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# THE EFFECT OF ALCOHOLIC INTOXICATION UPON THE HUMAN BRAIN AND ITS RELATION TO THE THEORIES OF HEREDITY AND EVOLUTION.

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ALCOHOL, even when diluted as in wine, beer, and cider, is a poison which changes pathologically the tissues of the body and leads to fatty degeneration. If the majority of men are still ignorant of this simple truth, and are disposed to laugh at it, it is owing to their deep-rooted, pernicious drinking habits and the prejudices that have grown out of them. Men can always find excuses for their worst and most senseless habits, and interweave them into their ethics and æsthetics.

Some poisons are useful as medicines, such as corrosive sublimate, quinine, etc. I am one of those physicians that assign but a very subordinate position to alcohol as a medicine. A continued use of alcohol, as in wine, for example, offers no benefits, since the pretended stimulating effect is lessened by the repeated use, and the nuisance of chronic intoxication is increased.

The acute action of alcohol is that of a poison to the nervous system, especially to the brain, with a paralyzing result. The phenomena of drunkenness are transient, but in other respects are similar to those which are based on the shrinking of the substance of the brain, technically called paralysis cerebri progressiva, or dementia paralytica. It is true that in both these conditions there exist excitements, cheerfulness, loquacity, uneasiness even to frenzy, and raising the lower inclinations (or exciting the passions). But in drunkenness as well as in general paralysis these phenomena seem to be based more on the paralyzing of the checking centres of the brain than on any really stimulating effect. The pure raising of brain activity, as we observe in it strong normal mental excitement, although the checking plays some part, yet altogether it has quite another character more vivid and connected with raising the faculty of apperception, of activity of the senses, and with clearer consciousness. On the contrary, during intoxication our apperception and consciousness, as well as the co-ordination of the movements, are disturbed, the temporary intensifying of the instinctive impulses is apparently based upon the paralyzing of the apparatus of checking, so highly important to our well-ordered mental activity. Alcohol paralyzes the intellect, the sensations, and the will; but shows the contrary delusively to the dimmed consciousness. It paralyzes the perception of cold as well as that of warmth, therefore it seems to raise our tem-

perature in cold weather and to reduce it in warm weather. Really it withdraws from the body heat and force and paralyzes its activities, the basis of its life. All judicious savants have long known this fact. We need to name only Dr. Richardson and the physiologist Bunge. Therefore, I can believe as little in its pretended stimulating qualities as in its pretended nutrient power.

For years, as my school and other duties have permitted medical practice, I have administered alcohol as a stimulant in conditions of collapse and debility. But I have never witnessed an objective success. Subjectively, it is true, patients feel relieved in consequence of the abatement of their pain and uneasy feelings. But a subjective delusion is no cure. It is true that the effect of the imagination as a brain-power over the body through the nerves is an important matter not to be underrated. But it is an element in all sorts of medicines. For its success it depends only on the intensity of the belief. It imposes apparent specific effects upon both physicians and patients, and perturbs the judgments of men in general, because it acts unconsciously. Upon this depends the successes of homœopathy in the miraculous cures and of the so-called curative magnetism. With a good suggestion, colored water, and bread pills we stimulate, according to my opinion, just as well, or even better, than with wine. And we do no harm with it, while with wine we might. The physician before treating the human organism should take into consideration the question whether he may not hurt rather than help. How many reformed inebriates have relapsed through medical prescriptions of wine, beer, or cider!

Will a physician, for a doubtful medical effect, ruin a patient for his whole life? True, we may keep a patient by using narcotizing medicines of agreeable taste, as alcohol or morphine, which through feeling better, convince him he is better; which please him with us, but make him crave narcotics or become a slave of chronic poisoning.

Physiologists have found that alcohol diminishes oxidations, and therefore allows life with less food. On this the whole theory of economizing by alcohol rests—a real paragon of learned theoretical subtilty. Is arsenic a healthy food, because it makes fat and renders the skin fine and smooth? The red face shows degeneration of the paralyzed capillary vessels. Are the drinker's face or obesity signs of health? Who proves diminished oxidation an advantage to the body, and not, on the contrary, a great disadvantage, as statistics of mortality show irrefutably? Is it economically more advantageous to eat less and to drink more with more expense, and to become less healthy or even sick? The food claimed to be "saved" by alcohol can only be carbonic hydrates, *i. e.*, quite cheap aliments, as potatoes, etc., while albumen can hardly be "saved" at all. Common-sense using all the elements of the problem, soon throws over this famous economizer, and justly calls it father of poverty and of misery.

The statistical bureau of Switzerland's new cards for the causes of death keeps the medical secret completely. The physician keeps the name and writes down only the cause of death, and sends the card directly to the bureau in Bern. Our statistics cover but two years and only the fifteen chief cities of Switzerland, with about 500,000 people in all. For 1891, of 3,409

deaths in adult males above 20 years, 366 show directly or indirectly alcohol as a helping cause; that is, 10.7 per cent. ascribed to alcohol. At La Chau de Fonds, an industrial place, it is even 25 per cent., or every fourth man. Of the 366 death-cases, only 188 were of the real working class, but 179 were persons of the so-called higher callings (officers, savants, business men, industrial people, artists, saloon-keepers, etc.). Of these 366, directly of delirium tremens, 105 died.

The consequences of the customary use of other narcotic stuffs, as opium, ether, morphine, coca, and hashish, are very bad. Lewin's "Narcotics and Legislation," in the *Berliner Klinische Wochenschrift*, 1891, No. 51, a most important composition, should be thoroughly known. The vivid story of facts proves the author has closely studied and knows exactly the social poisoning as an expert physician. In the description of facts, I, unfortunately, must agree with him, but not so with his consequences and advices. We see here again that knowledge and judgment—facts and opinions—are separate things.

After treating the alcohol question, Lewin turns to other narcotics. Not able to say anything better, we cite literally the following masterful description of morphinism:

"Naturally, these explications lead to a condition which, according to my opinion of the regulation of the alcohol question, as something inseparable from it, must too very soon give cause to a separate legislative act. Alcoholism takes most of its victims out of simple and skilled workmen—morphinism from those who, by their public situation, education, and culture ought the least to come into the suspicion as subject to this passion without will and energy. This is the first essential difference between alcoholism and morphinism. The second consists in the circumstance, that the effect of morphine is not followed by those unpleasant, very conspicuous, exciting, and depressing effects which are produced by alcohol. Thus, in the course of a very short time, a large congregation of morphinists has formed itself, to which belong some of the best heads of Germany, artists and savants, teachers at the universities, diplomats, officers, and business men. If alcohol hurts the hand of the nation, morphine destroys its brain. This state was scarcely known, when, at the same time as Fiedler, I first reported such a case in 1874. And, alas, how well known it is now!

"Morphinism as a passion forms and grows in the domestic circle, and does not trouble the public in a scandalizing manner. But deeper and in more fatal ways the public life and indirectly the welfare of innocent people is hurt by the consequences, which the perfected morphinism is causing. It is said if individuals must suffer in social positions by this disease it is their own fault—but in so far as government can, it should not leave drunkards in official positions, still less so morphinists. The reason for such a measure is not difficult to see. Except perhaps cocaine, no narcotic becomes such an exigency for the system as morphine. The hunger for morphine is much more urgent than the craving for alcohol. The drunkard can wait many hours after the effect of alcohol ceases before he is compelled to take a new quantity. The morphinist, however, when the time comes that

the cellules of his system imperatively demand their irritation, is precipitantly and without resistance driven to a new dose. If he doesn't receive it soon body and mind begin to suffer.

"Under such circumstances a judge injecting or taking morphine cannot follow the discussion and decide clearly, or an examiner cannot fulfil his duty and judge as he ought to do. Moreover, after a certain time, notwithstanding the introduction of sufficient morphine, the mental faculties suffer and the moral feelings are damaged. The morphine-taking racer audaciously acquires the prize on the arena; the morphine-taking surgeon elegantly performs the operation; the clinical teacher ingeniously puts the diagnosis—yet they are lost men, to whom the morphine gives skill for a time, but keeps them on a slave-chain becoming shorter and shorter. Negligence in all duties, loss of energy and producing force, partly also a being brought down to a very low ethical standpoint, soon follow, and associated with many kinds of bodily ailments, at last render the picture of sufferings a disconsolate one. Since a definite cure of this passion is brought about only quite exceptionally, morphinists are, properly speaking, to be always considered as incurable people.\* Such state, when the body, especially the central nervous system, gives the motive for continuing the drug, when the will and all moral forces combined are powerless to resist the body, cannot be done away with, or at least very seldom so.

"The difficulty to make here a practical difference between wanton and medical chronic use of drugs is very real. One is a morphinist because of the pleasant state it produces, the other because it has first removed painful conditions of the body, later it has subdued evil effects, and at last from mere custom. A third group take morphine because it controls their chronic pains. Unfortunately it is impossible in the public interest to separate these three groups. Proved morphinism or opiophagy, alcoholism, cocaineism, etherism, chloroformism, chloralism, sulphonalism, and perhaps also bromism, ought to exclude from governmental position. All individuals suffering from them ought to be excluded from responsible positions; if the caused pathological condition is far advanced, they should be deprived of their discretion, or they ought to be put into an inebriate asylum. I do not consider them able to dispose.

"A thorough legal arraignment must wait perhaps till morphine becomes artificially preparable and therefore cheaper, and alcohol having played its great role, morphine will take its place. Already this plague catches some who in the sweat of their face ought to earn their bread, but not their morphine. Many millions of people are slaves already of opium! Whoever should doubt the nature or extent of this passion may look to China, which has been conquered and enfeebled by it in so short a time. Read the descriptions of Prochewalski, to see how opium demoralized the militia, officers and soldiers, in Mongolia. The use of the drug is rapidly increasing, especially since the northern provinces of China cultivate the poppy, and have

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\* Here we must oppose Dr. Lewin. Our experiences are much better, because we insist upon abstinence from morphine, from alcohol, and from all narcotic substances.

become independent of India and the indish regal prices. Beyond the oceans the Chinese have carried this passion and have given to Americans, men and women, the opportunity to indulge in the same vice. In one large city of America opium-dens were discovered even for ladies, which pretended to be fine millinery-shops."

The acknowledgment of the truth of the theory of evolution is pushed steadily into the foreground of our scientific conception of the world; this in consequence reacts on our practical social life, and on our opinions about how to form the most advantageous human society.

Therefore, it is certainly timely to make some contemplations about the relation of the alcohol question and of abstinence to the future evolution of mankind.

We do not think man could adapt himself to the use of alcohol and narcotics, so that they would cease to hurt him, for the following reasons:

Experience teaches:

1. The general drinking and narcotic customs incessantly augment the production and the consumption, that is, to increase the daily doses, which every man consumes in the average.

2. The "craving" ("Sucht") which alcohol and all other narcotics produce, drives to such augmentation with peculiar force when severe laws do not counteract.

3. Alcohol and probably also all other narcotics poison not only the individual, but also his sperm, the germs of his descendants.

4. The progeny of alcoholists, according to experience, are especially disposed to mental degeneration and to drinking excesses. Their resistibility against alcoholic liquors is never raised, but rather very much diminished. At first this may seem strange from the standpoint of evolution. Yet it becomes at once conceivable, if we know, as Prof. Weismann has masterfully explicated, that the qualities and customs acquired by an individual during his life are never hereditary, except when the germinative plasma is itself changed. Then, however, not "a quality is transferred," but, as in the poisoning by alcohol, the germinative plasma is directly hurt with following degeneration of the germ. The variability in transferring the dispositions, therefore, is not based on direct actions from the outside on the individual, but on the circumstance that those qualities which take their origin respectively result from the conjunction of a female with a male cellule out of two different individuals as new combination peculiar to the product or descendant—that those qualities are better saved when advantageous for this descendant than when they damage him; for on a long and healthy life of the posterity principally depends its preservation in the struggle for life.

That abstainers live longer and are healthier than even moderate drinkers of alcohol, is proven by the statistics of the life insurance companies and of the insurance societies against sickness.

The drinking habit, as is well known, tends to lead a man to imprudent sexual actions, by which on the one hand he contracts very commonly venereal diseases, often rendering the woman sterile and the posterity crippled, and on the other hand is kept away from matrimony and led to prostitution and not seldom to premature impotence—hence, it is not diffi-

cult for him, who is not blind and prejudiced, to conclude that, in the struggle for life, man will never adapt himself to the drinking habit, but that gradually abstinence must triumph, because the drinking world will carry on things more and more extravagantly, and will for that be by the abstainers outrun.

Exactly the same is true about the use of all narcotic drugs. The temperance movement ought to include all these in its combat. Lewin, whom we cited, has, it is true, another more pessimistic view, because he does not know the success of the Norwegian and Finlandian laws, and misconceives the temperance movement of all northern nations. But since in this only he errs, we can easily compose ourselves.

#### I. THE ALCOHOLIC INTOXICATIONS OF THE HUMAN NERVOUS SYSTEM.

The intoxication of the nervous system is conspicuous at the very first, often after very small doses. Alcohol is, in the first line, a poison for the nerves, and especially for the brain.

Expert physiologists have stated that poisoning by alcohol paralyzes every activity of the nerves. It is scarcely to be doubted that the excitement often caused by alcoholic intoxication, yea, even the slight seeming irritation following the first glass, is based much less on an increased activity of the fine and most minute nervous apparatus of the brain than on a paralyzation of the complicated checking apparatus, which usually bridle the ruder instincts and impulses, as well as often also the too quick and imprudent running of the thoughts in the wide-awake man.\* Through all parts of nervous activity, from the enervation of the muscles and the simple sensation to the highest activity of the soul, the paralyzing effect of alcohol can be demonstrated. In mental effects, the principal thing for us, alcohol paralyzes in the first line, and in the strongest manner the highest, most complicated, and finest, *i. e.*, the so-called ethic and æsthetic conceptions, conscience and reason, the reflections of which (that are the combinations of conceptions) are the moving spring of the highest and relatively freest will, because adapted in the most adequate manner to the circumstances. The human will is always determined by complexes of partly conscious, but mostly unconscious feelings and conceptions. All mental happening recognized subjectively, that is, by ourselves on ourselves, depends upon extremely subtle, combined molecular activities of the living brain-tissue, on the nervous cellules with their feeling and irritating threads, the nerve-fibers. Therefore, the normal condition and integrity of human will and the normal condition and integrity of the human brain and its functions are vitally connected.

The acute or once happening alcohol poisoning of the brain is called intoxication or drunkenness. The individuality of the drinker and the quantity of the introduced alcohol diversify the intoxication. From a little, pleasant cheering up the mind and weakening the disagreeable feelings

\* Bunge's "Lehrbuch der Physiologischen Chemie," page 125, 2d edition, Leipzig, C. W. Vogel, 1889.

(slight dulling of conscience and of consciousness of all mental and corporal pains)—through all stages of excitation with loquacity, of the dimming of consciousness, of the paralyzation of language and all movements—it goes on to somnolence, apparent death, and even to real death, if enormous doses of very concentrated alcohol were taken. Intoxication reveals great individual differences: one is rather sleepy, another cheerful and talkative, a third sentimental and soft-minded, a fourth melancholic and checked, a fifth boastful, a sixth irritable and quarrelsome. In all of them, however, the weakening of the higher, especially of the ethic and æsthetic qualities of the soul, prevails in a prominent degree. Hence criminal statistics show that most crimes take place during intoxication, and that because to paralyze the higher checking apparatus causes the brutal animal instincts to rise. Hence the drunkard, too, loses the desire for the beautiful. In spite of this, intoxication does not permanently hurt the brain-tissue, for the molecular storm produced in it by alcohol ceases by and by, if the poison has been removed from the system.

All poisonings of the body divide into acute and chronic. A division, however, especially important, where the poison is quickly eliminated from the body, as in alcohol, while in steadily remaining poisons (lead, silver, etc.) there is no distinct difference between the two. The chronic intoxication by alcohol is produced in two ways, partly by frequently repeated excessive doses (acute intoxications, drunkenness), partly by the daily use of moderate to excessive quantities of alcohol without drunkenness. *The chronic intoxication of the brain is by far the most important one.* Its first, lowest stage consists in two well-known results, common to all moderate drinkers who take small daily doses of any intoxicating liquor, like brandy, beer, or cider. The first one is becoming accustomed to the poison effects so that small doses, which, in the beginning, lead to slight, acute intoxication, are now no longer perceived. The second one, which varies enormously, is the craving, the longing for alcohol. In less sensitive people this craving is of small amount, and shows itself only by a very trifling unpleasant feeling, viz., that a usual agreeable enjoyment is missing. But in more predisposed people or in those already alcoholized in a higher degree, it becomes an always returning and always stronger ravening for alcoholic liquors. In heavily predisposed ones it grows to an unquenchable thirst for alcohol, which requires always larger and more frequent doses, and influences all resting circles of conception so strongly that explications, confirmations, justifications of a more and more considerable use of alcohol are unconsciously obtruded upon consciousness and will by the craving for alcohol. These first two symptoms of the chronic intoxication by alcohol connected with the pleasant paralyzation of the disagreeable feelings and with the pleasant taste, which the daily drinker more and more finds in the alcoholic beverages—form the foundation of the insidious, siren-like nature of the alcoholic liquors. In men who only exceptionally take alcoholic beverages, these phenomena do not fully show.

The higher degrees of intoxication by alcohol, which alone come into consideration in our theme, can be divided into two groups: (a) curable and (b) incurable ones.

(a). *Curable degrees.*—To these belongs first a raising of the already-mentioned apparent resistibility (insensibility against larger doses of alcohol) and of the craving for alcohol. Further, quite gradually, according to the individual predisposition not before high or soon after relatively small daily doses of alcohol, there takes place a series of phenomena, of which sometimes the one, sometimes the other, is more distinct: weakening of the ethic, very commonly also of the æsthetic feelings and conceptions, irritability of the character very often connected with emotional, soft temper, lessening of mental activity and faculty of apprehension; one-sided, stubborn dogmatism, want of intelligence in general, brutality of mind, mendacity, inclination to rabietic distortion, raising of impulses, combined with diminishing of the corresponding production of energy, partial sexual impotence, rhythmical trembling of all muscles (to be noted especially in more minute movements), etc. This slow change of the nature of the chronic alcoholized remains unknown to him until, after many months of abstinence, he is completely cured, he is able to account for it. This often, if at all, occurs in a complete way, after some years. In the higher degrees of alcoholism the character can become more than beastly, and show all transitions to complete mental disturbance: senseless jealousy, irritability and brutality, the most shameless recklessness towards weaker ones, especially towards women, the meanest cynicism, etc. In its highest degrees alcoholism can produce senseless wrath, with insatiable thirst for blood. Sometimes greater, sometimes smaller dullness of consciousness, feelings of anxiety, hallucinations and delusional ideas of persecution, especially of jealousy, accompany these conditions.

In the course of chronic intoxication, often completely unremarked even by the whole company of the poisoned, there take place, not seldom unexpectedly, quick fits, which one has called delirium tremens (delirium alcoholism), and which suddenly betray the mistaken disease, hitherto slumbering. Usually, for producing such a fit, a disturbance of the accustomed way of the general functions of the body is sufficient, especially of nutrition, *i. e.*, a trouble of digestion, or the lying abed consequent upon a smaller or greater accident, or any other disease. The man in question must not necessarily have had an intoxication before, and not seldom has still the reputation of a quiet citizen, who does his duty, is respected, and, at the most, is accustomed to taking somewhat strong doses of alcohol. Soon after the derangement of the usual economy of life has occurred, he begins to suffer from sleeplessness, restlessness, anxiety, strong trembling, terrific dreams, then also in the daytime of hallucinations, especially terrible moving visions of animals and corresponding delusional ideas. The patient is often frightfully agitated, runs from anxiety with his head towards the wall, will kill his supposed persecutors, and dies in consequence of refused food and deranged digestion, combined with alcoholic fatty heart degeneration, and with brain exhaustion, particularly if fever or even pneumonia is setting in, and suicide is frequent in such conditions. Usually he recovers after some weeks, and I have often known the patient and also his family to think it a defamatory calumny when I declared the fit to be alcoholic delirium. To say such things was infamous, the man has not been a drunkard, he has never gone beyond

the allowed quantity, etc. Not till my prophecy was realized, and further fits of delirium tremens occurred, did they hesitatingly admit it might have come from drinking.

Delirium tremens, consequently, is a mental disease taking place episodically in the course of the chronic alcohol intoxication. Curing this fit of insanity is, therefore, by no means equal to curing the chronic alcoholism. However, the fit of delirium always furnishes the irrefutable proof of chronic alcoholism. But the reverse is not valid, for chronic alcoholism may exist in just the same irrefutable manner without any delirium, even without the precedence of any inebriation. In predisposed people still other mental derangements, as melancholia, mania, paranoia, etc., occur in the course of chronic alcoholism.

(b). *Incurable degrees.*—Chronic alcoholism usually lasts many years, mostly till death, since the only cure (the lifelong complete abstinence from all alcoholic liquors) is not only totally misconceived, but even in an incomprehensible way is marked as very dangerous, and that too from the medical side. But if the organs of the body, except the brain, have suffered less, and the patient does not soon die of a disease of the heart or the liver nor of a fit of delirium, the chronic alcoholicist may live many years. In case of continued excesses, especially in somewhat advanced age, about the fortieth year, or more frequently around the fiftieth, we sometimes observe symptoms pointing to shrinking processes in the brain-tissue. All such are to be noted, especially the weakening of memory and a general dullness and imbecility of intellect and mind. This condition is very similar with a premature senile imbecility (*dementia alcoholico-senilis*), but may occur under certain circumstances in rather young people. It is incurable. As much incurable is the pronounced chronic alcoholic madness (*paranoia*), which, under similar circumstances, often develops with delusion of persecution. On the contrary, a peculiar mental derangement, which looks very similar to the general progressing paralyzation of the brain, that is the alcoholic pseudo-paralyzation with inarticulate language, mania with exaltation, etc., is not by any means always incurable, and is to reckon better than (a).

All this shows clearly that chronic alcoholism, as a whole, is nothing but an imperceptibly graduated disease of the mind or the brain. To him who might still doubt, it may be said, that the autopsy of the chronic drinkers shows thickened places of the meninges of the brain, gathering of water in the brain cavities, and in advanced cases distinct shrinking of the brain. Further, we should still like to point to the just published annual record of the Nether-Austrian State lunatic asylums for 1889 (Vienna, k. k. Hof-und Staatsdruckerei, 1890). On page 7 it is stated that out of 549 men received in 1889 in the State lunatic asylum of Vienna, 135 fell sick exclusively by alcoholism, and 84 under co-operation of it. Consequently, 40 per cent. of the male receptions was wholly or partly due to the beloved alcohol. We may at once add, that out of 115 fresh male receptions of the cantonal lunatic asylum, Burghölzli in Zuerich, in 1890, 31 (that is, 27 per cent.) concerned exclusively alcoholic and morphinistic (3) kinds.

## II. INDIVIDUAL PREDISPOSITION AND HEREDITARY TRANSLATION.

The more exactly we study the drinkers, that is, the chronic-poisoned by alcohol, the more we are convinced how enormously the individual dispositions differ (that is, the kind of reactions by the effect of alcohol on man), and on how different and complicated causes this disposition is based.

One is intoxicated easily by small quantities, and is believed by the public to be peculiarly unable to resist; but he is often the least endangered, if he, in the rest, is in ethic respects well disposed and possesses an ordinary will, especially if the craving is not exceptionally quick developed in him. Another apparently stands ordinary quantities, but becomes in a short time "craving" (*süchtig*), that is, there is developed in him very early an irresistible longing for larger and larger quantities of more and more concentrated alcohol. This intense and early development of the craving has been called *dipsomania*; it is always the proof of a heavy hereditary burdening, and very often appears only periodically (periodical inebriety, "*Quartal-Trinker*"). That this intense craving offers one of the greatest dangers, is without doubt. Another man is neither soon intoxicated nor in any special degree craving, but yet very deficient in ethic respect, weak of character, careless, unable to consider earnestly important problems of his future life. He is also very much endangered and simply becomes a drunkard by the saloon-habits and the compulsory drinking of our society. In a large majority of our drinkers the trouble is still another one; they are simply the victims of human rage of imitation, of our social-drinking habits with their compulsory drinking connected with vainglory and braggartism, as well as of the popular delusion, that alcoholic liquors are healthy fortifying means. An extraordinarily insidious trap lies in the conspicuous, considerable faculty of resistance of certain people, who are able to consume large quantities of alcohol without getting intoxicated. They finally become chronic alcoholists, without observing it, without having had any intoxication; they seduce many others and endanger their progeny in especially high degree by the considerable alcoholization of the tissues of their system. Such people very often die of alcoholic degeneration of the heart, of the liver, etc., without having previously betrayed any considerable degree of chronic alcoholism of the brain, because in them other organs of the body are very often more inclined to alcoholic degeneration than the brain. In these things there are many individual differences. That poverty and misfortune often promote inebriety, we will not deny, but this cause has been immensely exaggerated by certain tendencies. Usually it is on the contrary the inebriety which produces poverty. In very many cases the drinking habit and poverty are the two sister-products of badly predisposed brains, which fall as victims of our drinking habits. In well-off people, however, alcoholism rages scarcely less than in poor people.

It is already well known that inebriety, the chronic poisoning by alcohol, is transferred by the degeneration of the semen of man and of the ovaries of woman to the progeny of the drunkard. It is true it very frequently causes in the descendants the above-mentioned irresistible longing for alcohol, but also a variety of other diseases, the children of the drunkards per-

ishing in large percentage of debility of life, dwarfed growth, idiocy, mental diseases, and so forth. In modern times these facts have received an essential support by statistical investigations of a most careful kind, among which the incredulous may take to heart especially the following :

Professor Demme, in Berne, "The Influence of Alcohol on the Organism of the Child." Stuttgart, 1891.

Dr. M. Legrain, "Heredity and Alcoholism." Paris, 1889.

Dr. P. Garnier, "Insanity at Paris." Paris, 1890.

For our question it is especially important to note the hereditary translation of the irresistible craving on the children by a father or a mother, who themselves did not possess this craving, but were drinkers only by custom or sociability. Very important for us is further the fact that in mental respects abnormally disposed people (psychopaths), as a rule, cannot bear alcoholic beverages and become very easily inebriated.

### III. INEBRIETY IN ITS RELATION TO PSYCHOPATHIA AND INSANITY.

We have seen that the chronic poisoning by alcohol can produce not only the typical delirium tremens, but still other forms of mental troubles. Almost of the same great importance is the fact that the "psychopaths, the so-called nervous people, and the insane, as a rule, bear the alcohol very badly, also when their disease has not its cause in alcoholism. Firstly, these people become very easily accustomed drinkers, and then often very small doses of alcohol are sufficient for them to produce considerable phenomena of poisoning. I saw severe delirium tremens with public dangerousness in psychopaths after the consumption of quantities of cider, scarcely to be called very immoderate (one and a half to two liters daily). Especially characteristic for the alcoholism of the psychopaths is the considerable prevalence of the mental troubles, of the changes of character, and of the nervous derangements in general. This is so evident that, very commonly in them, before the tissues of the body are alcoholically degenerated in a degree worth mentioning, we observe severe nervous and mental derangements, which sometimes look so similar to the non-alcoholic kinds of nervous and psychical diseases, that the diagnosis is made very difficult. Yea, we can decidedly affirm that there are intermediate forms between alcoholic and non-alcoholic mental troubles, since the abuse of alcohol, even the simple use of it, gives in psychopaths not seldom only the last inducement for the outbreak of a slumbering psychosis, epilepsy, or a similar disease. We can, too, observe after the cure of such troubles, that the degenerations of the tissues of the body, as we find them in the other cases of chronic alcoholism, are absent or developed in only a very low degree.

The just cited facts are of high importance. There are many more psychopaths among the drunkards than was formerly believed. The poisoning by alcohol and the psychopathy help and cause one another, the one always predisposing for the other : the poisoned becomes psychopathic and produces psychopaths ; the psychopath becomes very frequently inebriate, and produces drinkers. This unfortunate circle is to be abolished only by curing the inebriety, that is only by abstinence, because a congenital (in-

herited) abnormal disposition of the germinative plasma as the psychopathia, can as such not be cured in an individual. On the other hand, a deeper investigation of the mental troubles shows more and more, that, by the inconceivable graduations of the psychopathia and of the deficient normality, they offer all transitions to mental health. We find a quite similar series of transition between the formerly normal man having become inebriate only by seduction, sociability, etc., on the one hand, and the insane drunkard, the dipsomaniac or "Quartaltrinker," on the other hand. Nowhere is a sharp boundary-line.

It was frequently pretended that the dipsomaniac is incurable. That is not true. The experiences of the well-conducted establishments for the cure of drunkards (vide Christiania record, I. c., page 208, discourse of pastor Hirsch in Lintorf; besides this the first annual report, 1890, of the asylum for curing drunkards in Ellikon on the Thur), prove the curability of dipsomania. By abstinence the dipsomaniac is much better to be cured than the drinker, since birth defective in ethic respect and completely characterless.

We step here before an important question. In the ninth report of the Zuerich Assisting Society for Lunatics, of 1884, as well as in the "Correspondenzblatt" for Swiss Physicians, 1890, April 15th, page 233, I have treated the importance of the constitutional insanity (psychopathies, diseases of character) which so often represent the transition to mental health, and I have emphasized how necessary it is for human society that such conditions are timely recognized, and the persons suffering from them are made inoffensive, if necessary, by limiting their liberty in special institutions. All this leads forcibly to the scientific conviction that the inebriate or the habitual drinkers are to be put in medical, social, and legal respect upon the same scale as publicly obnoxious psychopaths, and, therefore, are to be treated as mentally abnormal men. The delirium tremens, the other alcoholic mental diseases, and even the heavy intoxication are nothing else than mental diseases, and, therefore, to be fully equalized to the rest of the acquired mental diseases. The chronic latent poisoning by alcohol, the chronic alcoholism with its changes of character, is in comparison to the just mentioned alcoholic mental troubles about what the constitutional mental troubles are in comparison to the pronounced acquired mental diseases. The chronically alcoholized submits to the force of his craving with the same irresistible surety as the constitutionally insane to the power of his morbid impulses. His will is, as soon as the inebriety has reached a certain degree, amidst our given social circumstances, just as little free, stands under just as strong a compulsion as that of the constitutionally insane. He is bound to succumb.