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## THE SCIENTIFIC TREATMENT OF CRIMINALS.

The *Tribune* is alarmed at the logical consequences of the mechanical theory of life, seeing in them not only the downfall of theological dogmas, but the subversion of our entire criminal jurisprudence. If we are to push to ultimate conclusions the theory that the acts of the lower animals are purely automatic, it argues, we shall be confronted immediately by the extension of that theory, demanded by the similar anatomy of man. This point yielded, we are brought face to face with the problem presented in the case of the wounded French soldier, who is scrupulously honest when the sound part of his brain is acting, but, when under the influence of its impaired portion, is an inveterate thief.

For example: "A prisoner, brought before a court of justice for assault, might admit that he struck the blow, but allege that the act was simply [the mechanical effect of] a piece of 'unconscious cerebration.' An insult from the man he struck called forth the blow in return, by reflex nervous action. His will bore no more part in the matter than would the winking of his eyelids if something suddenly approached his eyes. Certainly," concludes the *Tribune*, "no court would at present accept such a plea; but is it utterly at variance with scientific teachings?"

The *Tribune* apparently sees in this a fatal objection to the automatic theory. Perhaps it may be rather a fatal objection to the present constitution of the court—a proof that the current theory of criminal jurisprudence is altogether wrong.

Suppose the plea of the hypothetical prisoner to be admitted: nay, further, let the prisoner assert that the assault was due to *conscious* cerebration—in other words, that he knew precisely what he was doing and why he did it. Let his plea be that, owing to the structure of his physical and mental machinery, the alleged insult was a sufficient cause—an irresistible cause, if you will—of the muscular action in which the assault culminated: in other human machines the effect might be different; but for him he could not do otherwise, and he ought not to be punished for what he could not help.

Suppose, we say, that such a plea is accepted as cogent. Would the foundation of justice be undermined, and the stability of the social order destroyed? The *Tribune* would undoubtedly reply with an emphatic affirmative. A thoroughgoing scientist might claim, on the contrary, that, until such a plea can be accepted as valid, a rational judicial system is impossible; that, not until criminals are recognized as badly working, yet not wholly useless, machines, will it be possible to treat them with impartial and passionless justice, rendering justice at the same time to the well behaved.

Our present manner—we cannot call it method—of dealing with offenders against the commonwealth is an irregular inheritance of vengeance, intimidation, sentimentality, superstition, brutality, and party politics. Feeling for or against the criminal marks every stage of our treatment of him. We execrate him and pray over him. We shut him up in an unwholesome cell and give him a Bible. We drag him to the gallows between two clergymen and dispatch him with a passport to eternal bliss. From first to last, he is held responsible for the conditions of his birth and education, the structure of his body, and the constitution of his mind. He is born a thief and a liar, and is alone held to blame for it. His judgment is weak and his passions strong; his mind is uncultured and his tastes depraved by vicious surroundings in infancy and youth; yet we pursue his perverted course as vindictively as if he were free to choose the right at every stage of his career. We imagine that to punish him will satisfy the fetich called law and justice, will prevent others from doing the same things, and possibly, by some miracle, may make a different and better creature of him. That our criminal proceedings accomplish none of these things effectually is only too apparent; and they add to this failure the fault of being grievously burdensome to the well doing. For our part, we see no path out of this tangle of contradiction and injustice so clear as that opened up by the mechanical theory of human action.

From this point of view, the plea of our imaginary criminal would be respectfully heard. Then the judge might say: "The court is sorry that your organism is so viciously constructed, since it therefore becomes necessary for the community, in self-defense, to take it in charge. Have you ever learned a trade?"

The prisoner replies in the negative, and the judge continues: "That is to be regretted, since it makes it the harder for you to square your account with society. You will proceed to the public works, to perform such labor there as you may be found competent to do, under such restrictions as may be needful in your case. The man you struck has lost, in consequence, three days' time, for which we allow him so many dollars. The fee of the officer who took you into custody is so much. The cost of this court, so much. The expense of your keeping while under arrest has been deducted from your daily earnings. Your indebtedness to society is therefore so many dollars. This will be paid from the amount you may be able to earn at hard labor, after paying therefrom the cost of your keeping and what may be required for the support of those dependent upon you. This done, you will be set at liberty at such time as, by your conduct, you shall have demonstrated that your mental and physical machinery is in trusty working order. May your cure be speedy and effectual!"

But, it may be objected, all crimes are not of this simple character; the robber, the incendiary, or the murderer deserves punishment, while a lifetime of hard labor may be inadequate to make good the damage he has done.

Shall we therefore throw away all the possibilities of profit which his organism involves? Because a locomotive jumps the track and wrecks a train or kills a passenger, do we add to the loss by smashing the engine? There may be states of society in which the most profitable way to deal with disturbers of the peace is to kill them in the most summary manner; but in a working community, where every man's strength is needed, such a course is the reverse of economical.

The murderer is simply a bit of mechanism, not sufficiently well adjusted to be self-regulating. Left to itself, it works mischief; but, under proper supervision, it can do much that needs to be done. It is sheer folly to destroy it or lock it away to rust in idleness.

As for the deterring effect of the treatment of criminals upon those approaching criminality, we should certainly trust to the resistless, passionless logic of the scheme we have suggested, quite as much as to the uncertain and illogical disposition we now make of them. Impress the evil minded with the fact that it is easier and pleasanter to earn an honest living out of prison than in it: in other words, that crime does not pay, and will not pay them, and the great motive for wrong-doing will be gone. Make the criminal class self-supporting, and not only will a great burden be lifted from the shoulders of the virtuous, but crime will cease to be the refuge of the lazy.

For the reformation of criminals, there is demonstrably nothing more effectual than habits of industry, sobriety, and respect for the rights of others, which are not, but should be, the great lessons of the prison school. Further, when the prisoner is made to feel that his loss of freedom and privation of comfort are not intended as punishment, but as a social precaution, that he is regulated by others, simply because he has shown himself incompetent of self regulation, and that his return to liberty, full or partial, is conditioned solely on the payment of his obligations and the assurance of society that he is fit to be trusted with himself, the highest possible incentives will be offered for his genuine reformation, which, next to its own protection, is the chief object society should have in its exceptional treatment of him.

## HUXLEY'S THEORY OF MAN.

There is nothing so easy as to forget. Just now half the world is discussing as a new theme the logical tendency of Professor Huxley's latest utterance, or speculating as to the grounds of his declining to accept the conclusion that man is nothing but a machine, after demonstrating that animals are simply conscious automata and admitting that the view thus taken of the relations between the physical and mental faculties of brutes applies in its fullness and entirety to man. Yet it is but a little while since Professor Huxley went over this matter from the beginning, developing his position with a thoroughness which ought not to be forgotten after the fierce discussion it aroused.

The inseparable connection of matter and life is a fact of every day experience. Whatever the spiritualists may claim, Science has no knowledge of bodiless living beings. The inseparable connection of life and a particular combination of matter was demonstrated by Professor Huxley in the celebrated "Lay Sermon" on the physical basis of life (first delivered in Edinburgh one Sunday in November, 1868) by a line of argument substantially as follows:

The four elements never absent from living matter are carbon, hydrogen, oxygen, and nitrogen. Carbon and oxygen unite in certain proportions and under certain conditions to give rise to carbonic acid; hydrogen and oxygen produce water, and ammonia is the product of nitrogen and hydrogen. These several compounds, like the elements of which they are composed, are lifeless. But when they are brought together under certain conditions, they give rise to the still more complex body called protoplasm, which exhibits the phenomena of life, and which is found to be the formal basis of all life. From the elements to protoplasm there is a series of steps in molecular complication, a series showing no discernible break; and there is no good reason why the language which is applicable to any one term of the series may not be applied to any of the others.

We think fit to call different kinds of matter carbon, oxygen, hydrogen, and nitrogen, and to speak of the various powers and activities of these substances as the properties of the matter of which they are composed.

When an electric spark is passed through a mixture of hydrogen and oxygen in certain quantities, the elements disappear, and a quantity of water, equal in weight to the sum of their weights, is found in their place. There is not the slightest parity between the passive and active powers of water, and those of the hydrogen and oxygen which have given rise to it. Nevertheless, we call the phenomena exhibited by water the properties of water, and do not hesitate to believe that in some way or other they result from the properties of its component elements. We do not assume that something called "aquosity" enters into and takes possession of the oxide of hydrogen as soon as it is formed, to guide the aqueous particles to their place in the facets of an ice crystal, or among the leaflets of the frosty imitations of vegetable foliage which we see on our window panes in cold weather.

Is the case changed in any way when carbonic acid, water, and ammonia disappear, and in their place an equivalent weight of the matter of life makes its appearance?

What justification is there for the assumption of the existence in the living matter of something which has no representative or correlation in the not living matter which gave rise to it? What better philosophical status has "vitality" than "aquosity"?

Further, if the phenomena exhibited by water are its properties, so are those presented by protoplasm, living or dead, its properties. If the properties of water may be said to result from the matter and disposition of its component molecules, there is no intelligible ground for refusing to say that the properties of protoplasm result, from the nature and disposition of its molecules.

But having shown in another connection that protoplasm is the common basis of life, Professor Huxley sees no logical halting place between the admission that the properties of protoplasm are the result of the nature of the matter of which it is composed, and the concession that the highest manifestations of life are equally the expression of molecular changes. "As surely as every future grows out of past and present, so will the physiology of the future gradually extend the realm of matter until it is coextensive with knowledge, with feeling, with action." With equal confidence he predicts that we shall, sooner or later, arrive at the mechanical equivalent of that most metaphysical of phenomena, consciousness, just as we have arrived at the mechanical equivalent of heat.

Does this land him in materialism? He avers not, and takes pains to say that he reprobates the fundamental doctrines of materialism as he does the most baseless of theological dogmas, believing, with Hume, that they, like the fundamental doctrines of spiritualism and most other "isms," lie outside the limits of philosophical inquiry. The materialistic aspect of these matters has had an immense and a most beneficial influence upon physiology and psychology. And he shows, in the discussion of the philosophy of Descartes, that he is prepared to go with the materialists to the extent of holding that the human body, like all living bodies, is a machine, all the operations of which will some time be explained on physical principles; but when they declare that man is nothing but a machine, they go farther than he thinks they have any right to. Most emphatically does he decline to follow them in the assertion that the Universe is nothing but matter, and force, and necessary laws. Here he sides with the idealists, considering "matter" and "force" to be, so far as we know, mere names for certain forms of consciousness. "If I say that impenetrability is a property of matter, all that I can really mean is that the consciousness I call extension, and the consciousness I call resistance, constantly accompany each other. Why and how they are thus related is a mystery. And if I say that thought is a property of matter, all that I can mean is that, actually or possibly, the consciousness of extension and that of resistance accompany all other sorts of consciousness. But as in the former case, why they are thus associated is an insoluble mystery."

In all this no account is taken of what by many is deemed the essential factor of humanity—the soul.

While Professor Huxley evidently frames his definition of man so as to leave room for the introduction of this hypothetical element, if any one feels so disposed, it is clear that he regards its existence and influence somewhat as questions of "lunar politics"—questions which neither he nor any one else has any means of determining, and in the discussion of which he has no time to waste. Seeing that matter and

spirit—which are but names for the imaginary substrata of groups of natural phenomena—lose themselves in each other in ultimate analysis, what is the use of wrangling over them while there is so much honest work to be done in the world?

"In itself," he says in the "Lay Sermon" first referred to, "it is a matter of little moment whether we express the phenomena of matter in terms of spirit, or the phenomena of spirit in terms of matter: matter may be regarded as a form of thought, thought may be regarded as a property of matter; each statement has a certain relative truth. But with a view to the progress of Science, the materialistic terminology is in every way to be preferred: for it connects thought with the other phenomena of the Universe, and suggests inquiry into the nature of those physical conditions and concomitants of thought which are more or less accessible to us, and a knowledge of which may in future help us to exercise the same kind of control over the world of thought as we already possess in respect of the material world; whereas the alternative, or spiritualistic, terminology is utterly barren, and leads to nothing but obscurity and confusion of ideas."

## ALCOHOL, FOOD, AND FORCE.

We had supposed that Liebig's notion of the relation between food and force had been generally repudiated by scientific physiologists; but its appearance as a stumbling block in the recent discussion of the action of alcohol in the human system, by the Neurological Society, seems to show that it is not yet permanently set aside in all circles presumably scientific. Indeed it was never more emphatically enunciated than in the inaugural address of the newly elected president.

"We know," said Dr. Hammond, "that a certain amount of tissue is decomposed with every functional activity of the organ to which it belongs. Just as steam results from the combustion of fuel, so thought results from the combustion of gray nerve tissue, motion from the combustion of muscle, and the power to secrete bile from the substance of the liver. We know very well that, if fresh fuel be not supplied to the engine from time to time, steam ceases to be formed, and the machine set in motion by it no longer works. The like is true of the body; and were it not for the formative processes which are continually going on, whereby new material derived from the food is deposited to take the place of that which is consumed, death would very soon result. It must be distinctly understood, however, that ordinary food does not directly furnish any force inherent in the body, but that it must first be converted into flesh and brain and heart and liver, etc., from the destruction of which the force peculiar to each is evolved.

In restricting the theory to "ordinary food," Dr. Hammond evidently had in mind the extraordinary action of alcohol, which, according to his own showing, does furnish force to the body without first forming tissue, and—more perversely still—while it retards the process of tissue consumption by which alone, according to the theory, force can be evolved.

The experiments establishing this point are narrated at length in the address, as published in the *Psychological Journal*. A given amount of food *plus* a moderate dose of alcohol appears to enable one to do more work, without drawing upon the reserved forces of the body, than can be done on the food alone; or, when food and work remain constant, and so adjusted as to keep the body at a fixed weight, the addition of a small portion of alcohol to each meal is followed by a gain in weight. Similarly, if the weight of the body be increasing, the gain will be augmented, if losing, the loss will be diminished, when alcohol is taken, other conditions remaining unchanged.

This conflict between theory and observation is fairly faced. By the theory, alcohol, which does not form tissue, ought not to supply force to the system; by stopping the destruction of tissue, it ought to diminish the available force of the system. But the experiments show that, properly administered, it does increase the working force of food, both physical and intellectual. That the force thus developed under the use of alcohol is directly supplied by it, Dr. Hammond is certain. How it does it, he cannot see.

From first to last, indeed, the Society seems to have stumbled over Liebig's teachings; and curiously there was no one present sufficiently familiar with recent physiological research to challenge the theory and accept the facts as not inconsistent with known effects of food.

It is nearly thirty years since the death-in-life doctrine of force from tissue combustion was questioned by Dr. Mayer of Heilbronn, then an obscure country physician, now honored the world over as one of the first to propound the greatest generalization of modern Science, the correlation and conservation of force. More recently, Fick and Wislicenus, Dr. Edward Smith, Mr. Heaton, Professor Haughton, and others have demonstrated its baselessness by elaborate investigations showing that the waste of tissue is not proportionate to work done; while, save in cases of starvation, it is altogether inadequate to account for the forces evolved. Under normal conditions the larger part of the force required to maintain the body's temperature, to keep up the processes of thought, digestion, respiration, and other vital functions, and to perform the various sorts of external work demanded of the muscles, is shown by these investigations to be derived directly from the blood, or more precisely, from the food which the blood carries to the several organs.

The wonder is, not that the contrary view should have been entertained so long, but that it should ever have been accepted. An engine working in the manner thus attributed to the human system—first using its fuel to build up its parts, then burning up its own substance to develope power—would have been pronounced absurd by the most superficial observer. The fact, that it was, within certain limits, self-repairing, would not have made its mode of developing force in the slightest degree more economical; though it might help to hide its foolishness, as it seems to have done in the supposed case of our bodies.

If, from this point of view, we were to develope Dr. Hammond's comparison of the body to a steam engine, we should have to regard the organs, by means of which intellectual and mechanical work is done, as parts of a complete mechanism, capable of developing and transmitting the forces evolved by the decomposition of the food conveyed by the blood, just as the steam engine developes and transmits the power arising from the combustion of fuel. The work done in either case is proportioned, not to the loss of substance experienced by the machinery employed, but to that available in the food in the one case, in the fuel in the other.

True, as Professor Haughton observes, the same blood, which, by its chemical changes, produces movement and thought, also repairs the necessary waste of muscles and brain by means of which movement and thought are possible; just as if the steam that works an engine were able, without the aid of the engineer, to repair the wear and tear of its friction and waste spontaneously. "But no greater mistake is possible in physiology than to suppose that the products in the changes of the blood, by means of which mechanical and intellectual work is done, are themselves the result of the waste of the organs, whether muscles or brain, on the exercise of which that work depends."

Having thus a clear conception of the function of food in the animal economy, it is easy to see that alcohol, though not a tissue-forming substance, may nevertheless, under proper conditions, add directly to the working force of the system. The fact that, when taken in moderate doses, it disappears in the system as completely as beef or bread, lends probability to the opinion that it is a force supplier. How far it is a useful and profitable adjunct of food is another matter.

## BULLS ON THE TRACK.

Horace Greeley used to compare people, whose opposition to the normal progress of events was more zealous than discreet, to a plucky but shortsighted bull that tried one day to stop a railway train to Chappaqua. The result was disastrous—chiefly to the bull. Had the honest old gentleman lived to witness the revolt of the Wisconsin farmers against the social and material prosperity of their State, he would have found in their bovine attempts a striking and very pertinent occasion for recalling the comparison.

From a higher point of view, the action of the farmer class affords a perfect though costly illustration of the inability of human kind to profit by the fate of others, men as well as bulls. It furnishes also one more proof of the law of human development, that all societies proceed from barbarism upward along practically the same course, marked by the same characteristic stages, which may be more or less rapidly passed over, but which can never be altogether avoided.

One of the earliest steps which men take toward social improvement is that of combination. Unfortunately, however, first combinations among men are always for offensive ends, and are always destructive in their reaction. The first gang of prehistoric savages who ever put their shoulders in line for a common purpose doubtless had in view the wiping out of encroaching neighbors; a more enlightened self interest would have taught them that, in their severe struggle with the forces of Nature, not war, but friendly alliance, with all other men was the better policy. The same suicidal tendency crops out continually in the history of human progress. Nations spend ages—and their own manhood as well—in destructive wrangling, to discover at last that friendship and mutual helpfulness would have been infinitely better for both sides. And as with nations, so with the integral parts of nations. Each class must learn its wisdom by independent experience.

When the mechanic classes first reached the combining stage of development, they straightway declared war against capital, against machinery, against rival labor, against the inevitable, generally. Gradually, through bitter disappointment and loss and suffering, the more intelligent are learning that the wiser course is to form closer and more amicable alliances with all productive interests, especially with the men without whose money and organizing ability their own exertions would be prevented or rendered profitless.

The farmers' turn has come now, and they seem bent on going through the same unsatisfactory mill. They have discovered that there is strength in union, for them as for others; but they—at least those of Wisconsin—have not learned that it is madness to use their strength in overturning the corner stone of their own prosperity. It may be hopeless to expect them to profit much by the dear-bought wisdom of the classes which have preceded them along the same line of intellectual and moral development; nevertheless it is safe to predict that it will not take them many years to learn that the "independent farmer" in these days does not stand alone in the world; that his interests are inextricably blended with the interests of others, even those of the obnoxious railway magnate; and that in the long run a general regard for the Golden Rule will not seriously conflict with the advancement of agriculture.

Descending from general principles to special facts, it might be instructive to the Wisconsin farmers to give an impartial thought to the relation which the railroads bear to their present condition, to consider seriously their indebtedness to these enterprises, and to speculate a little in regard to the retroactive effect on their own prosperity, likely to result from the pressure they have brought to bear on these arteries of civilization.

The Providence which causes great rivers to flow by great towns for the advancement of commerce is seen not less clearly in the distribution of railways—particularly in the West. As a rule they have led the way, while population, and all that population brings, has followed after. Without them, except perhaps along the water courses, the country would have been to-day a wilderness. Contrast the rapid growth of Wisconsin with the slow development of States, in the days before the T-rail (with a dash) began to supersede the Indian trail; States which, like New York, were blessed with infinitely superior natural advantages, both from position on the coast and because of their facilities for internal communication by water. Or contrast those parts of Wisconsin which railways traverse with those which know them not; and it may be possible to estimate vaguely the influence which railways have had on the State's development.

In 1850—two years after Wisconsin became a State—the census takers found a population of 305,000, or 6 to the square mile. There were then three "railway men" in the State, and forty thousand farmers, with improved lands amounting to one million acres, and above the same number of acres unimproved, the average value of both together being less than ten dollars an acre. The aggregate wealth of the State in real and personal property was $42,000,000, or less than $140 a head. In 1870 the number of persons engaged in agricultural work in the State was 160,000, of whom 109,000 reported themselves as farmers and planters. The aggregate population exceeded 1,055,000, or 20 to the square mile. The value of the farms, now showing nearly six million acres of improved lands, had increased in amount from less than $30,000,000 in 1850 to over $300,000,000 in 1870. From less than ten dollars an acre, the average value of the farm land, improved and unimproved, had increased to more than twenty-five dollars an acre; while the aggregate wealth of the State had swelled to $700,000,000 and over, or an average of $665 to each individual. In the mean time the three railway men of 1850 had multiplied a thousand fold, and 1,525 miles of railways had been constructed.

We should like to see an honest Granger's estimate of how much of this enormous increase in wealth and population has been—we will not say produced, but—made possible by the railways which have been so oppressive (?) to farmers, while they have brought, in towns and cities, manufactories and markets, without all which the richest farmer in Wisconsin would, we fancy, find little encouragement in his work.

Have the millions invested in railways brought a corresponding reward to those who furnished them? In justice, they should; in reality, they have but little more than held their own. This result was not unexpected. In sparsely settled countries railroads are built, not for present but for future profit. If for years they pay their current expenses, they do well. It is only after the country has become thickly settled, and the connected points important, that they can hope for profits commensurate with those of other branches of industry. That the roads affected by the Potter law, namely, the Chicago and Northwestern, and the Chicago, Milwaukee, and St. Paul, have never yet been able to earn a fair income on the capital invested, is well known. At such a stage, to have their receipts arbitrarily cut down 25 per cent is, to say the least, not encouraging to such enterprizes, or calculated to impress the stockholders with a high appreciation of bucolic wisdom and honesty.

By skillful management, and with a great reduction of working expenses, the companies may be able, with the help of through traffic, to sustain themselves and pay the interest on their bonds; but the outlook is not encouraging. Already a large amount of rolling stock has been withdrawn; the speed of trains will have to be reduced, and second class coaches substituted for first class. Whether the through traffic can be retained in connection with the new arrangements remains to be seen. It is more than likely that it will be largely diverted to lines running through other States.

If the farmers only were to suffer the reflex consequences of this sudden set-back of the progress of their State, there would be fewer to deplore it. But they will not; nor will they be the first to feel it. The mercantile, manufacturing, and lumbering interests may be prostrated before the farmers begin to discover the mischief they have wrought—assuming, of course, that the United States Court affirms the validity of the law, and it remains unrepealed; but the penalty will be none the less certain because delayed. The farmers have been chiefly benefited by the rapid development of the country; by arresting its development, they will ultimately be the heaviest losers.

### New Postal System.

On January 1, a new law is to take effect, requiring the prepayment of postage by the publishers on all newspapers and magazines mailed to subscribers. The result will be to increase the postal revenue by insuring the payment of postage on all publications; and it is believed that the system will prove a convenience to subscribers.

Instead of the subscriber being required to pay any postage to the office where he receives his paper, it will be delivered to him free, and the publisher will include the postage in his subscription rates.

IN an ordinary open fire grate, 75 per cent of the heat, resulting from the combustion of the fuel, goes up chimney and is wasted, only 25 per cent being radiated into the apartment.