# SCIENCE

FRIDAY, SEPTEMBER 14, 1888.

THE YELLOW-FEVER IN JACKSONVILLE, although of a mild type and attended by an unusually small mortality, has become epidemic there. The United States Marine Hospital Service, under the authority given it by the new quarantine law and previous acts of Congress, has undertaken to prevent the spread of the disease from the infected points in Florida to other cities of the country. It is certain that every person, and every article of clothing, baggage, or of any other description, that comes out of Jacksonville, is in danger of conveying the infection to points which it otherwise might not reach. This is Surgeon-General Hamilton's justification for his order forbidding any person, baggage, or mail-matter to pass the quarantine station at Waycross, Ga., which is so situated as to intercept all railway-passengers from Florida, if from an infected district, without a quarantine of ten days for persons and a thorough disinfection of all clothing, baggage, and mail-matter. This, of course, causes very great inconvenience to those people of Jacksonville who desire to leave the city for healthful points in the North; but Dr. Hamilton has provided a refugee-camp, where any person may spend the period of quarantine free of expense, and in as much comfort as it is possible to give under the circumstances. These are the precautions that have been taken to protect the sixty millions of the people of the United States from sickness and death. It is unfortunate for the comparative few who have to suffer by detention in Jacksonville and other infected points in Florida; but the fact that more than a month has passed since the disease first appeared in Jacksonville, Tampa, and other points in Florida, and that not an authentic case has yet been reported as having occurred this side of the government quarantine station, is more than an ample justification for every thing Surgeon-General Hamilton has done. It may be that the yellow-fever will yet be carried to points outside of Florida. The most careful precautions are necessarily imperfect: they may sometimes be evaded, in spite of the most vigilant watchfulness. But every day that the contagious disease is confined within its present limits shortens the time that its ravages can continue elsewhere before the autumn frosts cut it short in its destructive career, and saves precious lives that else might have been sacrificed. If Surgeon-General Hamilton should succeed in preventing the spread of the yellow-fever beyond Florida, he will have rendered a service to the country that can never be measured in money. He deserves the most cordial support, which he is receiving, not only from the government, but also from the public press and enlightened public sentiment throughout the country.

IN A RECENT NUMBER of *The Medical News* appeared a note from a correspondent whose professional eminence is an unqualified indorsement of the accuracy of his observation, in which he writes, "I have recently seen in the medical journals that Dugald Stewart was once asked what was the earliest thing he could remember. He said it was being left alone by his nurse in the cradle, and resolving to tell of her as soon as he could speak. This may have been copied as a joke; but it brings to my mind the following statement that I have made from time to time for many years, which has always been received with derision, but which is a perfectly distinct remembrance in my mind: I remember being jolted over the crossings in a baby-wagon by a nurse, and resolving to tell of her as soon as I could speak." In reading the above, it occurred to us that it would not be amiss to ask the writer how he knew that there was such a thing as speech, and that he would ever be able to exercise that faculty.

THE ATTENTION OF OUR READERS has already been called to the passage by the Legislature of New York of an act substituting death by electricity for that by hanging as a punishment for crime. It will be remembered that Dr. William A. Hammond regarded the change as an unwise one, and presented a paper to the Society of Medical Jurisprudence on the 'Superiority of Hanging as a Method of Execution.' The society concurred in the views therein expressed, and protested against the passage of the law. In the *Asclepiad*, Dr. B. W. Richardson agrees in the main with Dr. Hammond. He believes that death by hanging is painless, and that the "process of hanging looks brutal without actually being so." He is especially severe on those who advocate the change. He says, "In disgust at the foolish barbarism of the time which keeps up the crime of capital murder, the humanitarian fraternity, afraid to support the sound and logical policy of abolition of the extreme offence, tries to dally with reason and conscience by the attempt to divest execution of all pain and all terrors. Euthanasia for the worst of criminals, by the side of so-called natural but often most cruel death for the rest of mankind, is practically the proposition, — a proposition which carries with it its own condemnation." In regard to the practicability of the new law, he expresses a great deal of doubt. In some experiments on the application of the electric discharge for the painless extinction of the lives of animals to be used as food, this mode of death was found to be any thing but certain. Sheep stricken apparently into instant and irrevocable death by electricity, after a few minutes showed signs of life, and were despatched in the ordinary way by the knife; and a large dog perfectly unconscious, and to all appearance dead, from the stroke of a powerful battery, was submitted to a surgical operation during unconsciousness, and afterwards made a sound and easy recovery. In most cases the electric shock will kill at one discharge, but exceptionally it will simply stun, and may induce the semblance of death instead of the real event. Dr. Richardson thinks that it will be real humanity, therefore, for the authorities of New York to supplement death by electricity by a post-mortem examination of the victims, so that the execution may not be crowned by burying the victims alive.

## ON THE ALLEGED MONGOLIAN AFFINITIES OF THE AMERICAN RACE.[1]

WERE the question I am about to discuss one of merely theoretical bearings, I should not approach it; but the widespread belief that the American tribes are genealogically connected with the Mongolians is constantly directing and coloring the studies of many Americanists, very much as did at one time the belief that the red men are the present representatives of the ten lost tribes of Israel. It is practically worth while, therefore, to examine the grounds on which the American race is classed by these anthropologists as a branch of the Mongolian, and to inquire whether the ancient culture of America betrayed any positive signs of Mongolian influence.

You will permit me to avoid the discussion as to what constitutes races in anthropology. To me they are zoölogical sub-species, marked by fixed and correlated characteristics, impressed so firmly that they have suffered no appreciable alteration within the historic period either through time or environment. In this sense, Blumen-

[1] Paper read by Daniel G. Brinton, M.D., before the American Association for the Advancement of Science, at its meeting in Cleveland, O., Aug. 15-22, 1888.

bach, in the last century, recognized five races, corresponding to the five great land-areas of the globe and to their characteristic faunal and floral centres. This division was an eminently scientific one, and still remains the most in accord with anatomical and linguistic research. About twenty years after the appearance of Blumenbach's work, however, the eminent naturalist Cuvier published his great work on 'The Animal Kingdom,' in which he rejected Blumenbach's classification, and proposed one dividing the human species into three races, — the white or Caucasian, the black or Ethiopian, and the yellow or Mongolian. In the latter he included the Malays and the American Indians.

This triple division has been very popular in France, and to some extent in other countries. It is not, and it was not in its inception, a scientific deduction from observed facts, but was a sort of *a priori* hypothesis based on the physiological theories of Bichat, and at a later day derived support from the philosophic dreams of Auguste Comte. Bichat, for instance, had recognized three fundamental physiological systems in man, — the vegetative or visceral, the osso-muscular, and the cerebro-spinal. The anthropologists, in turn, considered it a most happy thought to divide the human species into three races, each of which should show the predominance of one or other of these systems. Thus the black race was to show the predominance of the vegetative system; the yellow race, the osso-muscular system; the white race, the nervous system.[1] As Bichat had not discovered any more physiological systems, so there could be no more human races on the earth; and thus the sacred triplets of the Comtian philosophy could be vindicated.

How little value attaches to any such generalizations you will readily perceive, and you will be prepared, with me, to dismiss them all, and to turn to the facts of the case, inquiring whether there are any traits of the red race which justify their being called 'Mongolian' or 'Mongoloid.'

Such affinities have been asserted to exist in language, in culture, and in physical peculiarities, and I shall take these up *seriatim* for examination.

First, as to language.

The great Mongolian stock is divided into the southern branch, speaking monosyllabic, isolating languages, and the northern branch, whose dialects are polysyllabic and agglutinating. The latter are sometimes called Turanian or Ural-Altaic; and as they are geographically contiguous to the Eskimo, and almost to the Athabascan, we might reasonably expect the linguistic kinship, if any exists, to be shown in this branch of Mongol speech. Is such the case? Not in the least. To prove it, I think it enough to quote the positive statement of the best European authority on the Ural-Altaic languages, Dr. Heinrich Winkler. He emphatically says, that, in the present state of linguistic science, not only is there no connection apparent between any Ural-Altaic and any American language, but that such connection is shown to be highly improbable. The evidence is all the other way [2] (*Uralaltaische Völker und Sprachen*, p. 167).

I need not, therefore, delay over this part of my subject, but will proceed to inquire whether there are any American affinities to the monosyllabic, isolating languages of Asia.

There is one prominent example, which has often been put forward, of a supposed monosyllabic American language; and its relationship to the Chinese has frequently been asserted, — a relationship, it has been said, extending both to its vocabulary and its grammar. This is the Otomi, spoken in and near the valley of Mexico. It requires, however, but a brief analysis of the Otomi to see that it is not a monosyllabic language in the linguistic sense, and that in its sentence-building it is incorporative and polysynthetic, like the great majority of American tongues, and totally unlike the Chinese. I may refer to my own published study of the Otomi, and to that of the Count de Charencey, as proving what I say.

Some have thought that the Maya of Yucatan has in its vocabulary a certain number of Chinese elements; but all these can readily be explained on the doctrine of coincidences. The Mexican antiquary Mendoza has marshalled far more coincidences of like character and equal worth to show that the Nahuatl is an Aryan dialect descended from the Sanscrit. In fine, any, even the remotest, linguistic connection between American and Mongolian languages has yet to be shown; and any linguist who considers the radically diverse genius of the two groups of tongues will not expect to find such relationship.

I shall not detain you long with arguments touching supposed Mongolian elements of culture in ancient America. Any one at all intimately conversant with the progress of American archæology in the last twenty years must see how rapidly has grown the conviction that American culture was home-bred, to the manner born; that it was wholly indigenous and had borrowed nothing — nothing from either Europe, Asia, or Africa. The peculiarities of native American culture are typical, and extend throughout the continent. Mr. Lewis Morgan was perfectly right in the general outline of his theory to this effect, though, like all persons enamored of a theory he carried it too far.

This typical, racial American culture is as far as possible, in spirit and form, from the Mongolian. Compare the rich theology of Mexico or Peru with the barren myths of China. The theory of governments, the method of house-construction, the position of woman, the art of war, — are all equally diverse, equally un-Mongolian. It is useless to bring up single art-products or devices, such as the calendar, and lay stress on certain similarities. The doctrine of the parallelism of human development explains far more satisfactorily all these coincidences. The sooner that Americanists generally, and especially those in Europe, recognize the absolute autochthony of native American culture, the more valuable will their studies become.

It is no longer in season to quote the opinions of Alexander von Humboldt and his contemporaries on this subject, as I see in some recent works. The science of archæology has virtually come into being since they wrote, and we now know that the development of human culture is governed by laws with which they were unacquainted. Civilization sprang up in certain centres in both continents, widely remote from each other; but, as the conditions of its origin were everywhere the same, its early products were much alike.

It is evident from what I have said, that the asserted Mongolian or Mongoloid connection of the American race finds no support either from linguistics or the history of culture. If anywhere, it must be in physical resemblances. In fact, it has been mainly from these that the arguments have been drawn. Let us examine them.

Cuvier, who, as I have said, is responsible for the confusion of the American with the Mongolian race, based his racial scheme on the color of the skin, and included the American within the limits of the yellow race. Cuvier had seen very few pure Mongolians, and perhaps no pure-blooded Americans; otherwise he would not have maintained that the hue of the latter is yellow. Certainly it is not. You may call it reddish, or coppery, or cinnamon, or burnt sugar, but you cannot call it yellow. Some individuals or small tribes may approach the peculiar dusky olive of the Chinaman, but so do some of the European peoples of Aryan descent; and there are not wanting anthropologists who maintain that the Aryans are also Mongoloid. The one position is just as defensible as the other on the ground of color.

Several of the most prominent classifications of mankind are based upon the character of the hair; the three great divisions being, as you know, into the straight, the curly, and the woolly haired varieties. These external features of the hair depend upon the form of the individual hairs as seen in cross-section. The nearer this approaches a circle, the straighter is the hair. It is true that both Mongolians and Americans belong to the straight-haired varieties; but of the two, the American has the straightest hair, that whose cross-section comes nearest to a perfect circle. So that by all the rules of terminology and logic, if we are to call either branch a variation from the other, we should say that the Mongol is a variety of the American race, and call it 'Americanoid' instead of *vice versa*.

The color of the hair of the two races is, moreover, distinctly different. Although superficially both seem black, yet, observed

[1] See FOLEY, *Des Trois Grandes Races Humaines*, Paris, 1881.

[2] I do not think that the verbal coincidences pointed out by Petitot in his *Monographie des Dené Dindje*, and by Platzmann in his *Amerikanisch-Asiatische Etymologien*, merit serious consideration.

carefully by reflected light, it is seen that the ground-tone of the Mongolian is bluish, while that of the American is reddish.

Of positive cranial characteristics of the red race, I call attention to the interparietal bone (or *os Incæ*), which is found in its extreme development in the American, in its greatest rarity among the Mongolians; also to the form of the glabella, found most prominent in American crania, least prominent in Altaic or northern Mongoloid crania; and the peculiar American characteristics of the occipital bone, flattened externally, and internally presenting in nearly forty per cent of cases the 'Aymarian depression,' as it has been termed, instead of the internal occipital protuberance (HERVELACQUE et HERVÉ, *Anthropologie*, pp. 231, 234, 236).

The shape of the skull has been made another ground of race-distinction; and, although we have learned of late years that its value was greatly over-estimated by the earlier craniologists, we have also learned that in the average, and throughout large numbers of peoples, it is a most persistent characteristic, and one potently indicative of descent or relationship. Now, of all the peoples of the world, the Mongols, especially the Turanian branch, are the most brachycephalic; they have the roundest heads; and it is in a high degree noteworthy that precisely the American nation dwelling nearest to these, having undoubted contact with them for unnumbered generations, are long-headed, or dolichocephalic, in a marked degree. I mean the Eskimo, and I cannot but be surprised that such an eminent anthropologist as Virchow (in *Verhandlungen der Berliner Anthrop. Gesellschaft*, 1881–82), in spite of this anatomical fact, and in defiance of the linguistic evidence, should have repeated the assertion that the Eskimo are of Mongolian descent.

Throughout the American continent generally, the natives were not markedly brachycephalic. This was abundantly illustrated more than twenty years ago by the late Prof. James Aitkins Meigs, in his 'Observations on the Cranial Forms of the American Aborigines.' They certainly, in this respect, show no greater Mongoloid affinities than do their white successors on the soil of the United States.

If color, hair, and crania are thus shown to present such feeble similarities, what is it that has given rise to a notion of the Mongoloid origin of the American Indian? Is it the so-called Mongolian eye, the oblique eye, with a seeming droop at its inner canthus? Yes, a good deal has been made of this by certain writers, especially by travellers who are not anatomists. The distinguished ethnologist Topinard says the Chinese are very often found without it, and I can confirm this opinion by those I have seen in this country. It is, indeed, a slight deformity, affecting the skin of the eyebrow only, and is not at all infrequent in the white race. Surgeons know it under the name *epicanthus*, and, as with us it is considered a disfigurement, it is usually removed in infancy by a slight operation. In a few American tribes it is rather prevalent, but in most of the pure Indians I have seen, no trace of it was visible. It certainly does not rank as a racial characteristic.

The nasal index has been recommended by some anatomist as one of the most persistent and trustworthy of racial indications. The Mongolian origin of the red race derives faint support from this quarter. From the measurements given in the last edition of Topinard's work (*Elements d'Anthropologie*, p. 1003), the Mongolian index is 80, while that of the Eskimo and tribes of the United States and Canada, as far as observed, is 70, that of the average Parisian of to-day being 69 (omitting fractions). According to this test, the American is much closer to the white than to the yellow race.

Most of the writers (for instance, Avé-Lallemant, St. Hilaire, Peschel, and Virchow) who have argued for the Mongoloid character of the Americans have quoted some one tribe who, it is asserted, shows marked Chinese traits. This has especially been said of the natives of three localities, — the Eskimo, the tribes of the North Pacific coast, and the Botocudo of Brazil. So far as the last-mentioned are concerned, the Botocudo, any such similarity has been categorically denied by the latest and most scientific traveller who has visited them, Dr. Paul Ehrenreich. It is enough if I refer you to his paper in the *Zeitschrift für Ethnologie* for 1887, where he dismisses, I should say once for all, the notion of any such resemblance existing. I have already pointed out that the Eskimo are totally un-Mongolian in cranial shape, in nasal index, and in linguistic character. They do possess in some instances a general physiognomical similarity, and this is all; and this is not worth much as against the dissimilarities mentioned. The same is true of the differences and similarities of some tribes of the north-west coast. In estimating the value of any resemblances observed in this part of our continent, we should remember that we have sufficient evidence to believe that for many generations some slight intercourse has been going on between the adjacent mainlands and islands of the two continents in the regions of their nearest proximity. The same train of events led to a blending of the negro and the white races along the shores of the Red Sea; but any one who recognizes the distinction of races at all — and I am aware that certain eccentric anthropologists do not — will not, on that account, claim that the white race is negroid. With just as little reason, it seems to me, has it been argued that the native Americans as a race are Mongoloid.

## ON THE CAUSES OF VARIATION IN ORGANIC FORMS.[1]

THE fundamental principle of organic evolution is natural selection, which is based on individual variation and the struggle for existence, the effect of which is the preservation of the most competent. It is extremely difficult to get at the immediate cause or causes of this individual variation, and for this reason Darwin considered it promiscuous and aimless, though he wisely avoided calling it lawless. There is no more fascinating or profitable field of investigation than that leading to the proximate cause or causes of variation. We are not content to rest the case where Darwin did by recognizing variation as an inherent principle in organic forms, or to beg the question by saying that it is as much a necessity of life as natural selection itself. Let us, therefore, discuss these causes in the light of recent experience and experiment.

We soon find that they admit of a certain amount of classification, the minor divisions of which, as in all systems of classification, more or less fully interlock or blend. They fall, however, into two chief categories: viz., (1) external conditions or environment, which are, at bottom, physical; and (2) internal tendencies or promptings, which are, at bottom, psychical.

By external conditions or environment, we include all influences on organisms which act from without; and in carefully considering them we shall find it difficult to draw the line between those which are really external and independent of any motive or inherent tendency in the organism, and those which are not. Hence the general term 'external conditions' is resolvable into various minor factors.

No one can well study organic life, especially in its lower manifestations, without being impressed with the great power of the environment. Joseph LeConte speaks of the organic kingdom lying, as it were, "passive and plastic in the moulding hands of the environment." In Semper's 'Animal Life' we have the best systematized effort to bring together the direct causes of variation; and no one who has read through its pages can doubt the direct modifying influences of nutrition, light, temperature, water at rest and in motion, atmosphere still or in motion, etc., or question his conclusion that no power which is able to act only as a selective and not as a transforming influence can ever be exclusively put forth as a *causa efficiens* of the phenomena.

It is among the vital or organic conditions of variation that natural selection has fullest sway; and, as they have been so ably expounded by Darwin and others, I will at once pass to a consideration of the second class of causes, to which the study of the interaction of organisms leads, — the internal conditions.

First of these we will consider the physiological causes. Genesis itself is the first and most fundamental of all causes of variation. The philosophy of sex may, indeed, be sought in this differentiation, as the accumulated qualities in separate entities, when suddenly conjoined or commingled, inevitably lead to aggregation and heterogeneity; in other words, to plasticity or capacity to vary. Genesis,

[1] Abstract of an address before the Section of Biology of the American Association for the Advancement of Science, at Cleveland, O., Aug. 15–22, 1888, by C. V. Riley, vice-president of the section.