

and then but one. It is not necessary to study separately two skiagrams taken from widely different points of view, and then to coax them to give a mental picture of the real condition.

In this improved method, both pictures are combined into one, giving a view of the parts almost as definite as if they had been stripped of all impeding tissues; or better, that the flesh and other tissues which defy unaided eyes are made to serve as landmarks in the stereoscopic skiagram—or as I prefer to call it, the radio-stereogram.

I do not claim any priority in this matter at all, though I do believe myself to have been one of the very early workers in this line. Some of the Denver men will remember a radio-stereogram which I showed a few years ago; it was the skiagram of a ball of wrapping twine into which I stuck a number of pins in different directions. That was my first; my second was a sheep's kidney, whose vessels I injected with plaster of paris. The picture shows the branching of these vessels very well, and I think that it gives us a hint of a fine method for the study of the circulation of various internal organs.

It is not necessary for me to dilate on the advantages of this method, as I think it will be at once apparent to all what an advance we have here. All physicians are familiar with the stereoscopic views which used to be so popular, and how much better an idea they gave of the relations of different objects in the picture to each other than did a flat picture of the same scene; and it is the same with the radio-stereogram; instead of a flat view they gave a relief effect with full perspective.

As to the technic, a plate-holder so arranged that a plate in its light-proof envelope can be inserted, withdrawn and another inserted without disturbing the patient, who is placed on it, is quite necessary.

If there are no good natural landmarks near the part to be examined, a metallic marker may be placed on the skin, its location being indicated by indelible ink or nitrate of silver; in looking for a needle do not use a piece of straight wire as a marker, and if a bullet is sought, do not use a metallic disc, for very obvious reasons.

The tube is hung from a graduated support; a point on this support is found, that is in a line perpendicular to the plate and passing through the center of the object to be examined. The tube is now placed so that the anode is a certain distance, varying according to the thickness of the part, to one side of the base point already selected on the tube support; an exposure is made, the plate withdrawn from the plate-holder, and another plate inserted. The tube is then moved so that the anode is on the other side of the base point of the support a distance equal to its former distance from it on the opposite side and another exposure is then made.

For examination, the finished plates are placed in a suitable light, side by side—there is a right and left in this arrangement—and they are then examined by means of a special stereoscope. I use plane prisms of twelve degrees, with bases out; an ordinary parlor stereoscope will not do at all.

In looking at the skiagrams, the attention is concentrated on the center of the picture, and the observer is rewarded by a view of the parts that gives their true perspective. There are other means of examining these negatives, but I think this is the simplest.

I have reduced some of my radio-stereograms to such a size that they may be viewed through the ordinary parlor stereoscope, and I present them herewith for inspection. Naturally, they have suffered some loss of detail in the process of reduction, but I think they will convey my idea.

By diverging the eyeballs these radio-stereograms may be examined without a stereoscope. This feat is performed by attempting to look through a point midway between the negatives or prints, and focusing the eyes for a distance far away. The pictures will gradually merge into the stereoscopic view when the proper degree of divergence is attained, and the trick will be found a very useful one in this work. Details will appear after a few seconds which are not noticed at the first glance.

SHOULD INEBRIATES BE PUNISHED FOR CRIME BY DEATH?*

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The severe criticism by lawyers and judges of medical expert testimony is often based on facts and is not altogether unjust. Physicians in the witness stand are often very stupid, and give strained interpretations of scientific facts, mixed up with opinions and theories, which give rise to a suspicion of hazy, inexact ideas, or of some personal motives. Such testimony concerning the mental condition of inebriates who have committed crime is still more confusing and doubtful. Physicians who are generally clear on other matters in their everyday life, particularly relating to questions of cause and effect, hesitate and are confused when called to describe the mental condition of persons continuously poisoned by alcohol. The toxic effects of alcohol on the organism seems to be a matter of uncertainty, but when in place of the word alcohol, arsenic or mercury is used there is great emphasis and clearness of statement. The injurious effects of alcohol are very common, while that of mercury and arsenic more or less is rare. The one is invested with delusions and stupid theories, the other is not. If with the history of inebriety is associated a neurotic ancestry, bad surroundings, irregular habits of living and occupation, why should the expert physician be in doubt as to the degree of injury and damage which the brain has sustained from the use of alcohol combined with these agents? Why should the possibility of mental soundness and capacity of control be considered in persons with this history, and how utterly farcical is the attempt to draw dividing lines where health and disease join, or where mental strength and degeneration separate? During the past year over one hundred inebriates have been tried and punished by death for capital crime, and the question of responsibility and the degree of sanity present was the subject of controversial testimony among a large number of medical experts. The results of these trials indicated the profound failure of both courts and medical witnesses to understand the pathology or psychology of these poor victims. Literally, the questions of sanity and responsibility turned on the credulous acceptance of erroneous theories of the effects of alcohol on the brain. The dogmatic assertions that inebriety could not excuse nor lessen the responsibility of

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crime, and that any toxic states before and during the commission of the act increased the culpability, were accepted by medical witnesses as if they were exact facts. Also the still more incomprehensible classification of intoxications into voluntary and involuntary forms in which free will and judgment to discriminate were present, was repeated as scientifically true beyond question. Another assumption prevailed and was unquestioned by the medical witnesses, viz., that the question of motives and the consciousness of conduct in one poisoned by alcohol could be traced with as much exactness as a stream of water is followed back to its source. The absurdity of calling states of mania or melancholia voluntary or involuntary acts and the efforts to show their boundaries and limits appeared in the testimony of several experts.

Going further, they declared that the use of alcohol was a mere habit to be put on and off at will and that at no time was the consciousness or power to discriminate concerning the nature and consequence of acts lost entirely. In one instance an expert swore that the prisoner was sane and responsible at the time the act was committed, although he had drank to great excess for years and had had many attacks of delirium, one within two weeks of the time of the commission of the crime. He also had delusions that he was to be killed by persons who wished to drive him out of the community. In another case an expert gave similar testimony where the prisoner had drink paroxysms for ten years, dating from a sunstroke, and during these paroxysms he was maniacal and destructive. In other instances similar histories of long-continued use of spirits and of pronounced toxic states were given, and the possibility of such persons being sane and responsible was so remote that it is difficult to understand why it even should be considered. The efforts of courts and attorneys to judge of crime and criminals where the toxic causes are alcohol, based on medieval theories of the operations of the brain, are common, but why physicians should accept such theories and conclusions that are literally opposed by all scientific studies is, to say the least, very startling. Nothing seems more clear than that crime, criminals, insanity, inebriety, idiocy and many other forms of degeneration are all results of distinct causes, the origin and growth of which is becoming more and more apparent with every advance of exact knowledge. Theories of moral causes in inebriety, such as that tendencies and impulses are under the control of the will at all times, are unknown and are opposed by scientific studies. The inebriate whose use of alcohol may be a symptom as well as an active cause, is diseased and has a defective brain, with a defective power of control, no matter what the appearance may be. The reality of the disease is apparent in the failure of the use of moral means and remedies, such as punishment, ridicule, persecution, suffering and loss, which make no impression and which in no way check its progressive march. If there was sanity, normal control and consciousness in the inebriate's state, those means would prevent inebriety, but the fact that they increase and actually develop the favoring causes and conditions is an indication that the degeneration is physical and not moral. The inebriate is practically less able to control or to judge the nature and character of his acts because of his defective senses and general poisoned condition. Alcohol has paralyzed both the organic and functional activities of the body, and impaired his ability to adjust himself and to understand the constantly changing

conditions. The irresponsibility of the inebriate from the defective organism is confirmed by the modern studies of the physiologic action of alcohol on the brain and nervous system. No matter how it may be used, its effects are practically the same, only varying in degree. First, the action of alcohol is on the vasomotor nerve, disturbing the vascular circulation, both increasing and diminishing the flow of blood to the brain and to the surface of the body; second, the nutrition is disturbed, the oxygen-carrying properties are diminished and the toxins are increased and the vitality is lowered. The blood vessels are incapable of uniformly furnishing the proper nutrient supplies, and the supply itself is diminished in both quality and quantity. Every dose of alcohol disturbs and lowers the elasticity of the arteries, particularly in their terminals, and the normal rhythmic flow of blood essential to health is broken up. These changes are registered in the increased heart's action, vasomotor palsies, and surface congestions. This impairment of the arterial circulation is registered in the derangement of the senses, which can now be measured with great exactness. Alcohol impairs the sight, diminishes its color sense and power of discrimination; the hearing is lessened, and the co-ordination of sounds is disturbed. Both taste and touch are defective and the consciousness of the external world coming through these sources is perverted. This particular derangement of the impressions from the outside world through the avenues of the senses most seriously affects the power of reason, because such impressions are faulty and the data which they furnish misrepresents the real conditions. The brain is incapable of correctly judging of the surroundings, of the consequence, and of the nature of acts. This faulty condition of the senses extends to organic impressions within the body. The anesthetic effects from spirits promote delusions of strength and vigor, hence the inebriate never realizes the actual conditions and constantly misinterprets the impressions within the body. The co-ordinating centers and so-called consciousness of the higher relation of events are palsied, hence delusions, illusions, deliriums with stages of mania and imbecility appear from the use of spirits. These are noted in the later stages of mental disturbances which begin with the first use of spirits. The changed conduct, faulty reasoning, and emotional instability seen in inebriates is frequently an evidence of the advent of paralysis. Often these palsied effects concentrate either on the motor, the mental or the sensory centers until finally judgment, experience, duty, obligation and power of discrimination are confused or lost. The supposed clearness and activity of the mind does not represent the real condition, and is often the struggle of the co-ordinating centers to adjust themselves to the new conditions and surroundings. The appearance of health is a mask, and the organic activities of both brain and body become more and more automatic. The mind is cut out from the main circuit and does not act from the data of the present. General loss of memory, coming on suddenly and extending over a period of time, during which crime may be committed, is treated with contempt by the courts and regarded as a subterfuge and excuse for the acts committed. Many inebriates executed for crime claim that it was committed without the slightest recollection or consciousness of what they were doing. Testimony to determine the reality of this condition is seldom offered. In a study which I made some years ago of these amnesic trance states it was found to occur very frequently, and its reality did not depend on

the statement of the prisoner. The general conduct and automatic character of the act committed, together with a general history of continuous toxic states, made it clear that many crimes were committed in this condition, where the degree of responsibility was entirely absent. Many of these persons had a history of epileptoid impulses and explosions with concealed or open delusions, which were overlooked as of minor importance. These are some of the pathologic states common to inebriates, particularly those who have committed crime, and who have reached chronic stages of degeneration. The conclusion can not be doubted that irresponsibility and mental failure not only to control but to judge of the relation of acts and of the surroundings is present in all chronic inebriates. Looking at this subject from another point of view, it is evident that the legal theory that inebriety is no excuse for crime and the punishment based on this theory as a deterrent and remedy for its cure and prevention is a stupid blunder, and contradicted by all experience and statistics. In the lower courts, where toxic states from alcohol and mild assaults come into recognition, the efforts to cure by fine and imprisonment not only increase the disease but make the victim more incurable. Different studies of victims punished in the lower courts show that less than 1 per cent. received any benefit. Each effort to check these toxic states is literally a form of education increasing the debility, lessening the control and precipitating the victim lower and lower; thus the inebriate and pauper criminals are cultivated by the blundering efforts to prevent and to cure this condition. Of the hundred inebriates executed last year over 70 per cent, had been punished in the lower courts for minor acts, and the final culmination in capital crime was the natural consequence of a series of events which could have been predicted and which was almost certain to follow as the natural result from distinct causes. In one case, from the beginning there was continuous anesthesia and palsy of the higher brain centers and of the sensory activities, which went from bad to worse, making the victim more and more unable to understand the nature and consequence of acts. Notwithstanding this experience, the same methods are pursued and the same reasoning followed, that intimidation, fear and suffering will give some new power of control not exercised before. The same theories prevail in the higher courts, where the death penalty is supposed to check the use of alcohol and to prevent persons from committing crime while under its influence. These legal fictions are stated so emphatically that the thoughtless experts credulously accept them as true, actually believing that crimes committed while suffering from the toxic effects of alcohol may be, and are, the voluntary acts of sane minds. When the absurdity of this premise is pressed, the answer is that the mind was sane at the beginning and knew the consequences following the use of spirits. Another legal fiction has been accepted as an exact fact, that evidence of premeditation in the act is an indication of normal reasoning in the inebriate. Still another legal fiction is prominent in the supposition that a purpose or motive previously formed could be conceived and materialized in a brain continuously clouded by alcohol. And, lastly, the most astonishing blunder is that of attempting to point out fixed periods in the operations of the inebriate's mind where sanity and responsibility joined insanity and irresponsibility. In one instance a prisoner had been arrested many times for sudden, unprovoked assaults, evidently the result of concealed de-

lusions, yet the medical experts could not find evidences of an unsound brain. His volubility and the clearness of his statements seemed stronger proof of his sanity than years of insane conduct. Another patient, after ten years of the most irresponsible thought and acts, committed an atrocious crime, and in jail explained his conduct and gave reasons and talked so clearly and well, that he was convicted at once as sane and responsible. He was apparently converted and spent the last days of his life in warning others to avoid the use of spirits. This was literally concealed paresis. Another man, whose crime was sensational and whose previous life had been one of continuous alcoholic paralysis, was indignant that a defense should be made of insanity, and denied that he was irresponsible. The court accepted his statements and treated with contempt the efforts of medical experts to show the insanity of the man. These examples are common and indicate the dangerous and thoroughly futile efforts to discriminate and to point out degrees of sanity and rational appreciations of the surroundings and the consequence of acts by inebriates. Society, as well as human justice, suffers by these unreasonable efforts to punish and to destroy chronic inebriates for wrong doing. Society has no right to permit defectives to grow up unnoticed, and to be educated to acts of violence and destruction, and then to hold them responsible and to punish them as sane. The inebriate murderer should never be put on trial in public, and the farcical question of his sanity and responsibility made the subject of public discussion. One great fault at present is the failure and hesitation of the medical profession to defend the teachings of science, particularly when these are opposed to the theories of courts and to the delusions of the present.

Some of the conclusions which the scientific studies of the present make prominent may be stated as follows: First, the present legal treatment of inebriety and the efforts to apply preventive and deterrent remedies is a failure.

Second, science has proved beyond question that the action of alcohol is an anesthetic and depressant, and that its continuous use is followed by sensory and motor impairments, and also by poisoning and starvation of the brain and nervous system, hence sanity and responsibility is not possible.

Third, the object of the state, through the law, to prevent crime and to protect society from criminal inebriates by dealing with them as sound and responsible, fails in every particular.

Fourth, the fear that the plea of insanity in crime and the failure to inflict punishment is an excuse and encouragement for crime, is opposed by all statistics and experience.

Fifth, the inebriate should never be punished by death, for crime committed under the influence of alcohol, because he is not mentally sound. Such punishment surrounds the criminal with a contagion which leads other defectives to repeat these very acts.

Sixth, the question of responsibility in inebriety should never be made the subject of medical controversy.

The fact of excessive use of alcohol should be accepted as evidence of mental impairment and of inability to control acts and conduct. The medical examination will show this impairment, and the patient should be committed to institutional care and treatment. Physicians called to give evidence of the sanity and responsibility of inebriates should give their views entirely from the facts

of the neurotic heredity with the spirit and drug history. The more thoroughly these are known the more accurately conditions of the brain can be determined. The question is one of cause and effect; not of theory nor of legal dictum, but of actual fact, with the legal application of which the expert has no concern.

DISCUSSION.

DR. BROOKS F. BEEBE, Cincinnati, stated that many medical witnesses are not medical experts. They do not know the subject, and yet their testimony will go for as much on the witness-stand, often, as that of Dr. Crothers himself, simply because the laws have been made through ignorance and not on a scientific basis and, therefore, are altogether wrong. There is no question in the medical man's mind as to when an individual is responsible and when he is not. The line is clearly drawn, the difference being one of habit or disease. One individual goes out and takes one glass of whisky or two glasses of whisky and stops as he chooses; in the other case a man takes one glass of whisky and he can not be prevented from going on a spree. They may have an equal amount of knowledge, but not of will power. If it is simply a bad habit, the man is responsible for taking the alcohol and for all its consequences. On the other hand, if there is lessened will power, disease exists to that extent and irresponsibility follows. The method of punishment of these alcoholic criminals is all wrong. In Cincinnati the cases are tried in a police court. A man goes on a little drunk and is sent up to the workhouse for 30, 60 or 100 days. He comes out and in a very short time goes on another spree. When a police officer was asked what proportion of them returned, he said that more than two-thirds of them were sent to the workhouse more than once, many flitting from one to the other for years and years. If responsible, as some of them probably are, they should be sent to the workhouse, but doubling up the time with each new arrest, giving them 60 instead of 30 days, 120 instead of 60 days, and so on. Old offenders should spend part of their time in the workhouse being treated for their diseases—medicinally and otherwise—part of the time being spent in working for themselves and for their families, and in this way they may get back into a healthy condition. It is not a question of punishment altogether. It is a question mostly of curing the disease. Certainly an individual has no right to walk the streets and do harm; certainly the public has a right to be protected, but the state is in duty bound to take care of an individual in the proper manner. The state owes a duty to the criminal in more ways than one; to take care of him and of his children. Such people have no more right to marry and to propagate offspring than have the tuberculous or people with any other diseases, and the state should look after those cases also. Let physicians help to make laws permitting no one to marry unless he has a certificate of health and good character. The prevention of crime will be accomplished more readily by preventing propagation of the species than by punishing irresponsible diseases.

DR. S. M. CROWELL, Charlotte, N. C., said that physicians as well as the laity are too prone to look on these diseases as loathsome habits which do not need scientific consideration. The city recorder of Charlotte said that he was thinking seriously of forming a bill to be introduced in the next legislature to provide a treatment for these cases. Under its provisions, instead of sending a chronic case to work on the county roads, he would sentence him to a county sanatorium provided by the state legislature. Then, after a proper course of treatment, if the case should again appear before him for a similar offense, he would consider punishing him in some way.

DR. ALBERT E. STERNE, Indianapolis, declared that if the first law of nature is the preservation of liberty, then the punishment of the chronic alcoholic for crime is against natural law. Is not the mere fact that the person is satisfied and is willing to spend three-fourths of his life in prison *prima facie* evidence that the reason and judgment of the man is at fault? The mere fact that he goes to prison time and again and is

released only to be sent back again within twenty-four hours shows that it is not a habit and that the man is mentally unsound, that he possesses no judgment and exercises no judgment. That man is sick; he needs treatment; he needs to be incarcerated in a place where he will be treated, not where he will be surrounded by influences more deteriorating than those from which he was removed. A bill was introduced into the Indiana legislature two years ago, which was lost because the man who introduced it proposed to levy a tax on druggists selling liquor, morphin and opium without the prescription of a regular and practicing physician. Of course, the druggists got together and immediately put down that bill. Now there is another one which will come up at the next session to establish a hospital for inebriates. The city hospital is the place for the acute cases, just the same as for any other acute disease.

THE MUSEUM IN MEDICAL TEACHING.

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The stress and the high pressure of modern life is felt nowhere more keenly than in the field of higher professional education. On all sides the demand is heard for a wisely simplified curriculum, for a longer term of study, for methods that will bring the ever-widening field of knowledge to be covered within the range of the personal observation and induction of an ever-multiplying number of students. To meet the difficulties of the case, educational reforms have taken place all along the line. Teaching is becoming always more objective, illustrative, the didactic method more colloquial—so-called. The student is called on to produce, even more than to acquire, to enquire, to debate, and to himself form judgments on the facts of his own observation. The laboratory system, in short, with the symposium, is replacing the lecture room and the thesis.

Nowhere are these new methods of teaching carried further than in America, and yet it appears to me that it is on this continent that the remarkable adaptation of the medical museum to this colloquial form of objective teaching is, perhaps, least understood.

In this paper I will first present the important place which the museum should and can fill in medical teaching; and secondly, I will try to show how a well-organized, well-classified museum evolves itself as a teaching mechanism of great value; presenting also the methods in use in the pathological museum of McGill University which, although still almost in their beginnings, have proved successful in developing it along these lines.

THE MUSEUM IN MEDICAL TEACHING.

In this connection Professor Huxley has said: "Without doubt there are no helps to the study of biology, or rather to some branches of it, greater than our natural history museums; but, in order to take this place in biology they must be the museums of the future. The museums of the present do not by any means do as much for us as they ought." And again: "To all those who intend to pursue physiology, and especially to those who intend to employ the working years of their life in the practice of medicine. I say there is no training so fitted, or which may be of such important service to them, as the thorough discipline in practical biologic work which I have sketched, as being pursued in the laboratory hard by."

I have come on a most interesting article, "Museums as Educational Adjuncts to Medical Colleges," a graduating thesis by M. Josiah Roberts, which obtained hon-