

ensues. There is no inflammatory stage, and the anesthesia soon becomes so complete that the extremities often sustain serious burns before the patient is aware that anything amiss is going on. Dr. Bowerbanke, of Jamaica, pointed out to Dr. Lente various mental conditions of the lepers, and has noticed the existence of buboes below Poupart's ligament as occasionally occurring in these individuals.

The treatment of anesthesia is unsatisfactory, and depends upon the cause of the disease. "When it is produced by certain diseases which act through the medium of the blood, causing profound alterations in this fluid and its effects upon the nutrition of the nervous centres, our chief reliance is to be placed in the different preparations of iron, of quinine, and in the mineral acids. A tonic regimen must be subjoined to these remedial measures."

ART. XIII.—*Has the Law of Natural Selection by Survival of the Fittest failed in the Case of Man?* By LAWSON TAIT, Fellow of the Anthropological Society of London, &c.

THE science of Anthropology is one of such deep interest to all, and of such paramount importance to the members of the medical profession specially, including as it does their every aim and object, that I offer no apology for introducing the following remarks into the columns of the *Dublin Quarterly*:—

In the September number of *Fraser's Magazine* appears a thoughtfully-written article "On the failure of 'Natural Selection' in the Case of Man." It concludes with this paragraph:—

"Medical science is mitigating suffering, and achieving some success in its warfare against disease; but at the same time it enables the diseased to live. It controls and sometimes half cures the maladies that spring from profligacy and excess, but in doing so it encourages both, by stepping in between the cause and its consequences, and saving them from their natural and deterring penalties. It reduces the aggregate mortality by sanitary improvements and precautions; but those whom it saves from dying prematurely, it preserves to propagate dismal and imperfect lives. In our complicated modern communities a race is being run between moral and mental enlightenment, and the deterioration of the physical constitution through the defeasance of the law of natural selection; and on the issues of that race the destinies of humanity depend."

Such a line of argument as this is one which makes us pause, and at first sight it gives rise to very conflicting emotions. Is our noble profession, is all our hard work, battling against what we may term the first law of nature, only to be beaten by it? or must we get a little further from the surface before we can bring about a reconciliation, and are we likely to find one? Such were my thoughts as I read and re-read the article in question; and in recording them I do not for a moment imagine that my crude ideas and limited powers of investigation will clear up the matter; my only hope is that the attention of those more worthy to deal with the question may be drawn to it. In considering this matter I take as postulates the law of natural selection, and its corollary the correlation of growth; and I assume that the earliest Anthropoids were the men of the Drift—at least the earliest true Anthropoids with which we are yet acquainted.

When we examine calmly, all prejudice apart, the difference between man and all other animals, we find that it is constituted principally by his greater powers of *comparison* and *combination*. These are shared to a certain extent and in certain instances by the lower animals; as for example, combination is seen when wolves, dogs, or jackals combine in packs to hunt one individual animal of another species, who, if matched to one of the attackers, might easily overcome him; but they are pre-eminently the characteristics of mankind. There seems, however, to have been a period in the development of the human race when these powers were of such a low kind as that they could scarcely be said to exist. If we take a Drift implement from the valley of the Somme and place it along with one from Hoxne; or still better, one from the laterite bed of Madras, where they have been found in such prodigious numbers by Mr. Bruce Foote and others, it would be extremely difficult to point out the slightest difference between them. It is true that the European implement is generally of flint and the Madras specimen of quartzite; but this is not an essential point, nor one even of importance, for European implements have been found of quartzite, and generally the material is that which is most convenient in the special locality. It is the manufacture and style which are the important points, and we find that the size, shape, and method of chip are in all cases similar. The implements would seem to have been used either in the hand for striking, or for throwing at the object opposed. Here we have the earliest instance of an animal with a distinct artificial armoury; and while it is evident that the powers of observation (as

instanced in the fact that the weapons must have been used to produce wounds) were of a tolerably high order, yet that the powers of comparison must have been of an extremely low order, from the extensive use into which the weapons were brought, and the probably immense period of time during which they were in use, and before a variety and consequent improvement in their manufacture took place. Again, the power of combination must have been low, for although it is more than likely that the people who used these ancient stone weapons were combined in the pursuit of, or defence from, the enormous animals with which they were surrounded, yet it is almost certain that every man would be his own armourer, servilely imitating the rude stone he saw in the hands of his fellow savages. Thus an almost perfect physical and psychical equality would exist in this early race, such as the world has not since beheld; and up to the end of the Drift period one might say that the method by which the law of natural selection was applied to them, was similar to that which operated on their surroundings.

The power of comparison would seem to have been the earlier to be cultivated of the two mentioned; and this would be brought about when a community or tribe saw that the chipped stones of one or more of their number flew further, and struck a deeper, wider, or more fatal wound than the implements in general use. Then the earliest barter might be introduced by the lucky manufacturer making a fortune in skins, received in exchange for his superior flints; and here we have the first germ laid of the great principle of the *division of labour*. As the manufacturer was encouraged to improve his art by being relieved from the necessity for joining the hunt for his daily flesh, he would give origin to a combination for the common good—the first idea of social life. Why do men live in political and civil societies? Because man is a social being. Why are men social beings? Because they require the help of each other, being physically and psychically variegated in constitution from each other, both as races and individuals. Were all men equal in mental and physical energy, no one would be able or willing to help another, for every man would be everything to himself; and mankind would thus remain for ever savages, without the slightest prospect of advance. In support of what I say I may quote from the “Sketches of the Philosophy of Life,” by Sir T. C. Morgan, F.R.C.P.:—“Equality is a physical impossibility, since men not only differ amongst each other generally, but age and sex occasion most important variations in physical force, mental acuteness, and

manual dexterity. When forces are thus unequal, equality of power cannot exist." The work quoted, along with the "Sketches of the Philosophy of Morals," were written about 1820, forty years too soon to be appreciated; and were they known among scientific men as they ought to be we should be less frequently troubled by exploded theories and reintroductions of what is already well known. As we have just seen, it was because men were developed from this state of equality that they ever became civilized; and we may condemn then the idea of perfect or even moderate equality among mankind as the mere dream of a visionary and the greatest misfortune that could happen us. That this theory of the development of inequality, in the way mentioned, is more than a mere fancy might be shown by abundance of proof, enough to fill many columns. It meets our eye readily, however, in the instance of the Indian arrow-makers, who are protected and provided for by their tribe, and have immense respect paid to them, while they in their turn rigidly preserve secret the art they practice. Indeed we need not go out of the boundaries of Britain to find instances to this point. In the island of Lewis we have a relict of the stone-age in a pottery made in the parish of Barvas, of a peculiar red clay, glazed with milk.* It is made into vessels of considerable delicacy, some even with pretensions to elegance. There is no doubt a considerable amount of dexterity displayed in the manufacture of a tea-set in my possession, and the method of working is rigidly preserved a secret

* In Schoolcraft's "History, Condition, and Prospects of the Indian Tribes of the United States," III., 75:—"It is very clear that the art of the potter with these races was a 'fixed art,' and the occupation of a particular class of this people. A hunter or a warrior could not lay aside his bow or his club and set to work to make pottery. The art of mixing clay with gravel, so that a vessel does not change its form in burning, and bears a sudden transition from heat to cold, and *vice versa*, presupposes, when successfully carried on, uncommon practice and long experience. Much less could the general population manufacture flint implements of really good quality. Splitting the flints, and making the fragments into the shape of lance and arrow heads, knives, and saws, requires extraordinary ability and long practice. Amongst the primeval inhabitants of North America there was a peculiar class of people whose business it was to select the suitable stones and manufacture arrow heads, and who received from the hunters flesh and skins in payment for the implements supplied to them."

"Dr. Keller's Swiss Lake Dwellings," trans. by J. E. Lee, p. 365:—"A consideration of the earthen vessels discovered leads to the impression that the manufacture of earthenware vessels formed a particular occupation, and that it was exclusively carried on by individual settlers. The working, form, ornamentation, and the mode in which they were burnt, show, in the opinion of those conversant with the art, such a degree of ability and proficiency that only those individuals who devoted themselves exclusively to this work could produce such wares as we now see before us."

by the family of the old Celtic woman who was the maker. In Italy we find the same fact as recorded by Gastaldi in his work on the pre-historic remains of Italy. The heaps of chips belonging to the Palaeolithic age, found in Denmark and elsewhere, show clearly that what the Indians, now existing in a stone-age, have as customs our European ancestors had likewise.

The rise, progress, and influence of the principle of the *division of labour* I need not, if I could, trace; each one has only to regard his next door neighbour to see its effects. Concomitant with it, we may rest assured, were developed the powers of comparison and combination.

Here, then, we have a point from which we may date the growth of *intellect* as contrasted with instinct or crude reason, shown in the development of the powers of comparison and combination: for observation, through memory, constituting ideas, the comparison and combination* of these produce reason (according to a simple analysis.) Up to this point the law of natural selection has acted as it does throughout the rest of nature, and it does so subsequently too, but not in a manner quite so evident; and to this consideration of the difference this somewhat lengthy introduction tends.

At this point the *struggle for existence*, and its invariable law of selection, has brought a vertebrate animal into an upright position, still struggling with his fellow vertebrates, but now with a stone in his hand. After the date alluded to the struggle with the other species continues, but then begins that with his own, the like of which we find in no other kind of animal. For this his weapons increase in effectiveness, his powers of comparison and combination increase; and while they do so at a slow rate, his powers of killing his fellow-man, and his inclination to do so, are sufficient for the purposes of our law. Hence we find in the remains of Archaic man few or no traces of disease. Such traces must be rare, as I have never seen a single instance of diseased bone in the many that I have examined for the purpose, and have not even met with a notice of such a circumstance. I have seen, in the possession of M. Broca, a skull with appearances much resembling the effects of chronic periostitis; but Professor Busk assured me that it was stalactite, and M. Broca agreed with him. Besides most (nearly all until we come to the late stone-age)

* It may be objected here that I use this word somewhat with the liberty of an "undistributed term," but I think that a slight consideration will show that this is done only with the view of avoiding repetition, and of saving space.

of the remains are those of individuals of an age not far advanced in life. I have only once seen an edentulous lower jaw from a stone-age burial, which I myself found in Sutherland, where the use of stone weapons was continued perhaps to a period not remote from the Christian era.

When, however, civilization grew so that murder and war grew less frequent, as they would by degrees, then the struggle for existence necessitated a new condition, and disease slowly crept in upon mankind; arising, as it would, from many causes produced in their turn by advancing civilization.

Our knowledge of diseases, and the processes of their occurrence, is not sufficiently advanced yet to allow of the absolute recognition of the law of selection in them. We can as yet only see its action on individuals; but, although Morgan, Quetelet, Winslow, Buckle and others, have opened out the way by which we shall, sooner or later, recognize its working on societies of our race, the adequate understanding of it has not yet been arrived at.

We may take, however, as an illustration of how the law necessitates the introduction of disease among civilized animals, the instance of struma and its firm ally, phthisis. Suppose that in the Drift period a few individuals were born amongst a tribe, with narrow chests, deficient in cubic capacity, the law of natural selection would weed them out by cutting off the food supply; but suppose civilization gradually to be advancing from that point, we should find that fewer and fewer of these unfortunates would die, as they might make sure of their food by the help of some of their fellow-beings. The weak-chested ones would help their stronger brethren, by confining themselves to some occupation where violent physical exercise was not so necessary as in the case of hunting. In fact, there would occur, to a limited extent, exactly what occurs now among the lower orders, where a weakly child is always put to some sedentary occupation—generally the worst fate that can befall him. Suppose a male and female of these deformed instances to mate, they would, of course, reproduce their peculiarity to a greater extent; and if the tribe in which they existed were small in number, it would require no great length of time to produce a variety with a tendency to chest disease. Then, from the fact that advancing civilization necessitated less and less the violent destruction of mankind—a destruction which would naturally fall principally on those least fit for survival—there would be propagated a certain number of the population least fit to survive disease; this number

continually increasing, as likewise would the intensity of the tendency to the disease.

Suppose, then, a sudden alteration of temperature to occur, the poorest of the population, that is the oldest and the youngest, would be least prepared to resist it, a certain number of them would die, while the rest would continue to propagate the condition. But mark how the tendency would be, in great measure, checked by the death of the young of the diseased and poor class—a fact which is constantly before our eyes now. How the law of natural selection works to prevent the over-action even of its own agent; exactly as it does when the lion over-eats the antelope, and, therefore, makes his own kind scarce. But if the lion were to disappear, the antelope would, by disproportionately increasing, not only destroy its own kind but many others, both vegetal and animal. The death of weakly men, by disease, is merely a substitution for their violent death under more barbarous circumstances, and it is modified by the ratio between the food supply and the population.

We know that there exists a constant and never-varying ratio between the price of corn and the number of marriages. When food is cheap, the population increases, and disease is less rampant; when food is dear, precisely the reverse occurs—fewer marriages, and far more disease.

In our country the instance of phthisical and strumous diseases is a particularly happy one; because we know that all forms of them, and all diseased conditions with which they are intimately allied (more especially insanity),* are steadily on the increase.

Along with our advanced civilization, there has occurred, not necessarily in connexion with it but possibly so, an alteration of climate, which has had a very great influence on those less fit for survival, by reason of pulmonary debility. We know that ever since the Roman occupancy, and probably for some considerable time anterior to that period, we have been losing, to some extent, our insular character; that is, the sea has been retiring from our coast. We know that, in the eleventh century, the Castle of Norwich stood on an arm of the sea; and that at Legeolium, and the Antonine Wall, the water was at a considerably greater elevation during the Roman period than it is now. During the thirteenth century, the vine grew freely, and produced fruit

* See Clouston's Papers; *Journal of Mental Science*, 1863; *Transactions of Med. Chir. Soc. Edin.*, &c., &c.

in the open air in parts of England,^a where it would scarcely put out leaves now. We know that those storms, which have been so violent and so general as to attract frequent notice, have been gradually increasing in frequency, from the eleventh century, in a ratio which is not altogether explained by the probability of more notice being taken of them as the tendency increased for observation of natural phenomena. It seems, also, to be a recognized fact, that the average rainfall, in Europe, is steadily increasing, year by year. Le Hon^b gives for Belgium the rainfall of the month of May for four years:—

1842	. . .	49.52	millimetres
1843	. . .	52.83	„
1844	. . .	81.04	„
1845	. . .	106.09	„

We know that the northern ice-cap is slowly increasing—has rendered the larger part of Iceland totally uninhabitable—the Alpine and Norwegian glaciers grow every year, and Greenland is rapidly disappearing. In fact, the conditions, unfavourable to the class of cases instanced, are becoming more persistent as our climate becomes less temperate.

Then there is the other condition: war becomes of more and more seldom occurrence, and every improvement of armoury—every triumph of the division of labour—makes it less fatal.

Thus, it follows that the less war, the more pestilence; the greater the civilization, the more terrible the disease. This accounts for the fearful mortality which ensues among our autochthonous and savage people, when infected by the diseases of a race much their superior in civilization. Could a better instance be given than in the case of the Micmac Indians, annihilated by a single attack of small-pox?^c Does it not account for the fact, that every century seems to have an epidemic more terrible than the epidemic of the century preceding, apparently in the same ratio as the difference of the condition of the people of the centuries in point of progress in civilization? Does it not

^a *Periodicities des Défriges.* Adhemar : Paris, 1867.

^b *Harmonies de la Mer.*

^c The experience of the surgeons in charge of coloured troops during the late war, as shown in the Report of the Surveyor-General, shows that while the negroes were not less likely, in the instance of any disease, to be attacked than the whites, that in the cases of scarlet fever, measles, and pulmonary diseases, they suffered to a much greater extent. (See the papers on the Cause of Camp Diseases, edited by Austin Flint).

account for the fact that no sooner has science overcome one epidemic, than another, far more formidable, makes its appearance? Did not the Elizabethan epidemic of ague give way before Jesuit's bark, drainage and tree-planting, only to be superseded by the more terrible small-pox? This, in its turn, has almost succumbed before the genius of the immortal Jenner, only in its turn to give way to the horrible cholera. Is it fair, under such circumstances, to accuse the medical profession of having stood still since the days of Hippocrates? or need we be surprised at the evidence before us all of the existence of a change of type of something—be it of disease, or be it of human constitution? It would seem, and I believe it to be, a dream to imagine that we can ever eradicate disease as an entity; nor do I believe (unless under the circumstances of a millenium, of which the prospect is faint,) that it would be an advantage to our kind that we should. But, for all this, are we to give up our scientific pursuits, our hard-working, practical medicine? Certainly not. For, let us see what would happen in either case: if we eradicated disease, the chances of life and death being equal, beings of an equal calibre, in every respect, would be produced; on the other hand, if we gave up the treatment, and prevention of disease, the same condition would be brought about, and in a shorter time, and, of course, with a residue of population infinitely less in numerical strength than there would be under the action of the former hypothesis; and this, having reached the phase of individual equality, would soon increase to the dimensions of the other supposed condition. The result would, consequently, be equal in either case; namely, that the struggle for existence would be so intense, with no advantage to any individual, that there would be a perfect and general dead-lock, and an equally perfect and general destruction of mankind. Therefore, we must continue to suffer disease, and we must equally continue to study and treat it with the knowledge of the fact that, Sycophus-like, we can only roll the stone nearly to the top, and then see it roll down again.

In this manner, I believe, this great law acts on man; but if its action is more complicated than elsewhere, it is not the less in existence. For the same reason that science keeps a check on the ravages of disease, and so prevents the establishment of equality, so the protection of property for those who, in the words of the writer in *Fraser*, "Never could themselves have acquired property

* Sir William Hamilton.

by industry, or conquered it by courage, or kept it by strength or ingenuity, and who are utterly incompetent to use it well, are yet enabled by law to inherit and retain it"—for the same reason it is retained to those that there may be an inequality. For by the very fact that they are unable to use it properly, it passes at a greater or less speed from them to get into the hands of others, who, for the time, get it by their superiority in the struggle for existence; the descendants of the latter in their turn degenerating, the process is again repeated. The accumulation of property inherited under protection merely forms magazines of the material by which the struggle for existence is kept up, and from which it is distributed to the "fittest for survival."

Thus it is of necessity that the law of entail is now impracticable. An entail cannot now be made, rendering as it would, the struggle for existence a hopeless and impossible one, by shutting up the storehouses, save to access by a privileged few. We find in the small remnants of the old aristocratic families of the land which are now left us, much of that fine animal courage for which our Norman invaders were marked; but this is merely a racial peculiarity, which is always strongly inherited. But how seldom do we hear of the son of a great general, or of a great politician, following in his father's footsteps; still less frequently are the talents communicated to more distant descendants. It is because the success of the original member of the family has put his immediate posterity beyond the necessity for entering the arena of the struggle for existence. Hence they disturb equality, and give way to others more fitted for the struggle, only holding on till they are pushed off the stage. Can we look at the political history of our country for the last two centuries without seeing it crowded with instances? Do not even now the Wellingtons and Marlboroughs give way to and rank far below Gladstone and Disraeli? We shall find, and that I believe before long, that a system of life peerages, which must be introduced, will push the *ancienne noblesse* to the wall, as surely as the Saxon has destroyed the Tasmanian—when those who, in the struggle for existence, have obtained the first rank in law, medicine, in all the arts and manufactures, will form one Upper House of Appeal.

On the other hand: "In a natural state of society they would have been pushed out of existence, jostled aside in the struggle and the race, and left by the way to die;" but this cannot, and must not

take place now. For, suppose that there was no protection for property, might would again be right in its fullest meaning, and we should recur to our original savage condition. Or, suppose that there was protection for, but no inheritance of property, to whom would the property go? Putting aside the consideration of the impracticability of a general division at each decease, and suppose that the property went to a central government as *haeres communis*, this condition would have one of two results, either the seizure of the whole, and its retention by what would become an oppressive oligarchy, or there would be a necessity for the establishment of jubilees, for the purpose of the distribution of the accumulated wealth. In the intervals between such distributions, and more especially towards the close of the interval, the struggle for existence could be carried on by barely one-half of a population, on account of the drain of the material, and disease and famine would be rampant; while, for long after the distribution, there would be an utter stagnation from surfeit, and until some inequality came about by the old process of accumulation by some, and loss by others.

Thus, we see that there cannot and must not be anything like an equality, either in health or property.

The writer in *Fraser's* apparently would select (as breeders do with animals) "till all the human race, both in its manhood and its womanhood, became a glorious congregation of saints; till we were all Blondins, all Shakespeares, Pericles, Socrates, Columbuses, and Fenelons." Apart from the consideration that the very law we are considering—the law acting by *variation*—would utterly prevent such a condition being attained, or at least retained, one might ask, suppose it could be arrived at, *cui bono?* *to whom would it be for a good?* Certainly not to the people concerned (we are considering them with special reference to their individuality, not in relation to their existence as a race or races; although even then, since the author quoted imagines this alteration for the whole human race, what I say would hold good); for the very idea of *good* implies comparison. If all were equal we could predicate of none that it was *good* for them, or *evil*, for there could be no contrast. Could *then* any one Shakespeare benefit in the least his brother (and sister) Shakespeares? or would there be the least occasion for the athleticism of a Blondin when all were Blondins, and were to remain equally so? Could the religion of a Fenelon be of service to his neighbours when they could equal him in their sentiments and powers? We must answer in the negative; for to entertain such

propositions would be to predicate *finity*, and of this we can form as little conception as of *infinity*. Besides, could all this power be called into existence only to die off for want of exercise?

I believe then that I may sum up by saying, that when an animal becomes erect, and begins to appreciate the principle of the division of labour, then begins its development in domestication, its tendency to protection of individual rights, and an increase of its tendency to disease; and with the latter I am certain that there is a correlation in the development of the *Xanthocroic physique*; for Darwin tells us that white terriers suffer more from fatal distemper than others, and that white chickens are more liable to the *gapes* than those of other colours; indeed, that under domestication light coloured animals generally suffer most from disease, and from parasites.

We also are well aware of the fact that savage nations are comparatively very free from disease until contaminated by a superior race, when all at once the virgin soil is covered by the weeds. We also know that in direct ratio to the degree of civilization, or more properly domestication, is the severity of the disease, the average age to which the people live, and the number of births. Among domestic animals the most fertile is the sheep, and it is the most diseased.

Finally, that to whatever elevated rank mankind may attain in development, it is essential that there shall be individual inequality.