the City Asylum December 21, 1897, suffering from chronic alcoholism.

No details could be obtained of his family history. From youth onward he had led a most dissipated life, and in later years had been a constant inmate of almshouses through the drink habit, which had not lessened as he grew older. When received at the hospital he was very weak, unable to stand, and, above all, suspicious, even to the refusal of food, saying that it was poisoned. Those persecutory ideas were accompanied by various hallucinations and delusions. The room was filled with witches, who tormented him by inserting needles and knives into his flesh; there were bayonets stuck upright in the floor to pierce his feet in unguarded moments; negro women were constantly at work removing his white flesh and replacing it with black, and he had other similar

paræsthetic delusions. The facial expression was depressed. The articulation was defective, blurred in character. Nutrition poor; sleep fair.

The physical examination showed a very much emaciated man, having every appearance of being upwards of seventy years, with numerous bruises and recent scars about the limbs. The skull was brachycephalic (+81). Lungs normal; mitral sounds slightly accentuated, first aortic normal. There was a noticeable diffuse sclerotic degeneration of the peripheral arteries. The pulse was feeble, the circulation much impaired. The deep reflexes were exaggerated, the knee-jerk particularly showing a crossed reflex. The muscles offered a certain plastic resistance on flexion and extension, which apparently was involuntary. No inquiry into the condition of the special senses could be made.

Resistance was obstinately offered to all attempts at examination. Constant automatic movements of the extremities were made. The mental reduction was very great, and no coherent statements concerning the patient's personal history could be obtained. The urine showed traces of albumin, as well as granular and hyaline casts.

Under improved alimentation and rest in bed the man's strength improved somewhat, but soon after he relapsed, the lower extremities became edematous, and on the morning of February 17, 1898, he was paralyzed (right hemiplegia) and died within a few hours.

Autopsy (summary), February 20th, sixteen hours after death. There was marked rigor mortis of all the limbs. Pupils evenly dilated. Purplish discoloration of dependent portions of the body. Lower extremities edematous as high up as the ankle. Abdomen contained some fluid.

Brain. — Weight, with soft membranes, 1430 grams (edematous). Beneath the dura mater on the left side was an extensive blood clot, covering the whole convexity of the cerebrum, and extending to the base of the brain. The dura was

not thickened; the pia over the right half of the cerebrum was gelatinous, milky, with numerous contorted vessels visible in it. On section, beneath the thickest portion of the blood clot, the cerebral substance was pinkish; elsewhere the normal gray appearance of the cortical matter was preserved. The ventricles were considerably dilated and were surrounded by white matter much denser and harder than that of the adjacent tissues. The basal and meningeal arteries were somewhat thickened and showed here and there foci of atheromatosis.

Thoracic cavity.—The pleura was adherent to the lung over nearly the whole of the left side; both lungs were emphysematous, the bases congested but crepitant throughout; the pericardial cavity contained about twenty cc. of clear fluid.

The heart weighed 270 grams. Tricuspid valves coaptated, but showed patches of atheroma. The mitral valve admitted two fingers with difficulty; the left segment was thickened and covered with calcareous patches. The walls of the coronary arteries were sclerotic. Left ventricle wall thirteen mm. thick; the right four mm. on cross measurement.

Abdominal cavity.—There was considerable fluid in the dependent portions. The spleen weighed eighty-five grams, the parenchyma was resistant to the knife and showed an overgrowth of connective tissue. The liver weighed 1,040 grams. It was hard to the touch and nodular upon the surface. On section it was tough and quite light in appearance. The right kidney weighed seventy-five grams, the left ninety-five grams. The surface felt hard and nodular. The capsule was firmly adherent. The pyramids were partly obliterated, cortex three mm. in thickness. The suprarenal capsules were large and normal in aspect.

Atheroma was not pronounced in the aorta and large vessels, but there was an universal diffuse thickening of their walls, especially of the inner lining. In the arteries surround-

ing the cerebral ventricles there were numerous points of annular atheromatosis, which in a few had proceeded to complete obliteration of the lumen in segments of the vessels.

Microscopic examination. — Various portions of the cortex from both hemispheres were preserved on ninety-six per cent. alcohol and in Muller's fluid for after-examination.

Nissl Methylene Blue. — There had been during life an edematous condition of the cortex, and, as a consequence, the prolongations of the nerve cells are apparently larger than normal and can be traced a longer distance than usual from the parent body.

The pathological changes in the veins are much more distinct than in the arterial channels. A morbid process is not everywhere present, but is confined to scattered vessels of medium and large calibre in every level of the cortex.

The lumina of these veins are filled with blood cells, some have corpuscular bodies uniformly scattered through the coagulated mass, while in others the fibrin and cells have separated, the coagula, from the presence of fibrin threads, looking as if the thrombotic plugging had taken place before death. The internal laminae of these vessels have no observable departure from normal conditions beyond being somewhat thickened. Outwardly there is no trace of muscular tissue, but in the place of this layer a greatly hypertrophied tunic of connective tissue elements, entirely devoid of any nuclei, is found. Still outwardly there is a thinner layer of a less dense character, in part separated from the middle one by a lymph space. This most external layer is fibrillar in character and holds a few round nuclei deeply stained by hæmatoxylin. Along the margin of the extravascular lymph space and penetrating into the external layer are deposits of hematoidin crystals.

The lymph spaces around all the cortical vessels are much dilated and contain quantities of hematoidin and granular debris. The vascular neuroglia system is also implicated, the

bodies of the cells being swollen and unusually distinct, while the pseudopods attached to the margins of the perivascular spaces are numerous and unusually visible — *Mental Diseases.*

EFFECT OF ALCOHOL ON THE CELLS.

Dr. Hugo Hoppe of Allenberg, Prussia, in his book on "The Facts Concerning Alcohol" (Dresden, 1899), gives the following account of discoveries relating to the effects of alcohol on the cells made by Ernest Overton, who has been pursuing some investigations in the osmotic properties of cells, accounts of which have appeared in the *Quarterly Naturalist*, Zurich. Dr. Hoppe says:

"Overton found that while cells usually have the ability to hinder or prevent the entrance within their walls of substances that will injure them, this is not the case with alcohol, as well as with ether, chloroform, and other narcotic poisons. These easily penetrate the cell walls and proceed into the interior of the cells, whose protoplasm they deaden. Furthermore, Overton makes the highly interesting observation that if one subjects different kinds of cells to the same diffusion stream of alcohol so that it can enter all with equal rapidity and in the same degree of dilution, the suspension of activity begins first with the most complex and proceeds from these to the most simple. Alcohol plays a similar part in the animal body. As soon as it enters the same it passes by diffusion into the general blood stream which carries it through the organism. Wherever it arrives it passes through the cell walls into the cells and arrests the activity of the protoplasm. If the amount of alcohol is only small, only the cells lying nearest to the stream and those most finely organized will be disturbed. If the amount is large, the influence extends further."

THE MEDICAL PROFESSION AND TOTAL
ABSTINENCE.

BY J. J. RIDGE, M.D., LONDON, ENG.

The whole question of the effect of alcohol on the people of every race, whether we consider it in its individual, social, or political aspect, is necessarily dependent in the first instance on its physiological action. It is a natural consequence of this fact that the medical profession must have the first word and the greatest influence in deciding it.

The medical profession has, indeed, been well represented among those who have taken an interest in the temperance question. Some of the earliest reformers of last century in England and America were medical men. Dr. Rush of Philadelphia and Dr. Cheyne of Bath, even in the eighteenth century, denounced the use of alcohol, while in the nineteenth such men as Dr. Erasmus Darwin, Dr. Beddoes, and a host of others have advocated total abstinence from alcohol, both by precept and example. There have been many more who have realized the evils which have resulted from the use of alcohol as a beverage, and have been ready to help in getting rid of them. They have spoken against the consequences of drinking and have declared the safety and advantage of total abstinence for other people, while they have taken more or less alcohol themselves.

In the United Kingdom there was a notable declaration made in 1839, to the following effect:

"An opinion handed down from rude and ignorant times and imbibed by Englishmen from their youth has become

very general, that the habitual use of some portion of alcoholic drinks, as of wine, beer, or spirit, is beneficial to the health, and even necessary for those subjected to habitual labor.

"Anatomy, physiology, and the experience of all ages and countries, when properly examined, must satisfy every mind well informed in medical science that the above opinion is altogether erroneous.

"Man in ordinary health, like other animals, requires not any such stimulants, and cannot be benefited by the habitual employment of any quantity of them, large or small, nor will their use during his lifetime increase the aggregate amount of his labor. In whatever quantity they are employed they will rather tend to diminish it.

When he is in a state of temporary debility from illness or other causes, a temporary use of them as of other stimulant medicines, may be desirable, but, as soon as he is raised to his natural standard of health, a continuance of their use can do no good to him, even in the most moderate quantities, while larger quantities (yet such as by many persons are thought moderate) do, sooner or later, prove injurious to the human constitution, without any exceptions.

"It is our opinion that the above statement is substantially correct."

This was signed by the Queen's physician and surgeon and the leading practitioners of the day.

In 1847 another declaration was issued, signed also by most of the leading physicians and surgeons, and altogether by 2,000 medical men. It said:

We, the undersigned, are of opinion:
1. That a very large portion of human misery, including poverty, disease, and crime, is induced by the use of alcoholic or fermented liquors as beverages.

2. That the most perfect health is compatible with total abstinence from all intoxicating beverages, whether in the

form of ardent spirits, or as wine, beer, ale, port, and etc., etc.

"3. That persons accustomed to such drinks may, with perfect safety, discontinue them entirely, either at once, or gradually, after a short time.

"4. That total and universal abstinence from alcoholic liquors and beverages of all sorts would greatly contribute to the health, the prosperity, the morality, and the happiness of the human race."

These two famous declarations of British medical men, although issued sixty-two and fifty-four years ago, are just as true to-day. All the experience and all the experiments of all physicians and all countries has not only confirmed them, but confirmed them so completely (with the possible exception of one statement, namely, that they are desirable in states of temporary debility) that there literally remains nothing more to be said. They are *true*, and the Congress of Vienna would do itself honor, would point out to mankind the true significance of the alcoholic plague, and the true and simple remedy, by endorsing them *en bloc* and with acclamation.

The medical profession is slowly but surely taking up a position of antagonism to the drinking customs. In the United Kingdom I had the honor of starting the British Medical Temperance Association in 1876, an association of abstaining medical practitioners, which now numbers more than 500 members, with as many medical students as student associates, while it is quite within the mark to say that there are as many more abstaining doctors who are not yet enrolled in its ranks. While the drink bill of the United Kingdom is steadily increasing, it is a significant fact that the drink bills of the large hospitals and infirmaries have largely decreased during the last thirty years, in several cases being only a nominal sum.

The example of the B. M. T. A. was followed a few years

later in America, where an American Medical Temperance Association was established on similar lines and continues to flourish.

Later still, the Association of German-speaking Abstaining Physicians was founded and the president, Professor Sims Woodhead, and the council of the B. M. T. A. send all these co-workers their heartiest greetings and their heartfelt thanks for the important experimental assistance which such men as Kræplin, Furer, Smith, Forel, and Bunge, and many others have rendered to the cause of total abstinence.

I started by pointing out that the solution of this problem depends on a right understanding of the physiological and pathological action of alcohol. I contend, in concluding, that the declarations above given afford a sound basis for the total prohibition of the manufacture and sale, as beverages, of those liquors which have done, during the past century, more harm to the human race than the accumulated evils of war, pestilence, and famine.

When considerable quantities of beer and wine are taken frequently, it is not merely the alcohol in these beverages that is injurious, but also the temporary overfilling of the blood vessels, because that entire stream of fluids is obliged to pass through the blood. All of that superfluity has to be equalized by means of increased action of the heart. Now, it is true that a sound heart is furnished with considerable reserve force that enables it to respond to great demands on exceptional occasions; but there is no doubt that those who persist in making demands of that sort diminish considerably their capital in heart power. The consequences of such real overburdening of the blood vessels become especially manifest at middle age in the form of a weak heart, a condition we might term a strike on the part of the exploited heart." — *F. von Birch-Hirschfeld, M.D., Professor of Pathology, University at*

A STATISTICAL INVESTIGATION INTO THE ROLE
OF ALCOHOL IN THE ORIGIN OF
INNATE IMBECILITY.*

An Address delivered before the Vienna Anti-Alcohol Congress by Dr. Dom Bezzola, Director of the Sanitarium Schloss Hard.

Judging from the results of the medical investigations thus far, the fact that alcohol injures the human germs of procreation seems established. I also place myself unconditionally upon the standpoint of my colleagues, and believe that the injuries alcohol produces extend beyond the individuality of the drinker to his offspring. However, in this paper I do not propose to deal with the different varieties of these injuries, but with only that one of its multiple forms with which I have long been occupied, innate imbecility in its relation to alcoholism of the parents. This has especially interested me, because both in my capacity of specialist in mental diseases, as well as resident physician in a training institute for imbecile children, my attention has often been arrested by the frequency with which the father or the mother, or both parents of imbecile children, are mentioned as notorious drinkers. And, besides, among our toppers I have often observed imbecility, as well as other defects in their offspring. In short, that which is acknowledged even by the laity in Switzerland who trace the origin of imbecility to alcoholism in the parents — is confirmed upon more exact investigation, so that as for conditions within our Confederation especially I have been obliged to

*The completion of this paper has only been rendered possible through the indefatigable co-operation of my amiable colleague, Dr. Rothstein of Düsseldorf, and of my dear wife, as well as the help of Baron Cederström, Paul Hitz, Philipp Kuh, et al., to all of whom I here take extreme pleasure in expressing my gratitude.

accept the opinion of the authors. However, it is the business of science to be skeptical, and to furnish the greatest possible number of proofs for every new conclusion resulting from investigation, because every additional proof makes a scientific result more unshakable. And, in natural science especially, we have a right to require that investigation should not merely confirm the existence of a fact, but, according to the nature of it, to explain it.

In regard to the relation between alcohol and innate imbecility, this is just what has been lacking. Here we still move in the realm of theory. Some investigators, as for instance, Dr. Smith of Marbach, assume the question to be one of chronic disturbance of nutrition among drinkers, manifesting itself in the sexual nature especially in the production of descendants weak in body and in mind. Of the other hypothesis Prof. Forel is the most celebrated exponent, who holds that innate imbecility is caused by alcoholic poisoning of the germ plasma. Which is correct?

Probably both can be supported theoretically, and if our scientific views were purely Platonic, possibly neither could lay claim to practical importance. But this is precisely where I disagree. The fact is, it must be of the utmost importance to know whether only notorious drinkers suffer such disturbance of nutrition as to render them capable of begetting imbecile children, or whether a healthy being in a state of occasional intoxication is exposed to the same danger. We speak of conception during intoxication as especially liable to produce offspring of imbeciles. If that were to prove a fact, there would be a difficulty will arise for the principle of moderation in drinking; because by pure induction it could be proved that every drop too much of alcohol can undermine the healthy constitution of a child begotten under its influence. How can we possibly determine the amount of this poison it is safe to partake, when, because of the varying powers of resistance in the different tissues, the germ plasma may become

poisoned before the nervous system, which decides the question, feels any effect from the poison?

With this, it seems to me, I indicate sufficiently the importance of the problem as to whether the effect of alcohol on the germ plasm is acute poisoning, or disturbance of the process of nutrition caused by chronic alcoholism. But it is necessary to exercise caution here, and not to cast everything into the same retort. The conditions resulting to children from alcoholism in the parents are too various not to suggest that they may be different modifications of one and the same cause; but, as we have already emphasized, the specific question before us is the nature of the germ disease produced by alcohol that originates imbecility.

Searching for a method of solving this problem, I was brought to the following considerations: The human drink customs, although universal as regards time and place, nevertheless show variations, both of intensity and extent, that continually recur during certain periods in the year. In Switzerland we have our periods of alcohol plenty and of alcohol dearth succeeding one another, *i. e.*, when the drink customs exercise more or less control over our population. For instance, throughout Switzerland, New Year's and Shrove Tuesday, and within the wine regions, the grape harvest, are periods when alcohol is universally abundant. Furthermore, in the spring, April to June, with their weddings and other festivals, Easter, *Mai Bowlen*, etc., and the wedding journeys, we have another such period. Whereas, during the months of increased labor, July to September, there is a marked diminution in the use of alcohol, particularly among the people engaged in agriculture and hotel-keeping. These are the months also when the higher classes are taking their cures, regulating their lives more according to the dictates of reason. Now, if it is a fact that conception during intoxication plays any rôle in the origin of innate imbecility, the number of births of the beings so

afflicted ought at stated periods so to multiply that the conceptions in point can be traced to a period of alcohol plenty. This would not necessarily exclude the possibility of such conceptions in diminished numbers during the periods when less alcohol is used, since intoxication is a disease not confined to special periods, but only more frequent at certain times.

However, the normal birth rate varies also within the course of different sections of the year to such an extent that nothing but a comparison with the normal birth curve will secure results to which no exception can be taken; that is to say, the periods of alcohol plenty and of alcohol dearth must determine variations from the pathological birth curve, for our purpose the imbecile birth curve. Having at hand within my own community, Graubünden, sixty-eight cases of imbecility of various grades, I undertook a preparatory investigation among these and arrived at the astonishing result that one-half of their births fell upon days following forty weeks of the periods of alcohol plenty, New Year's, the Carnival and the Lenten-Feathering. That is to say, within an aggregate of four-weeks, while the remaining half was distributed rather evenly through the remaining thirty-eight weeks of the year.

The normal curve of comparison constructed from the arithmetical average figures of the weekly census of births in the principal Swiss cities, 1893-1899, from estimates furnished by the Weekly Bulletin of Sanitary Demography, showed the very opposite tendency, falling deepest during the period of alcohol plenty, New Year's, and the Carnival. Possibly this is due to a diminished procreative capacity from the same cause as that which injures the quality of conceptions, *i. e.*, the use of alcohol.

Therefore, having my presupposition borne out by the material in hand, I was encouraged to apply my method to a mass of material. For my purpose it seemed as if I should find the best material in the "Confederation Census of Imbecile Children of 1897," that had been undertaken for peda-

gogic purposes. Dr. Guillaume, the director of the Confederation Bureau of Statistics in Berne, kindly placed at my disposal all of the tables, about four hundred weight. The material included all of the children of school age incapacitated from attending school, or whose attendance was fruitless, from 1880 to 1890. After eliminating all cases in which the exact date of birth could not be ascertained, there remained as available material, in addition to 294 epileptics, 886 deaf mutes, 57 afflicted with blindness, 1,906 with other physical defects, 1,144 morally defective, 8,196 imbeciles and idiots. According to my program, I took under consideration only the 8,106 imbeciles, classifying all births occurring on the same day throughout the 365 days of the year. Those falling on February 29 were not included. It became manifest that the material was too limited to classify according to days, since incidental daily variations (January 10, 36 births; January 11, 15 births) would cloud the total survey and veil the conformity to law. I was the more willing to abandon drawing conclusions from this attempt, since from the present status of science we can only approximate the day of conception computed from the day of birth.

By combining the days into weeks it became clearly evident that the procreative curve of imbecility constructed from 0.00 reckonings (calculating the human period as forty weeks) was conspicuously high during winter, January and February, while during the summer, August and September, it was conspicuously low. However, even yet the mental picture was clouded by regular monthly variations that possibly have connection with the periodicity in the sexual life of woman, and also of man (ecbolie), which also are manifest in the weekly normal curve.

Finally, in order to eliminate every variation arising from other causes, the daily birth numbers for each month were added up, and from the aggregate number of birthdays falling within the various months, according to the varying lengths

of the different months, the daily average number of each month was computed. This seemed the more rational method, because the periods of alcohol plenty and of alcohol dearth also include longer sections of the year than days or weeks. At the same time it secured the invaluable opportunity of procuring from the official reports of the Bureau of Statistics of the Swiss Confederation (Marriages, Births, and Deaths Among the Swiss Population during Twenty Years, 1871-1890, II Part: The Births, Swiss Statistics, volume 112, tables 15, 16, and 17, pages 54, 58), the material with which to construct a normal curve for the purpose of comparison that would be perfectly comparable as regards locality and time. It was also prepared exactly on the principle described, the daily average number per month of the total, 934,619 births, in Switzerland, 1880-1890, was computed, letting this general daily average equal 100, and this was compared with the daily average for each month according to the method adopted by the Statistical Bureau of the Confederation in table 16 of the publication above mentioned (p. 55). Accordingly, if within any month the daily average of births is higher, the number rises above 100, if lower, it sinks below 100.

The figure-values computed according to this method are for the number of births, 1880-1890, in general (— — —) and for the births of the 8,106 imbeciles in special (—————) distributed through the individual months as follows:

Birth month	Jan.	Febr.	März	April	Mai	Juni
Normal	101,7	103,5	103,8	101,7	99,8	100,3
Imbecility	104,8	104,3	104,9	101,9	97,1	94,8
Month of Conception	April	Mai	Juni	Juli	August	Sept.
Birth month	Juli	August	Sept.	Okt.	Nov.	Dez.
Normal	100,5	99,9	99,9	95,9	95,7	96,2
Imbecility	100,8	98,8	99,0	96,7	100,3	97,5
Month of Conception	Okt.	Nov.	Dez.	Jan.	Febr.	März.

It may stress upon the fact that this normal representative curve computed from the total number of births in Switzer-

land, 1880-1890, derived from nearly one million of births, may lay claim to being a more reliable standard than the European procreative curve constructed by Mayr (Conformity of Law in the Life of Society, 1877), on the basis of a quarter of a million births in Germany, Austria, and Italy; so much the more as our curve is derived from the same population and the same period as that which produced our imbeciles. Now, if we regard the course of the pathological curve more closely we see clearly that our presuppositions have been fulfilled in detail. Judging from the month of conception, the winter time, after New Year's, and especially February, and Shrove Tuesday, shows a most pregnant increase in the production of imbecility, while the normal curve exhibits precisely the opposite. In March the curve of imbecility sinks somewhat, but still remains steadily above the normal, finally mounting with the normal during April, only rising still higher, and remaining upon this elevation until in June. Here we have the period of the weddings with their increase in the number of conceptions, and this, especially when taken with the increase in the number of illegitimate conceptions, clearly advances the probability that originally this was the normal period of fertility. The influence of Bacchus, Gambrinus, and the Schnapsdevil combine with that of Venus to send the pathological curve to its highest elevation. After that the curve begins to sink. The healthy employment of our country population, on the one hand, and the rational manner of life of our seekers after health, on the other, leave little room for excess in alcohol, and besides, our festivities are fewer, while our bibulous societies are also having a vacation. But in October it suddenly flames up again. People have been getting ready for new excesses, while in many a section the grape harvest provides for new germ poison.

I want to emphasize that this curve of imbecile procreation suddenly mounting from its depths during September would keep on ascending to an unsuspected height were it not that

only for the minor part is Switzerland a wine country. Canton Waadt furnishes evidence for what has just been stated, since in this month it reaches the comparative number 112, while in the wine year, 1885, its "blessed" month, October, influenced the daily average figure of imbecile births in July to reach the stately total of 209, more than double the daily average of the entire year.

In November and December the curve is again at a deeper level, although these months also are not wanting in intoxication. However, they are among the better months comparatively, probably because the people who have been neglecting the drinking customs during summer are now obliged to begin gradually. It is only in the wine regions that plentiful drinking already begins in October. It should be stated, however, that the figures obtained are only relative; under normal conditions without alcohol we should not have the birth of one imbecile for every hundred births, as is the case even in these favorable months, if we include those previously eliminated because the precise date of birth could not be ascertained.

Now, I am far from deriving absolutely binding conclusions from these data, because of course we also have imbecility without alcohol.

However, my results appear to confirm the conviction that alcohol and imbecility stand in causal relations, and at the same time to speak for the probability that with innate imbecility the injury alcohol produces on the germs is that of direct poisoning. The fact also that it is chiefly the notorious drinkers who convey this inheritance to their descendants is another evidence in its favor. Even though afflicted with disturbance of tissue change under the form of chronic alcoholism, we must take into consideration that such toppers are also more frequently subject to the effects of acute alcohol poisoning than moderate drinkers. At the same time this furnishes an explanation for the fact that drunkards sometimes beget intelligent children, if at the period of procreation they acci-

dentally are free from acute alcoholic effects and the chronic disturbance of tissue change has not progressed far enough to convey to their offspring other physical and mental injury from alcohol. On the other hand, the assumption of direct alcohol poisoning seems the more plausible when we consider how often the firstborn and illegitimate children manifest diseased nervous conditions, and how in just such instances alcohol (weddings, etc.,) may have played a role because it invalidates sexual remonstrance. It would be interesting to secure confirmation of the results of this investigation, not only on the basis of a still greater amount of material, but especially with relation to the other hereditary defects produced by alcohol, such as moral imbecility (crime), epilepsy, *dementia praecox*, dwarfed development, and early child mortality.

Perhaps people will finally attain the insight that every drop of alcohol in the procreator will mean a drop of stupidity in the offspring. But I leave this task to specialists in the diseases in question, cherishing the hope that this small contribution to the subject may incite to further investigation.

THE POISONOUS ACTION OF ALCOHOL IN SOME
NERVOUS AND MENTAL DISEASES.

BY PROF. WAGNER V. JAUREGG, M.D.

A paper read at the Eighth International Congress, Vienna, April 9, 1901.
Translated by Mrs. E. L. Transeau.

During the next few days you will hear the word poison used continually in connection with the word alcohol. Again and again the subject under discussion will be the poisonous action of alcohol.

There is not the least doubt that alcohol is a poison, and for the practical purposes of the anti-alcohol movement this elementary knowledge is quite sufficient. But we who are engaged in the scientific study of the disturbances brought about by alcohol are not satisfied with the information that alcohol is a poison. We need to know more precisely the way in which it exerts its poisonous action.

Such a study brings to light some very remarkable facts. Before entering upon the discussion of these I would say that I have chiefly in mind the disease-producing action of alcohol upon the nervous system.

When we have before us the symptoms of acute alcohol-intoxication, of drunkenness, we easily conceive that we have to do with a direct poisonous action of alcohol, with its action upon the elements of the nervous system, upon the cells and fibers of the brain and spinal cord. But the thought arises: Perhaps that statement is not correct, or at least only partially correct. It may be that the alcohol acts primarily only upon the blood vessels of the nervous system, and that the symptoms of acute alcoholism are due wholly or in part to the

fact that in certain regions of the nervous system the vessels are partly expanded, in others partly contracted, the blood supply, therefore, in some parts being increased, in others diminished. The supposition is so much the more probable since alcohol has an obviously powerful vasomotor influence.

The question is not easy to determine. For first we know extremely little concerning the action of alcohol upon the blood vessels of the brain, and, furthermore, the most exact knowledge of the condition of the blood vessels of the brain under acute alcohol poisoning would not supply the full explanation. For we do not yet know whether the primary change is in the activity of the nerve elements or in the caliber of the blood vessels. In the case of muscle, for example, we know that in a condition of activity it has an increased blood supply. This, however, is not the cause of the contraction, but the result.

It may also be that alcohol acts not directly upon the nerve centers, but upon the blood, producing some changes in it in consequence of which the nourishment of the central nervous system is disturbed; or, in other words, that under the influence of alcohol a poisonous material is formed in the blood to which is to be ascribed the acute alcohol intoxication. Such a supposition has little probability for acute alcohol intoxication; but we shall see later that we need it for chronic alcoholism.

In acute alcoholism, however, we meet with something bearing upon this poisonous action: the factor of individuality. This factor, which we must take into consideration in all cases of poisoning, is due to what we call disposition. But the disposition is by no means purely a chance, inborn, constant factor; it changes with acquired influences, for example, habit, on the one side, fractures of the skull, brain diseases, and the like on the other side. It is changed temporarily by transitory influences such as the poisoning of depressing emotions by excited or fatigued conditions of the brain.

Far more interesting for us, however, is another question, the origin of alcoholic delirium. The superficial observer naturally sees in alcoholic delirium only a poisonous action of alcohol, but to the thoughtful the case appears much more complicated.

At the start we come upon two facts: First, the large part which individual disposition plays, even in the origin of alcoholic delirium. The number of drunkards is very large; but the number of cases of delirium tremens is relatively quite small. It would undoubtedly be much larger if we took into account not only the serious cases which nearly always need to be treated in hospitals, but also the rudimentary deliriums which in from one to two nights pass off into symptoms that are but little alarming. Here is seen clearly the significance of individual disposition. One has a severe attack, another only a slight attack, or even no delirium, while not a few have the delirium seriously, not once, but repeatedly.

The second noteworthy fact is that the delirium usually appears after one single, although great, alcoholic excess, or even after a brief series of repeated excesses. As a rule delirium comes on only after a long debauch, at least from four to six weeks. Chronic alcoholism must be at hand. What is this chronic alcoholism of which we read so much? The question is not easy to answer.

One might think that the alcohol must first have caused some positive change which is of some tissue-like nature, and only have its action in the brain before the poisoning could reach delirium. But the case is otherwise. We can not by any means look upon delirium as a manifestation of the poisonous action of alcohol. Against that stands the undoubtable fact that alcoholic delirium is often brought on directly by abstinence from alcohol, and that abstinence (temporarily) tends toward the attack of delirium. While this fact would have once been generally acknowledged, it has for a long time been combated by individual psychiatrists. In non-psychia-

trical circles, however, this conviction still continues, and recently the influence of abstinence is again acknowledged even by such distinguished men as B. Jolly and Wernicke.

It has been held that abstinence cannot be the cause of delirium because numerous alcoholics stand abstinence very well without having delirium. By that logic one could maintain that the misuse of alcohol has nothing to do with delirium, for there are a great many toppers who, in spite of long-continued tipping, have no delirium.

Nor is delirium the only symptom of chronic alcoholism in which abstinence plays a part. It enters in a yet higher degree into alcoholic tremor, and, in the morning, nausea of the toper. Even the short abstinence of the night's sleep is sufficient to bring on tremor, or at least to increase it materially, and to arouse ill-humor and murderous impulses (*wurgreiz*). With the first dose of alcohol both disturbances disappear.

In order to explain these abstinence symptoms we must turn to a hypothesis which is made for another poisoning in which abstinence symptoms enter in to a much higher degree, namely, morphinism.

When alcohol allays disturbances in a case of chronic alcoholism it acts in a certain measure as an antidote. There may be also disturbances not brought about by alcohol, which it allays. We must admit that in the chronic alcoholism a poisonous material is formed in the body, under the influence of alcohol, which causes certain disturbances, such as tremor, nausea, and, occasionally, even delirium,— a poison whose origin depends, indeed, upon the ingestion of alcohol, but which cannot itself be alcohol, because alcohol certainly abolishes its influence. We might also add to this: a poison which is more slowly eliminated than alcohol, hence its effects will first make their appearance when the alcohol has left the body. We will call this hypothetical substance an alcoholic (*alkohogene*) poison.

This poison also produces apparently not only a chronic but an acute poisoning; it must be the notorious *Katzenjammer* (the cause of the indisposition or "seediness" following a debauch).

We will now enter more closely into the nature of this poison. As we cannot become acquainted with it directly, since no one has shown it to us, we must confine ourselves to judging its properties by its action.

Alcoholic delirium offers the most suitable object for such a study, for it, in so far as it is an abstinence delirium, represents the most serious poisoning with this alcoholic (*alkohogene*) poison.

We will leave undecided, in the meantime, the question, in what relation abstinence delirium stands to other delirium.

The constant systematic agreement between the various cases of alcoholic delirium, the form of this disease so typical, allows us to suppose for all cases of the disease an identical cause.

When we take into consideration the symptoms and the course of alcoholic delirium, we must say that this alcoholic poison has great similarity to the poisons of bacterial origin, which become active in certain acute, quickly terminating, infectious diseases.

First of all, delirium tremens frequently runs, in the severer cases, almost parallel with fever, though there is seldom any great rise in temperature. Further, in typical cases, the delirium runs its full course in a few days ending with extreme, characteristic, critical prostration (*lösung*) which is closely comparable with that of an acute infectious disease.

Again, in favor of this view, is a very interesting result which my assistant, now docent Dr. Elzholz, has brought to light through experiments on the blood of alcoholic delirients.

He counted the different forms of white blood corpuscles during the various stages of delirium and afterward. He discovered regular changes there taking place. During the delirium there appeared to be a higher rate of increase of the

white-blood corpuscles, a *leukemia*, in which the proportion between the individual forms of white-blood corpuscles was broken up, the mononuclear being greatly decreased, the polynuclear correspondingly increased, while the eosinophile bodies diminished or entirely disappeared.

After the termination of the delirium the blood forms were altered, and the alterations referable to the eosinophile bodies appeared to coincide often quite quickly with the critical sleep.

The blood forms after the delirium were shown to be the opposite of those during the attack: the polynuclear corpuscles were relatively diminished, the mononuclear relatively increased, and the eosinophile bodies reached numbers often far in excess of the normal. After a few days the blood forms returned to the normal.

It is of the greatest interest to see that entirely analogous changes in the condition of the blood take place in certain quickly terminating infectious diseases. The blood forms of delirium have the greatest similarity to those of croupous pneumonia, which infectious disease like delirium usually has, as is well known, the critical stage of prostration (*lösung*).

A further analogy which delirium has with certain acute infectious diseases is the appearance of albuminuria during the delirium, which obviously indicates a toxic kidney irritation. This albuminuria is found very frequently in delirium; it is not a result of the action of alcohol, for, as a rule, it does not appear during the chronic alcohol poisoning, but when the alcoholic poison, which the delirium causes, comes into action. Neither is it the result of a kidney disease, not even in those cases in which cylinders are occasionally present in the urine, for in most cases it disappears after the cessation of the delirium, leaving no trace.

Another interesting discovery made by Dr. Elzholz should be mentioned here. He observed that most delirium patients have eye-catarrh, which manifests its dependence upon the delirium in that it demonstrably appears first in the course of

the delirium, and disappears with the critical termination (*lösung*). One must, therefore, conclude that the alcoholic poison has also an inflammatory-exciting action upon the conjunctive, and in this respect it is analogous to certain bacterial poisons.

Investigations in oxidation as far as they give information concerning the power of the body to assimilate grape sugar yield us further interesting information concerning the action of this alcoholic poison. The poison has a retarding action upon oxidation, so that grape sugar introduced into the organism in relatively small quantities is not completely assimilated, but a part of it is eliminated unchanged. It is remarkable that this retardation is greatest not during the delirium, as my assistant Dr. Raimann has shown in a work on alimentary glycosuria in mental diseases, but in the first couple of days after the critical period (*lösung*) about the same time that Dr. Elzholz found the blood forms of delirium returning to the opposite extreme. Whether between these two discoveries something of a causal connection exists further investigation must teach.

In addition, Dr. Raimann has found that the alcoholic patient, in non-alcoholized conditions, has a prevailing high rate of oxidation; he can also take a large quantity of grape sugar without eliminating it in the urine. Possibly in this high rate of oxidation which the alcoholic displays when he has not had his dram, we may find a clue (*Veranlagungszeichen*). Possibly this characteristic of constitution, which we cannot call so much as a constitution anomalie, disposes the individual in question to lower his rate of oxidation (when he has taken alcohol) in order to favor the deposit of reserve material.

The typical course in all cases of true alcohol delirium conforming to likewise typical forms of other diseases permits the conclusion of a uniform process for all cases; and when we apparently know the greater share of causes, as abstinence,

shock, catarrh of the stomach, or fever, we must conclude that these are all able to bring about one and the same process in the organism.

I am inclined to ascribe an important part in this process to abstinence. I see in delirium the passage of the alcoholized into the non-alcoholized condition. By abstinence the alcoholic poison, which before is held in abeyance by alcohol, is set free; it produces its effects in the organism, and requires a certain time for elimination. But there disposition, as has been said, plays an important part, whence it happens that according to the disposition one produces much alcoholic poison, the other little, or that the one reacts strongly to this poison, the other weakly.

As for the remaining cases, which, according to my observation, are exceedingly rare, they would occur where the delirium begins during an unlimited use of alcohol, where according to my hypothesis, so much alcoholic poison is produced that finally the alcohol consumed no longer suffices to suppress its action. Similarly we see in morphinism many states in which the patient, in spite of the resumed use of morphine, continues to suffer from abstinence symptoms.

The appearance of wholly rudimentary delirium, of only one or two nights' duration, in the course of chronic alcoholism, might be explained thus: that is, in these cases, only a partial abstinence takes place, and that the action of the alcoholic poison is outstripped by the newly ingested alcohol.

The experiences which are met with in the administration of alcohol during delirium also favor my hypothesis. It is first of all certain that in delirium alcohol exerts a thoroughly specific stimulating influence. At my clinic, in light, uncomplicated cases of delirium, we generally give no medicine; but in cases where collapse or heart weakness appears, where the inclination to *musstirenden Delir* proclaims imminent danger, we give large doses of alcohol, and have reason to be satisfied therewith. Not only our favorable death rate leads me to

support this prescription, but also the fact that frequently one can see the immediate rapid change in the patient's condition in consequence of the alcohol medication. It is self-evident that the administration of the alcohol removes the impending danger.

I have recently tried the experiment of continuous administration of alcohol during the delirium, which, as yet, has led to no conclusions. It appears that one can by this means prolong the delirium, but moderate its intensity. That would be in accordance with my hypothesis. The alcohol acts as an antidote against the alcoholic poison, and thereby mitigates the delirium; but the administration of the alcohol causes the production of new alcoholic poison, thereby retarding its final elimination, and thus prolonging the delirium.

As we have seen that alcoholic delirium is a sickness which has a certain similarity to other infectious diseases, so we find in two other alcoholic diseases of the nervous system a similarity to the nervous after-troubles following infectious diseases. These are alcoholic polyneuritis and Korsakoff's psychosis intimately connected with it. Even in polyneuritis and the polyneuritic psychosis we do not perceive the expression of a pure alcohol poisoning, of a direct action of alcohol upon the peripheral nerves and the brain. It is not so much the relative infrequency of these diseases over against the frequency of alcohol poisoning — individual disposition might suffice to explain this; it is much more the fact that we see these diseases set in in entirely similar form without any alcohol action, also that these diseases have no specifics as perhaps has delirium.

From whence it follows that in these diseases we see entirely distinct injuries repeated under other circumstances than alcohol poisoning, injuries which may be engendered under circumstances which have no concurrence with alcohol poisoning.

Of these damages one known and acknowledged is the

acute infectious disease whose toxine causes polyneuritis with its accompanying psychical disturbances. It is less known that in the remaining cases prevailing disturbances of digestive function are found which lead to polyneuritis by a chemical way through the toxic products formed in the digestive tract, and I myself have treated a number of cases where acute polyneuritis and the polyneuritic psychosis have joined a severe indigestion.

What we know of the intestinal toxines leads us to think that we have a uniform etiology in the post infections and in the forms arising from gastrointestinal auto-intoxication. Alcohol plays a part there only so far as it produces a disposition of the nervous system in consequence of which the bacteria toxine can exert its action more easily, a disposition which is manifested more strongly in the brain than in the peripheral nervous system, for while the non-alcoholic polyneuritis is only seldom accompanied by a mental disturbance (senile polyneuritis excepted) we find in alcoholic polyneuritis in the majority of cases, specific polyneuritis psychosis.

In polyneuritis of gastro-intestinal origin alcohol moreover plays manifestly a double part in which on the one side it disposes to disease of the nervous system, on the other side it brings about a disposition to auto-intoxication through disturbances of the digestive activities.

In conclusion I must permit myself to touch only briefly upon a further question. The poisonous action of alcohol extends to the liver; it acts deleteriously upon this organ. But the liver is a great clearing station for the poisons arising in the digestive canal. Possibly there arises also, from the action of alcohol, secondary poisoning in which the injured liver allows poisons, which in its normal state it renders harmless, to escape into the general circulation. It is possible also that alcoholic psychosis, for which we have as yet no reliable footing, rests upon some such a poisonous action.

Abstracts and Reviews.

A CASE OF RECURRENT ALCOHOLIC PERIPHERAL NEURITIS.

BY LESLIE H. JONES, M.D.,

Manchester, Eng.

Considerable diversity of opinion appears to exist among physicians regarding the part alcohol has played independent of its conjunction with, arsenic in the recent outbreak of peripheral neuritis. Indeed, some appear quite skeptical, and doubt whether alcohol has had any influence. Dr. Reynolds, for instance, in his evidence before the Royal Commission appointed to investigate the subject, is reported to have said: "I have never seen pure spirit produce alcoholic neuritis. I knew one lady who took a bottle and a half of whisky a day, and another a bottle of whisky a day, and neither had neuritis," and, as if to emphasize his skepticism, he concluded by saying: "Typical instances of this disease had occurred among spirit drinkers, though none had come within his own experience."

Now, it is my conviction that I have seen many cases, and among them the following incontestable example, remarkable for the fact that the intense neuritis, which affected almost the whole muscular system, was caused by a very moderate amount of alcohol.

First Attack.—On June 1, 1887, Miss X. was sent to me from the country suffering from absolute paralysis of the

extensors of the hands and feet. With difficulty she dragged her feet along the ground, and the hands were utterly powerless. The deltoids, muscles of the arms, the buttocks, and the muscles of the legs were atrophied.

At first sight the case looked like one of lead poisoning, but the concomitant symptoms of this affection were entirely absent, and on investigation it was found that no source of lead poisoning existed.

This lady had for some time been peculiarly circumstanced. — domestic duties of the most exhaustive nature, continuous throughout the day, and extending to the early morning hours of the next, reduced her strength and debilitated her constitution. In contending against her weakened physical condition she had recourse to stimulants. Whisky, in moderate quantities, was the stimulant she resorted to, never dreaming she was taking more than was good for her, or than modesty or rectitude permitted; and indeed the quantity daily taken had been so moderate I doubted whether it could have caused the paralysis, and suspected that this might possibly be of idiopathic origin. At that time my friend, the late Dr. Ross, was greatly interested in the subject, and I got him to see her, and after a prolonged and exhaustive examination he concluded that it was a typical case of alcoholic neuritis. Subsequent events proved the correctness of his diagnosis.

After total abstinence from alcohol for four years, during which electricity from both the continuous and interrupted currents was used regularly, the patient, having passed through a checkered time of progresses and relapses, almost completely recovered power in the extensors of the hands. The feet, at the same time, showed similar improvement, and the muscles of the body generally developed.

Second Attack. — From this time, residing at the seaside, until 1898, this lady enjoyed perfect health, was bright, active, and became engaged to be married. Then, unhappily, she received a terrible shock, and again was compelled to under-

take most arduous domestic duties, which made exhausting calls on her strength. Again she had recourse to stimulants, but this time in more moderate quantities than before; three glasses of burgundy was her usual daily limit. This, however, was sufficient in her exhausted and shocked nervous condition to cause a recurrence of the neuritis. The dropping of the feet, however, was not clearly so marked as in 1887.

Now, after two years' total abstinence and the renewed use of electricity, she has once more regained perfect power over her limbs and her usual health.

Such a case as this raises the question whether skepticism as to the power of alcohol to produce peripheral neuritis may too easily be carried too far. On the other hand, I have for many years been in the habit of treating cases of chorea in children and adolescents with large doses of arsenic, amounting in many cases to forty-five minims of Fowler's solution daily, and in two instances only have I observed the approach of neuritis, indicated by numbness of the thumbs and finger ends. Again in cases of pernicious anaemia, where arsenic has been pushed in large doses, month after month, no signs of neuritis has appeared; and, lastly, in a case of sarcoma of the face, which I attended in conjunction with Mr. Walter Whitehead, no less than ninety minims of the solution was given daily, for I cannot recollect how long, without producing any paralytic symptoms.

I conclude that alcohol is responsible for much that has occurred in the recent outbreak, and that in a great measure the arsenic has acted on systems saturated with alcohol, much as a candle-end or a resin lighter would on a smoldering fire.—

British Medical Journal.

ALCOHOLISM IN CHILDREN'S HOSPITALS

Summary of the Report of Professor Kassowitz at the Anti-Alcohol Congress in Vienna.

After citing particular cases in evidence of the serious effects of alcohol upon children, he summed up his discussion in the following propositions:

1. Grave functional disturbances (delirium tremens, alcoholic mania, epilepsy) and obvious organic modifications (liver enlargement, dropsy) have been observed in children by myself and others as a consequence of the long-continued use of alcohol.

2. These diseases were not caused by the use of brandy alone, but also by the use of beer and wine in large quantities, or by the use of such small quantities of cognac that they would be considered by many not only allowable and harmless, but even as beneficial.

3. These experiments showed that because of their particular sensitiveness one must preserve absolutely the nervous system and the organism of the child from the poisonous effects of alcohol. (French rendering.)

3. From these experiments one must conclude that the nervous system and the organism of the child in general is particularly sensitive to the poisonous action of alcohol.

4. Not infrequently alcoholic liquors are administered to children in good faith, because moderate doses of alcohol are expected to have a beneficial effect in cases of feebleness or disease in young children.

5. Physiological researches contradict entirely the formerly widespread supposition that alcohol possesses nourishing properties and is able to protect the tissues of body from waste; they show, on the contrary, that alcohol increases instead of diminishes the quantity of nitrogen eliminated.

6. In all of these investigations, retardation of growth and

development has been unanimously observed as the result of the use of alcohol by children.

7. The affirmation that alcohol aids digestion is not warranted, because experiments in digestion upon both men and animals show always a disturbing effect. The apparent contradictory subjective impression is due to a temporary dulling of unpleasant sensations but not to a true promotion of digestion.

8. In many cases of loss of appetite by children it can be demonstrated that the habitual ingestion of alcoholic drinks is the true cause, for after the withdrawal of these the normal desire for food returns.

9. Alcohol is useless as a febrifuge, because very large doses, which cannot be taken by children without perniciously injurious consequences, produce only a very slight diminution of temperature.

10. Numerous experiments have taught that the reputed stimulating action of alcohol is either not manifested at all or very quickly disappears, while in every case it causes a kind of paralyzing depression of the muscles and of the nervous system. The employment of alcoholics to combat or even to ward off heart weakness in the febrile diseases of children is without scientific justification.

11. The internal employment of alcohol as an antiseptic, that is, as a means of killing the bacteria in acute infectious diseases of children, is not rational because experiments on animals have shown not only that the susceptibility to infection is not reduced, but on the contrary is decidedly increased by the administration of alcohol, and, furthermore, a bacteriacidal (bacteria destroying) action of alcohol would be incomprehensible because the alcohol is burned in the body in a very short time.

12. Numerous experiments have shown that the stimulation and acceleration of the mental faculties attributed to alcohol have no existence in reality because here also a quickly

passing state of excitation is regularly followed by an impairment of mental ability that continues through an entire day.

13. With school children the enfeebling effect of large doses of alcohol upon the ability to comprehend is shown directly.

14. Against all the actual indubitably injurious effects of large doses of alcohol upon the physical and mental functions of children no certain demonstrated advantage is to be placed, therefore the administration of alcoholic drinks to children, sick or well, is under all circumstances inadvisable.

SPIRITUOUS DRINKS IN WAR AND ON THE BATTLE FIELD.

It is known that the sturdy president of the Transvaal Republic, Kruger, is a total abstainer, and that in his country many effective measures have been taken for the suppression of alcoholism. In the present war with England, the use of alcohol has been prohibited by the Boers, and the significance of this fact is discussed by one of the non-abstinent partakers of the campaign, Fr. van Straaten, in an article sent from Lorenzo Marques to the "Deutsche Warte." He says that people in Europe are generally of the opinion that before a battle the soldier must have his brandy, that it gives him courage, warms his stomach, increases his power of resistance and endurance of fatigue, and makes him oblivious of danger and hunger. In the Boer army the drinking of brandy was forbidden, and, the introduction of spirituous liquors into the camp was prevented as much as possible. "From these regulations," he says, "we have obtained the best results. In all weather our people have sat in the saddle and traveled hundreds of miles with scarcely the loss of a single man. There were no uniforms manufactured according to the teaching of hygiene. Everyone went clothed just as he would go about his work in time of peace. Many had not even one warm

cloak, and yet we endured the fiery heat of the African day and the following piercing cold of the night without injury to health. We were often for months under no roof, and in no bed, but no 'stomach warmer' was ever handed out.

"I have during the campaign asked various physicians their opinion on this point. They are almost universally of the opinion that the wonderful power of endurance of the Boer army has in great part been due to their total abstinence from spirituous drinks. Men say that brandy makes privation more endurable. No word of that is true. It is also a fable that when one takes spirituous drinks it relieves fatigue. All that is true is that the drinker does not measure the extent of the danger, and on that account disdains it, even if he is cowardly by nature. In earlier times when the method of fighting was to run down the antagonist by a wild dash, alcohol probably had its effect. But modern scientific warfare has other features to reckon with. The intoxicated madmen who might rush over the field in vehement charges would be shot collectively and individually under the quick fire of the repeating guns. But now tranquility, cold-blooded deliberation, iron endurance, a steady hand, a clear eye, a quick decision, are the qualifications which the warrior of the present day must possess in order to make the rifle in his hand his formidable weapon. To remain hour after hour under cover, and coolly, with the sharpshooter's eye, wait the cautious approach of the enemy, or, in attack, to scan with falcon's eye every stone, every rise of ground, every molehill in order, if possible, to come upon the enemy unperceived — that is business which requires actual courage, but not that drunken tumbling into danger with which one whose brain is clouded by the use of alcohol enters into a battle. The thing is not to underestimate danger, but to recognize it, by foresight to diminish it, and, if that is not possible, to meet it coolly.

How far the hygienic experience which we have gained by the prohibition of spirituous drinks in this war will prove

correct for non-African conditions is difficult to decide at this point. Personally I think that general conclusions may very certainly be drawn from the facts here given, and will only add that the auxiliary European troops which are accustomed at home to the use of spirituous drinks have done very well with tea and coffee. Their condition of health was also entirely satisfactory, although many in this war became accustomed for the first time to the African climate, and most of them knew only by hearsay of the fatiguing hunter's life of the sub-tropical campaign.

"Conversely, it very frequently happens where troops and officers defy all measures of prudence and break into stores of brandy or wine that great injury follows." — *Berlin Educational Transcript*.

ALCOHOL AND NUTRITION

Foods are distinguished from poisons in this, that they have no energetic action upon the tissues, neither disturbing nor destroying sensibility, power of contraction, or nutrition, nor do they alter the texture of the tissues. The neutrality and the absence of salient chemical properties distinguish some foods from poisons without direct experiment, but with many poisons, especially those of vegetable origin, experience is necessary to distinguish them from food.

Has alcohol the property of accelerating the nutritive molecular renewal of organic tissues, in other words, does it favor digestion, assimilation of nutritive substances, and the elimination of the products of decomposition? Has it not rather an energetic action upon the tissues by which it disturbs or destroys the sensibility, the contractibility, and by which it alters the texture? Is it distinguished by the absence of salient chemical properties? If we are in doubt on this subject, examine the results of experiments made by a large number of impartial and conscientious observers.

If we examine all the researches that have been made in the entire domain of physiology and pathology we are forced to the conclusion that alcohol can neither strengthen nor nourish the body, but that its anæsthetic and sedative influence renders it injurious in proportion to the amount taken. As a medicine its indications are extremely limited. In the majority of cases there are other substances that could replace it to advantage.

It is not necessary to go farther to be convinced that alcohol is not truly a tonic, and that its apparently beneficent action is in reality false and dangerous.

Nor is it any more a food, as some physicians still declare, without having verified this too superficial opinion.

If this were true, alcohol would equal in value a respiratory poison whose combustion would furnish the calories necessary for the preservation of the heat of the body. The fact of its combustion being admitted, in order for alcohol to be a food it would be necessary evidently that there should be (for the body) no quantitative difference in the calories, which the latter produced, and those furnished by one or another of the carbohydrates.

But the most superficial observation shows that this is not so. There is an actual difference between the absorption of an equal quantity of alcohol or of sugar. This difference must therefore proceed from the manner in which the combustion takes place. And, in fact, a whole series of purely chemical observation force upon us an entirely new conception of the action of alcohol in the living organism. Physiological experiments entirely confirm this idea, but the literature upon alcoholism has not taken it sufficiently into account.

According to these observations we may consider alcohol as a respiratory poison which in the vital process of respiration hinders the physiological course of the gaseous exchange in the lungs or in each of the cells of our tissues in general.

This action is due to the promptness of its combustion, to its great affinity for oxygen, to its considerable reductive ability on the one hand, and to its easy diffusibility on the other. We must, in general, admit that for the preservation of our bodily heat there must be regular and continuous processes of combustion. The supply of fuel must undergo a regular and progressive oxidation, so that the charge of carbon in the form of calorifics, admitted at one time, does not burn instantaneously, but is consumed at a regular time, due to a current of air regulated in harmony.

The special kind of coal that corresponds to one system of stove may be looked upon as its physiological aliment; while with another fuel either one could not obtain heat, or else an explosion even would be produced.

Now we may likewise affirm that only certain hydrocarbons are appropriated for fuel for our bodies. These are those that by a progressive combustion, exactly regulated by the automatic nervous centers, liberate the heat necessary to the vital processes of the organs without exciting a superfluous afflux of oxygen to those that produce the normal respiration.

We see already at first sight that alcohol does not answer to these essential requirements of respiratory food. Moreover, we have reason to believe that on these two accounts alcohol produces a double damage: First, because it burns with too much energy, and the normal respiration is not able to provide for the sudden increase of the demand for oxygen; second, because the carbon dioxide produced by the more intense oxidation is not eliminated with sufficient rapidity.

This being admitted, we have matter for an active and a passive poisoning, for the time. The first mode of intoxication is produced by the rapid passage of the alcohol from the stomach into the blood. The oxygen of the blood not being sufficient for the energetic combustion of this alco-

hol, there must be produced, reflexly, a greater amplitude of the respiratory movements in order to increase importation of oxygen. It is this that confirms the experiments of Zuntz who has shown an acceleration of nine per cent. of the respiration, and those of Geppert, which indicated seven per cent. at least after the ingestion of small doses of alcohol.

Nevertheless the organism may not sufficiently incorporate the oxygen to correspond to the increased necessity for this gas produced by the alcohol. Wolfers has demonstrated this by a conclusive experiment upon rabbits to which he gave alternately alcohol and other hydrocarbons. As measured by the gasometer, the ratio between the carbon dioxide exhaled and the oxygen inspired showed for the oxidation of alcohol only a quotient of two-thirds. Now, although the rabbits of Wolfers consumed by the gasometer much more oxygen when they were given alcohol than when they took other hydrocarbons, the respiratory quotient remained extraordinarily elevated, and increased at times the unit. That is to say, the quantity of carbonic dioxide expired exceeded the corresponding quantity of oxygen inhaled.

This result can only be explained in two ways: either with the other hydrocarbons a greater quotient should have been consumed in the same time as with the alcohol, and Wolfers admits that the rabbits in his experiments had fasted a long time or else, and this seems to be more reasonable, it must be believed that the alcohol not finding in the oxygen in the circulation a sufficient quantity for its combustion, borrowed even from the cells of the tissues the oxygen that should serve those tissues for their very life.

And thus the anatomical, pathological diagnosis of alcoholism is explained in an entirely natural manner, for it institutes, as we know, a degeneration of the cellules of practically all of the organs. Degenerations, particularly typical of acute poisoning, are observed in the organs where the vessels of absorption are closest, primarily in the liver.

In serious poisoning with alcohol this degeneration is very pronounced even so far as the complete destruction of certain cells, for example, in the brain, as they are shown in the fine preparations of Nissel and Delio.

This shows us that we should distrust the physical advantage to be derived from the heat which, without doubt, is formed by the oxidation of alcohol, and which has gained for the latter the reputation of being a respiratory aliment. This mistrust is increased when we consider the final results of this production of heat.— *The Revue Medicale, Geneva.*

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS. A practical exposition of the methods, other than drug-giving, useful in the treatment of the sick. Edited by Solomon Solis Cohen, A.M., M.D., Professor of Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer on Clinical Medicine at Jefferson Medical College, etc. Volume II, Electrotherapy, by George W. Jacoby, M.D., Consulting Neurologist to the German Hospital, New York City; to the Infirmary for Women and Children, etc. In two books: Book I, Diagnosis; Therapeutics. Illustrated. Published by P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa. Price, eleven volumes, \$22 net.

The definition of the name of these books is as follows: "By physiologic therapeutics is meant the utilization in the management of the sick of agencies similar to those constantly acting upon the human body in health, but because of some departure from health needing to be especially exaggerated or localized in their action." From this point of view a series of books of which the first two volumes are published is projected to take up a field of therapeutics not treated in other works. The first two volumes are exceedingly valuable, showing the scope of the work. One of the volumes gives an

exhaustive treatise on electricity and electrical machines. The second volume presents in a practical manner the application of electricity to therapeutics. This is also exhaustive. In all probability this system of books will mark the beginning of a new era in therapeutics and give the physician a new literature of the most practical character. The editor, Dr. Cohen, and his collaborators are among the most eminent men in the profession, and the subjects treated will be not only attractive but authoritative as the last word in their respective fields of study. We shall call attention to this system of books again, but at present this is the most valuable system of works which has been offered to the profession. Send to the publisher, P. Blakiston's Son & Co., for prospectus.

ARSENICAL POISONING IN BEER DRINKERS. By T. N. Kelynack, M.D., Medical Registrar Manchester Royal Infirmary, and William Kirkby, F.L.S. Bailliere, Tindall & Cox, London. 1901.

In this volume of 130 pages the author has given a fair study of the somewhat remarkable epidemic of arsenical poisoning in Manchester and surrounding districts. This epidemic was unusual and traceable to the arsenic found in the beer. A large number of cases came under observation with several deaths. A very careful study pointed out the cause, and the epidemic subsided. Great credit is due to the editor of this book and others for their diagnostic skill in ascertaining the real cause and allaying the excitement which followed from this obscure disease. This book gives a description of the clinical symptoms, progress, and treatment and the diagnosis; also a very excellent bibliography, making it a valuable contribution to the literature of new and obscure diseases. We shall hope in a future number to give a summary of these cases, which are fortunately very rare in this country.

DISEASES OF THE RESPIRATORY ORGANS, ACUTE AND CHRONIC. By W. F. Waugh, A.M., M.D., Professor of Practice and Clinical Medicine, Illinois Medical College, etc. Clinical Publishing Co., Chicago, 1901.

This appears to be a part of a larger work yet to come, and is a practical, condensed summary of the general diseases of the respiratory organs. Dr. Waugh, the author, is a famous teacher and writer, and groups in a very condensed form a great variety of theories and practical facts which will be very welcome to the ordinary reader. The treatment of the subject is clinical and conversational in style and quite minute in the matter of treatment, giving much detail in remedies and their effects. Such works have great value on the office tables, where they can be picked up at once and consulted. The interleaving of the book is an additional value for the student who wishes to make notes. We shall look forward to the larger work of which this is a part with much interest.

ANNUAL AND ANALYTICAL CYCLOPEDIA OF PRACTICAL MEDICINE. By Charles E. de M. Sajous, M.D., and one hundred associate editors. Vol. VI. F. A. Davis Company, publishers. 1901.

The concluding volume of Sajous' Annual Cyclopedia is issued. Like the others, it is a very attractive volume of nearly a thousand pages devoted to the diseases of the rectum and anus. The literature is grouped in the same attractive form as in the other works, making it one of the most practical handy volumes of the library. These books have attained a celebrity and value which can only be appreciated by those who own them. We suggest to the editor that a similar grouping of the literature on the various subjects of medicine would be welcomed by the profession, and particularly readers of this series of works.

3,500 QUESTIONS ON MEDICAL SUBJECTS ARRANGED FOR SELF-EXAMINATION. Philadelphia, P. Blakiston, Son & Co. 1901. Price 10 cents.

This is a small book in paper cover, containing 3,500 questions without answers, but references to works in which the proper answers may be found. We would recommend physicians in general, and members of examining boards in particular, to spend an evening in self-examination.

The Journal of Mental Pathology, under the care of Dr. Louise G. Robovitch, made its bow to the public in June last. This is a large sixty-page monthly, well printed, devoted largely to psychiatry and problems of mental disease. The first number is made up altogether of foreign articles and reviews. We shall welcome it with great pleasure, and hope the author will be encouraged to continue a journal of this class. It is published by the State Publishing Co., 290 Broadway, New York, at \$2.50 per annum.

The Journal of Physical Therapeutics, an international quarterly review, is to be issued in this country under the charge of the American editor, Dr. Cleaves. As the name implies, it is devoted to physical therapeutics, and has been issued for two years in London, and occupies an entirely new field which is rapidly coming into prominence. We welcome this new journal, and believe it will be a very valuable help. The American office is at 79 Madison Avenue, New York.

We have received a number of books, notices of which will appear in the next issue. Our readers will be interested in the announcement that we will issue at an early day a symposium of articles on the heredity of inebriety and the influence of tobacco in drug-taking, as well as in general degeneration. A number of prominent writers have already contributed papers on these subjects.

Our association has projected a number of quarterly meetings in different parts of the country to discuss the practical questions of inebriety and its treatment. These meetings will be informal and be held in different homes and asylums, notices of which will appear later.

The Popular Science Monthly is the medium for the publication of exceedingly valuable matter. A recent number gives the detail of the experiments on yellow fever, and other wonderful discoveries which are not published elsewhere only in brief.

The Homiletic Review contains some very valuable papers on recent researches in Nineveh and Egypt which are of particular interest to students and medical men. Send to Funk & Wagnalls Co. for a copy.

Frank Leslie's Weekly, illustrated, gives in each number a very graphic representation of the events of the week, both by pen and pencil. It is one of the best weeklies of its class now published.

The Scientific American has especial merit to medical men in the attention it gives to hygienic subjects.

Editorial.

This number of *The Journal* is devoted to some recent addresses and papers on alcohol and its effects. The purpose is to show the radical changes of theories among physicians regarding the nature and value of alcohol, and the passing away of the old superstitions of its food and stimulant powers and harmlessness when taken in moderation. Scientific study of alcohol shows that it is an anæsthetic and paralyzant, and also a special cell and tissue poison. These conclusions are opposed by those who use spirits, and by the capitalists interested in the trade, and others who dread revolution of fact and theory which reflects on their judgment. Such persons refuse to believe that alcohol is a poison and that its moderate use is dangerous. They are apparently anxious to prove that alcohol is a blessing to the race when used properly, and that temperance theories and laws are failures, and that the canteen and the saloons are necessities for civilization and growth.

In meantime great corporations, banks, and trusts employing a large number of men are becoming more and more rigid and imperative in their demands for total abstainers to do their work. Twenty-six great trunk line railroads make total abstinence an essential for all persons employed in their service. Thus capitalists everywhere act on the fact that any use of alcohol impairs the efficiency of both brain and muscle, and is followed by inferior work. There is no theory or sentiment in this. It is the result of bitter and costly experience, with but one conclusion, namely, that alcohol is dangerous, is not a food, and is unsafe either in small or large doses, and that no good brain and muscle work can be given except by

total abstainers. These conclusions are identical with the new theories and teachings of laboratory and statistical studies. At present there are two parties in the effort to find the exact facts on this subject. On the scientific side is the medical temperance association of this country, numbering over two hundred physicians, organized for the special study of the nature and effects of alcohol. In England a similar society of over one thousand physicians is studying this subject in this same way. On the Continent over a dozen societies of a similar character, composed of physicians and laymen, are approaching this subject from the side of science with laboratory experiments and researches. Beyond this there are over a million persons in this country organized into societies for the promulgation of total abstinent doctrines. In Europe half as many more are engaged in a similar reform movement. In all this there is a consciousness that alcohol in some way is one of the great evils of civilization and progress. Opposed to these movements are the moneyed interests involved in the manufacture and sale of spirits and the great army of moderate and occasional users who insist that alcohol has a food value and its moderate use is the highest possible temperance.

In this great physio-psychological movement medical men must study the facts and point out the conclusions above all bias or prejudice. They alone should be independent and uninfluenced by subsidized teachers and self-appointed committees and personal interests which would dissemble and conceal the real facts.

Alcohol in its nature and effects is purely a scientific topic and cannot be decided from any other basis.

The annual meeting of the American Medical Temperance Association at St. Paul in June was noted for the large number of papers presented. Several speakers called atten-

tion to the fact that certain journals and certain prominent laymen asserted with great positiveness that the conclusions of Atwater had settled the alcoholic controversy. This idea is industriously encouraged among literary centers where articles showing the other side of the question are refused as the work of extremists. As a protest against this dogmatic position of final truth from the studies of one man, the following resolutions were passed as the unanimous opinion of this association:

"Whereas, The American Medical Temperance Association, the members of which are physicians and medical teachers who have devoted years to the study of alcohol and its effects, and who are conversant with the work done by scientific men the world over to determine the effects of alcohol when given in any quantity, have noted the teaching of Prof. W. O. Atwater of Wesleyan University upon the food and medical value of alcohol as set forth by him in the pages of the influential lay press, be it

Resolved, That this association utterly repudiates the pro-alcoholic doctrine of the said Prof. W. O. Atwater as being contrary to the evidence deduced by scientific experimentation, and that his conclusions are unwarranted by the evidence resulting from his own experiments. Be it further resolved

2. That this association regards the teaching of Prof. W. O. Atwater as erroneous, and a source of danger to the laity insomuch as such teaching contributes towards the increased consumption of alcoholic beverages by giving supposed reason for their safe use."

(Signed) N. S. DAVIS, M.D., President,
Chicago, Ill.

T. D. CROTHERS, M.D., Secretary,
Hartford, Conn.

Alcoholic intoxication is literally physical and psychical traumatism of the nerve and brain centers. The temporary character and the apparent recovery from the toxic state conceals the real injury which is apparent later. Intoxication is practically insanity produced by chemical agents concentrating in a brief period the various symptoms of delusions, delirium, dementia, and melancholy followed by stupor and slow recovery with weakness and exhaustion. The direct effect of alcohol often increases the heart's action from ten to twenty beats a minute. Almost immediately the functional activities of the brain cells show signs of exaltation and irritation. Thoughts and emotional impulses follow each other with great rapidity, and the sense impressions are intense and vivid. The brain activity shows a sudden increase, then quickly falls into a confusional state. Thoughts follow so rapidly that they become confused, and run into each other. The pathological condition is one of poison from the toxins of alcohol, and the sudden anæsthetic effect disturbing the co-ordination of the normal activities of the brain, also the accumulation in the capillaries and about the brain centers of toxins from the waste of cell and tissue, which increases the exhaustion, produces serious disturbances from which recovery is very slow. After a time these extreme symptoms pass away, but the after-history shows changes and injuries dating from this event. The person who has used spirits in moderation for a long time, then becomes intoxicated, has prepared the ground and cultivated the toxins which culminate in a veritable toxic concussion of the brain and nervous system. The first use of spirits may awaken some latent tendencies and predispositions, and after the first intoxication these will appear in the changes and diseases which follow. Repeated intoxications point to a rapid degeneration which may be both local and general. At all events it cannot be mistaken. Alcoholic intoxication, next to syphilis, is the most active cause of brain and nerve lesions, developing into serious

disease sooner or later. Inebriety can be traced in many cases to an early accidental intoxication. Various forms of insanity date back to the same toxic condition. The toxic poison from alcohol seems to be the starting point for a circle of very serious diseases of both brain and nervous system, and it is often overlooked in the study of these complex insanities.

A statement has been going the rounds of the press that the duration of the life of an inebriate was fifteen years after he began to drink, and that three thousand intoxications was the limit of toleration for brain and nerve resistance. This statement is based on a limited experience, and conveys an impression of a degree of resistance to the efforts of alcohol that is rarely seen, only in very exceptional cases. There are some persons who use spirits irregularly, and not to great excess, and others who drink periodically, having distinct periods of drink excess followed by sobriety and rest. Many of these persons may live fifteen, or twenty, years or longer. The ordinary inebriate who uses spirits daily or with every opportunity, usually drinking to excess, and is more or less intoxicated on every such occasion, rarely lives more than four or five years. This limit of the drink period almost always ends in some form of insanity or death. Such persons die from pneumonia, from hæmorrhage, provoked by sunstroke, blows, and falls on the head or from contused wounds which do not heal, or toxic poisonings manifest in sudden delirium, coma, and death. The fact of being inebriated is not mentioned in the statistics of the cause of death. The number of intoxications which the brain will tolerate cannot be estimated, but there are many reasons for believing that death follows long before the number has reached five hundred. In all probability the state called intoxication marked by stupor and general paralysis of a temporary character is not tolerated by the brain for more than fifty or a hundred times before final

collapse and death ensue. At all events serious organic changes appear in most cases before this limit is reached, which, if it does not end fatally, develops some form of insanity. The instances of great toleration to the excessive use of alcohol are always exceptional, and give no intimation of the rule in such instances. In reality the vast majority of persons who use alcohol to toxic states die early of some intercurrent disease, and the real cause is often overlooked and unnoticed. Recent researches show that alcohol is one of the most insidious as well as fatal drugs in common use, both in its direct and indirect effects on the cell and tissue. This is confirmed by ordinary observation in any community of the sudden deaths from trifling, insignificant causes of persons who use alcohol in so-called moderation, or are recognized as inebriates. In brain workers this toleration to the poisonous effects of alcohol is much less than in others, who live out of doors and exercise a great deal. In all classes there are widely varying degrees of resistance to the poisonous effects of alcohol which control this limit of death. Instances are reported of persons who die after the first profound intoxication, the brain never being able to recover from the profound anæsthesia produced by alcohol. In others the recovery is only partial, and associated with an extreme susceptibility to its toxic action which increases ever after.

These two incidents are striking illustrations of a great revolution in public sentiment concerning the disability which alcohol produces. They also show the recognition of this fact in the experience of practical men who have no theories but only hard facts to confirm their impressions. One of the leading surgeons of Boston was recently called to operate in a case of appendicitis. The father, a wealthy manufacturer, after a few moments' conversation with the surgeon, politely dismissed him, saying that he would not be wanted to per-

form the operation. In explanation to the family physician the father said: "The greatest losses which I have sustained in my business career have come from trusting persons with an alcoholic breath. I never permit anyone to do any work for me who finds it necessary to take spirits to the extent of showing it in his breath." The second incident was that of a capitalist who intimated that he would like to build a memorial hospital in his native town. An organization was made with a leading physician of the town as president. This physician and two committee men called on the capitalist to make good his promise by a subscription. They were astonished to be turned away coldly, without any encouragement or any promise to assist in any way. Later, the capitalist said in explanation that he made it a rule never to give any assistance or money to men who thought it necessary to use alcohol before they called on him. Also that he positively refused to put money in the hands of drinking men or persons who went about with an alcoholic breath.

In four railroad accidents this year, each of which was attended with loss of life, it was ascertained that the responsible persons had been using spirits just before the accident. In two instances the responsible persons lost their lives. This was not mentioned by the press, but was known to the officers of the roads, and the necessity of total abstinence was emphasized more clearly than ever. In these cases it was the paralyzing action of alcohol on the brain which confused the trainmen, and ended in an accident.

When the use of alcohol is followed by sense perversions, particularly of sight and hearing, a dangerous form of insanity is impending. Soon ideas of persecution will follow with acts of violence. The alcoholic psychopath, who is suspicious, gloomy, and irritable, with sense perversions, should come under medical care at once. He is dangerous to himself and to the community.

Clinical Notes and Comments.

"Another physiological problem is the exact action of alcohol on the heart. It is considered a stimulant to the heart's action, but is the effect produced direct or indirect? Is it through action on the heart muscle or on the nerves? If on the nerves, is it due to stimulation of the accelerator nerves or paresis of the depressor nerves? Are the cardiac ganglia or the cerebral ganglia affected, or both? Is the primary effect due to reflex irritation of the endocardium by the alcoholic blood? What part does the effect on the blood vessels have? More experiments on the blood pressure are required. Prof. Parke's conclusions on the work of the heart need revision and, probably, modification. All this applies to the healthy heart, but there are similar problems connected with the heart in disease, both intrinsic, cardiac diseases, and the heart affected in other diseases. Till we get these facts the administration of alcohol to act on the heart is one of empiricism with a considerable amount of ignorance, where the wisest are not those who push alcohol blindly in."—*Dr. Ridge.*

Thoughtful persons begin to recognize the close connection between drink and some of the greatest evils of the times. Unfortunately thoughtful people are in a small minority, while the great masses do not think of these things, and are hard to convince of facts which antagonize old habits and customs. This explains the slow process of the recognition of the fact. The pioneers who point out from the front lines the ravages which alcohol is producing make no impression, and are thought to be extremists and alarmists. Even medical men hesitate when the facts are brought clearly before them, but

this cannot always last. The time is not far away when the superstitions and errors of the present will disappear, and the tyranny of the present superstitions will pass away.

The fear that statements concerning alcohol and its effects should be extravagant and not represent the real facts is hard to explain, and does not appear in other matters or questions of reform. Why untrue statements in regard to alcohol cannot be discovered and disproved as quickly as any other errors, and why the truth of this drug should not be welcomed and accepted with as much confidence as any other statement, are psychological mysteries.

"What becomes of the alcohol which is absorbed into the circulation? Some of it passes to the liver, and some circulates in the blood to every part of the body. It is only an inference to say that alcohol is oxidized; this is not proven. If it is oxidized, it is strange that it continues to exercise a physiological action, and to be excreted in small quantities hours after it is taken." — *Dr. Ridge.*

The London Lancet says: "We look to the medical profession to be brave enough and courageously defend the facts which they are so well acquainted with, and rise above the sneers and cheap criticism which would call them cranks, because they urge total abstinence and denounce alcohol as a beverage."

The New York School of Clinical Medicine has attracted unusual attention in establishing a chair for the study of spirit and drug psychoses. The need for such a work is recognized, and up to the present time few teachers have thought it of any interest except to make a casual reference to it in their lectures. The startling statements noticed in this copy of *The Journal* are the clearest evidence of the need of special instruction in this new field.

Uric Diathesis. — Please accept my best thanks for the *Urticaria Hydrangea* (Lambert) you forwarded to me for the
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purpose of making trials in my practice. To know that this pharmaceutical product contains Benzo-Salicylate of Lithia sufficed to induce me to prescribe it in full confidence to a certain class of my patients, and I have obtained most satisfactory results from its administration, especially to those suffering from gout and rheumatism, improvement being rapid, and manifested after but a few doses of the *Lithiated Hydrangea* had been administered. I am continuing my observations with said preparation in order to gain a more thorough knowledge of its therapeutical effect in cases of Cystitis, Hæmaturia, and Renal Calculus.

F. VIDAL COLARES, M.D.

Calle de Vergara, núm. 12, Barcelona.

We call attention to a new preparation of morphine, called heroin, which may be successfully used in the withdrawal of morphia as a substitute, and which appears to be less injurious and more easily abandoned. Elberfeld Co., 40 Stone St., New York, are the selling agents for this and a great variety of new synthetic preparations. Among these is Hedonal, which seems to have a very powerful influence as a promoter of sleep. Sulfonal and trional are well-known remedies from the same company, the value of which cannot be overestimated by the profession. We shall take pleasure in calling attention to some of these drugs in the near future.

Dr. Smithwick of La Grange, N. C., in the January, 1901, number of the *Maryland Medical Journal*, says: When, in disease, bed sores occur we must use the best means for healing them and making the patient comfortable. In my experience I have tried a great many things, but have come to the conclusion, which is substantiated by clinical results, that I obtain the best results by thoroughly washing the parts with warm normal salt solution, bathing in peroxide of hydrogen, and dressing in pledgets of cotton or strips of gauze soaked in Ecthol. This dressing is repeated once, twice, or thrice daily as the urgency of the case seems to demand.

The Ammonol Chemical Co. of New York is now putting on the market a preparation called "Quassine," which we

believe to be the very best preparation which has been offered for the treatment of acute inebriety at home under the care of the physician. We take great pleasure in indorsing this preparation, and from practical experience believe it to be invaluable in all such cases. The same company manufacture Ammonol combined with codeia and other narcotics, which is exceedingly valuable and safe as an antipyretic and analgesic.

Bovinine continues to bear the test of experience as a medicine of exceeding great value. A Canadian physician announces that he has succeeded in aborting tuberculosis by giving it freely in a case where the disease started and seemed progressing rapidly into the chronic stages. There is nothing impossible in this, and we are disposed to credit any use of it as a tonic, and believe that its value cannot be overrated in many instances.

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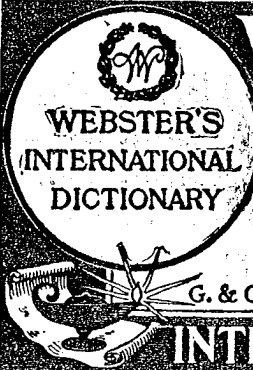
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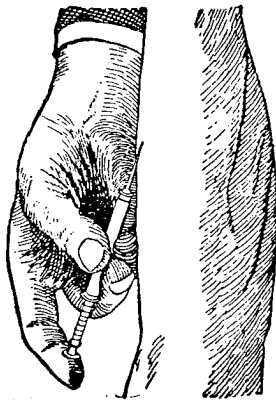
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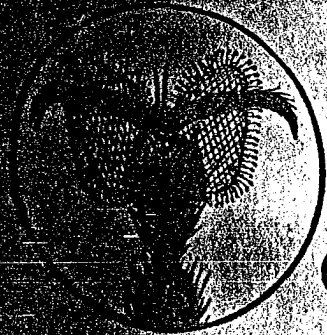
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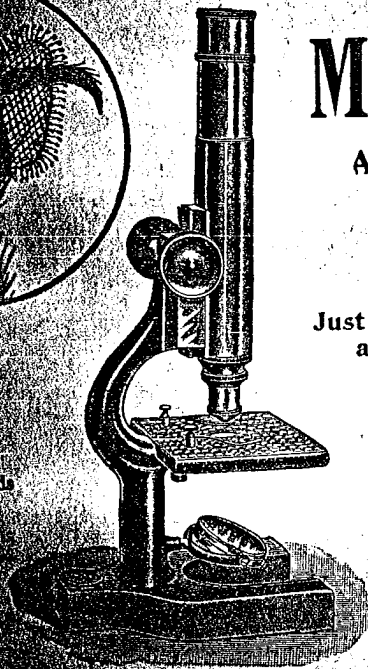
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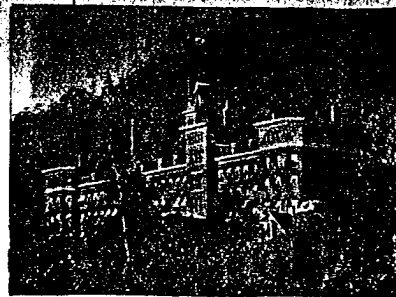
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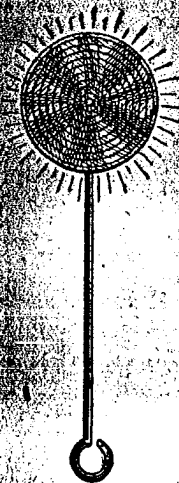
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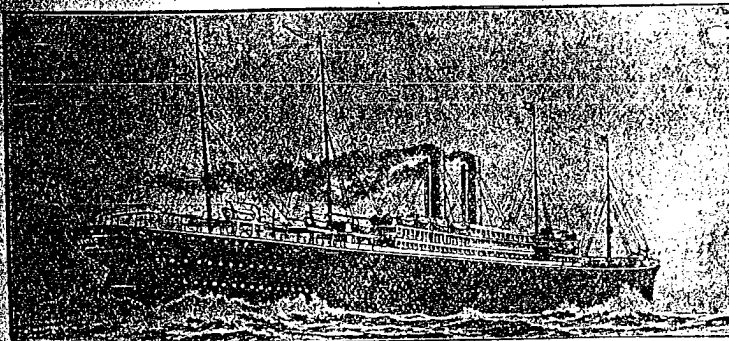
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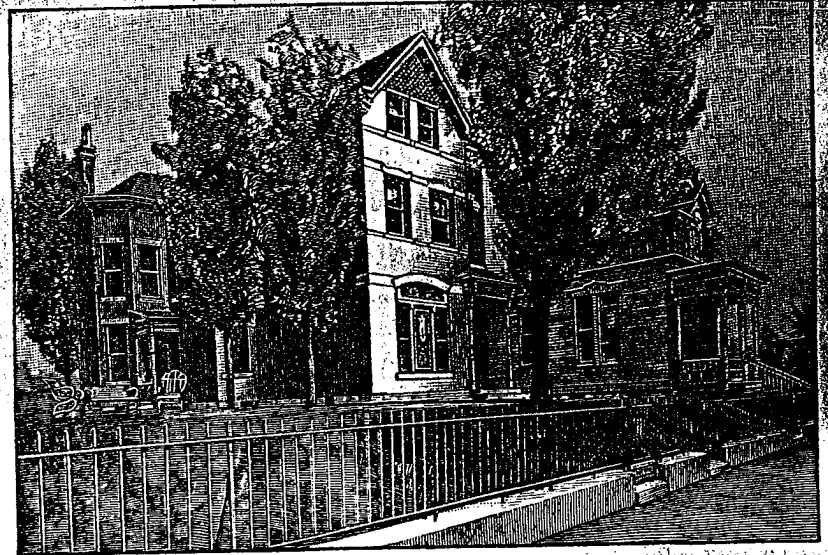
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