

One zoologist, designated by the chief of the Biological Survey.

One botanist, designated by the botanist of the Department of Agriculture.

One forester, designated by the chief of the Bureau of Forestry.

One anthropologist, designated by the chief of the Bureau of American Ethnology.

with whom should be associated one officer of Engineers, U. S. A., and one naval officer. Let this council meet once each year, for example, towards the close of the rainy season, and decide, in the interests of the Philippine surveys as a whole, what areas each bureau shall take up during the ensuing season, and with what degree of detail. It is believed that such a council would deal satisfactorily with all matters which might come before it, without lack of due regard to the expert opinions of the chief officers affected. In case of dissatisfaction, however, an appeal might be allowed to the governor-general. The findings of the council should be regularly reported to the Board of Philippine Surveys in Washington.

14. *Aid from Army and Navy*.—Except at the largest towns, it is seldom possible in the Philippines to obtain clothing or food such as Americans are accustomed to, and transportation facilities are very limited. For this reason it is recommended that the officers of the scientific surveys be granted permission to purchase supplies at military depots, such as army posts and naval vessels, and to avail themselves of opportunities of transportation on vessels attached to either service when such accommodation can be afforded without detriment to the military service.

15. *Cost and Time*.—This committee is not in a position to offer estimates of the cost of Philippine surveys. These could be easily furnished by the chief officers of the various scientific bureaus. It is believed, however, that with a moderate number of parties in each branch, under the

system of cooperation recommended in this report, nearly all the work of exploration outlined above would be completed in a period of ten years, including charts, topographical maps and geological maps.

16. *Order of Importance*.—Should it be impracticable to organize the entire system of surveys simultaneously, it is recommended that they receive attention in the following order:

Coast and geodetic work and marine hydrography.

Land topography, including surveys and classification of the public lands.

Geology and mineral resources.

Botany.

Systematic forestry.

Zoology.

Anthropology.

This report was adopted by the committee on February 7, 1903.

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Chairman.

GEORGE F. BECKER,
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ANTHROPOLOGY AND ITS LARGER PROBLEMS.

YOUNGEST in the sisterhood of sciences, anthropology borrows principles and methods from all the older branches of knowledge; and her first problem—a problem renewed with each step of advance and hence endless as the problem of quarry to the huntsman or of crop to the planter—is that of determining her own relations in the realm of knowledge, her own place and powers in the intellectual world.

Viewed in the light of history, it is no accident that anthropology is the youngest of the sciences; for it is the way of knowledge to begin with the remote and come down to the near—to start with the stars, linger amid the mountains, rest awhile

among rare gems, and only slowly approach such commonplace things as plants and animals and soils, to end at last with man. *How* growing knowledge has pursued paths leading from the remote to the near, from the rare to the common, from the abnormal to the normal, from the unreal to the real, from wonder to wisdom—indeed, from chaos to cosmos and from star to man—all this is history; *why* these paths have been pursued may well remain a problem until more is known of the constitution of the human brain and of the laws of mind.

Yet, viewed in the light of the relations among the sciences, it is no mere chance that the science of man rises from the hip and shoulder and head of the elder-sister sciences, as the family infant is borne by primitive folk; for the sciences have come up, just as the cosmos seems to have developed, in an order of increasing complexity. The stellar bodies are interrelated through gravity and various forms of molar force which may be combined under the term *molarity*; and astronomy in its earlier form was the science of these relations. As the planets took shape (whether through nebular integration or through planetesimal aggregation) chemical reactions became paramount over mechanical relations, and *affinity* was superadded to molarity; and in a parallel order chemistry was added to astronomy in the growth of knowledge. When our planet was encrusted and the great deeps were divided into sea and land, life appeared; and thereby *vitality* was superadded to affinity, and, concordantly, as knowledge grew, the biotic sciences followed the more exactly quantitative earlier branches. In cosmic time animal activity followed hard on more inert vegetal life, and *motility* was superadded to vitality; and in human time animals were domesticated soon after plants were cultivated, while zoology grew up nearly apace with phytology. As the earth aged into conti-

nental and seasonal steadiness and the struggle for organic existence grew strenuous, more and more of the battles were lost to the strong and the races to the swift, and were won by the intelligent, and thereby *mentality* was superadded to vitality as a factor in earth history and man came to his own as a mind-led monarch over lower life and a progressive conqueror of the natural forces; and in like manner, as human history matures, it records anthropology as the younger-kin of zoology. In a word, man, as the head and intellectual ruler over the realm of life, alone stands for all the fundamental forces of molarity *plus* affinity *plus* vitality *plus* motility *plus* mentality, and is interrelated alike with sun and planet, agent and reagent, plant and seed, egg and animal, and with groups of his own kind; and in a word, the science of man is, more than any other branch of knowledge, interdependent with all the sister sciences and more many-sided than any of the rest.

THE SETTING OF THE SCIENCE.

The scriptless nomads of the human prime (and of many lands) set their journeys by the stars and enshrined their beastly deities in the visible firmament, and thus astrology set out on a course still traceable through constellations and planet-myths; at the same time these mnemonic devices of the sky were mated with equally imaginative symbols of every-day things, and as these grew into geometric designs and arbitrary characters, a system of almagabala—the earth-placed twin of sky-set astrology—took a course still marked by the ancient hieroglyphs of many lands. In the fulness of time (and primitive progress was tedious, beyond telling) astronomy grew out of astrology as the first of the sciences, leaving a large residuum of mythology behind. In like manner, and at about the same stage (*i. e.*, about the birth-

time of writing), algorithm and algebra came out of almacabala, leaving a residuum of black art and white magic, jugglery and enchantment; and as the algorithm grew into arithmetic and wizardly geomancy gave way to scholarly geometry, mathematics took shape as the complement of astronomy—and these sisters twain were nurses and teachers of all the younger sciences. Still the caldron of inchoate knowledge boiled and bubbled with Macbethian pother, and the foul fumes of black magic long concealed the few germs of real knowledge shaped by the steady pressure of actual experience—for this was the time of alchemy, whose slimy spume at last slipped away from chemistry, the third of the sciences.

Astronomy led writing (as the constellations attest), while mathematics followed close on writing and records as its symbols show, and both belonged to what may be called the *naissance* of knowledge; chemistry appeared during the same period, bearing the prophecy of physics caught by Archimedes, yet remained a helpless weakling—the foil and puppet of medievalism—throughout the whole of the dark ages; but during the renaissance the trio of elder sciences gained strength together and assumed lasting dominion over the realm of knowledge. Because their birth dates back to or beyond the beginning of records, the early stages of these sciences are imperfectly written; but the youngest science, anthropology, buys methods and principles from the more exact elders and pays amply in coin of history—for by tracing the careers of later-born or slower-grown folk and cults, anthropologists learn to retrace the lost steps in the careers of ancestral peoples and early cultures. Here lie some of the relations between anthropology and the elder sciences; she receives exact methods tested by millenniums of experience, and gives interpretations of the ideas and

motives, the arts and accomplishments, the modes of thought and the stages of progress of the earliest science-makers. Astronomy and mathematics and chemistry are systems of knowledge produced by men and minds, anthropology is systematic knowledge of these producers; and neither the old sciences nor the new can be rendered complete and stable without the support of the others.

The science of sentient man—of man as a thinking and collective organism—helps to illumine the dark ages no less than the *naissance* of knowledge; and at the same time it sheds new light on the origin of that group of modern sciences of which it is itself the youngest. The early period of intellectual activity in Babylon and Alexandria, Athens and Rome, may be likened to the blossoming of a plant in spring-time; it was the summing and outshowing of a mentality shaped during uncounted generations of experience along definite lines, in environments of distinctive sort—and the blossoming was fuller of promise than the ancients dreamed. Then came the ages that were dark because energy was diverted to new lines; for leaders of thought gave way to leaders of action, and these became pioneers in new environments where threads of new experience had to be spun from the lives of generations before they could be woven into the fabric of knowledge. The forefathers of the joint founders of scholasticism and science lived winterless lives in sunny lands, and the early science reveals an *elysian* tinge; while the ancestry of the makers of modern (or natural) science spent their force in conquering woodlands and wood-life in cloudy and wet and long-wintered Europe, and their efforts finally yielded a harder and more practical product than that of the earlier and easier time. During the nature-conquest of a millennium and more, the ideals of the elder masters seemed lost in a

survival of astrology and alchemy, a survival so well recorded in growing literature as to simulate a revival; yet the sense of the reality of things gained strength by exercise in the ceaseless contact with nature, while the oft-told magic was relegated to beldams and crones rather than reserved for rulers and high-priests as of old. The Renaissance revealed the influence of these centuries of nature-conquest and nation-planting which made the Europe of history; and its dawn showed that the seat of highest intellectual activity had slipped in the darkness from the sensuous shores of the eastern Mediterranean to the remote and rugged lands in which the world's richest blood and ripest culture were blent and pent against northern seas. The closest concentration of human strength was in Britain, the uttermost goal of conquest, the last resting-place of the conquerors of conquerors, where Cæsar might have wept for worlds like Alexander long before; and here modern science began with Francis Bacon (1561-1626) as expounder. The Britainian Renaissance coming so long after the Mediterranean Naissance may be likened to the ripe-fruited of a plant in autumn; for it followed the vernal blossoming after a tedious interval of scarce-seen growth.

With the 'Novum Organum' of Bacon, the last vestige of magic and mysticism fell away from the body of real knowledge; for not only was the practicality of centuries summed in the new system, but its author saw more clearly than any predecessor the relation between the thinker and his thought, between the human mind and the rest of nature—he perceived that 'Man * * * does and understands as much as his observations on the order of nature * * * permit him, and neither knows nor is capable of more.' On this and kindred verities he built a foundation for all the sciences, for the unwittingly-wandering

elders as well as for those yet unborn, even down to anthropology—though this part of the foundation lay unused for three centuries. Bacon's influence on contemporary and later thought was steady, albeit slow-felt; for his school was a normal by-product of the making of Europe, and he was the exponent of principles themselves the product of the world's most significant chapter in human development. True, the next epoch was opened by a son of southern shores and a devotee of the oldest science when Galileo (1564-1602) saw the sun-centered order of the solar system; yet it was left to English Newton (1642-1727) to shape the epoch and systemize all astronomy by a law of gravitation based on commonplace observation, while the third epoch of modern science came with Linné (1707-1778), like Bacon and Newton a product of the harsh northland and an exponent of practical experience, who led conscious seeing down from the stars to the plants and animals of daily knowledge. Of all the world's thinkers Linné would seem second only to Bacon in originality, if that quality be measured by grasp of realities; and while his system was crude, especially in relation to animals, his gift of phytology (or botany) enriched knowledge and opened the way for the rest of the natural sciences. Linné, the Swede, was soon followed by Hutton, the Scot (1726-1797), with a practical science of the rocks long contested by Werner, the German (1750-1817), under a theory smacking of Alexandria and Athens; but the sturdy English quarryman, William Smith (1769-1839), successfully supported his northern neighbor until his countryman, Lyell (1797-1875), came up to make geology a science. The influence of these sons of woodland and wold extended rapidly and widely, rooting readily in the fertile minds of their kinsmen, while the printing-press spread the stimulus of their work over all Europe

and unified the knowledge of the nations.

The next act attested the blending of the ancient and the modern, of Athenian and Anglican, of Aristotelian and Baconian, of the southern and the northern, and the scene was the middle ground of France. There Lavoisier (1743–1794) applied modern practicalness to chemistry, and discovered the indestructibility of matter; Lamarck (1744–1829) sought to amend the Linnean system, yet pushed too far in advance of observation (and his times) for full following; and the brothers Cuvier (1769–1838) so improved on Linné as to give form and substance to zoology, and incidentally to presage anthropology. These movements led up to the distinctively nineteenth-century stage, and a renewed pulse of British activity; Joule and others measured the mechanical equivalent of heat and experimentally demonstrated the persistence of motion, and so founded physics; by masterly observation and comparison, Darwin defined the development of species (including man), thus infusing the blood of life into the Linnean system; Huxley and Tyndall simplified all science by establishing the uniformity of nature; and at last American scions of Anglican sires independently discovered through anthropologic observation that the minds of all men of corresponding culture-grade respond similarly to similar stimuli, thereby proving the soundness and completeness of the Baconian foundation of knowledge. The four laws of nature established in western Europe—the indestructibility of matter, the persistence of motion, the development of species and the uniformity of nature—are, in fact, complementary to the law forecast by Bacon and applied in America three centuries later as the responsiveness of mind; and the five laws are the cardinal principles of science. It is curious that while Bacon's view of the mind as a faithful reflex of other nature colored and shaped the prog-

ress of science through the centuries (for how could Lavoisier, or Joule, or Darwin, or Huxley repose confidence in their observations without resting even greater confidence on the accuracy of the observing mechanism?), the Baconian law lay in the background of thought without conscious expression (despite daily subconscious use) from the dawn of the seventeenth century down to the last quarter of the nineteenth. *How* the law was neglected is the history of modern science read between-lines; *why* it was neglected until the science of sentient man arose to rediscover it is a present problem for those anthropologists whose sympathies and interests cover the full field of human knowledge.

Howsoever the three-century eclipse of Bacon's fundamental law be interpreted, the history of science stands out sharp and clear when viewed in the light of anthropology: There were two great movements, the naissances in the east Mediterranean region, and the renaissance commonly credited to the Mediterranean countries but really made in the North Sea region; each comprised a long interval of accumulation of experience and a briefer time of formulation of knowledge; in each the formulated knowledge faithfully expressed the habits and characters of leading thinkers of the times; and the modern movement reached the commonplace thing of every-day life in such wise as to render science a devoted handmaid rather than a remoter deess, a means of welfare rather than an end of aspiration. The anthropologist feels that the comprehensiveness of the ancient and the practicalness of the modern unite in his science, which (despite the narrow definitions of earlier decades) is that of mind-controlled man, the dominant power of the visible world, the science-maker as well as the subject of science.

Such are a few of the relations of anthropology to the sister sciences, a few of

the ways in which the science of sentient man touches the sum of human knowledge; to catalogue all would be an interminable task.

THE RISE OF ANTHROPOLOGY.

When the science of man grew up in the North Sea region, it was at first little more than a branch of zoology, and its makers busied themselves with features of the human frame corresponding to those of lower animals; comparative anatomy was cultivated with assiduity and profit, anthropometry flourished, and mankind were apportioned into races defined by color of skin, curl of hair, slant of eyes, shape of head, length of limb, and other structural characters—*i. e.*, the methods and principles of zoology were projected into the realm of humanity. It was during this stage that homologies between human structures and those of lower animals were established in such wise as to convince attentive students that mankind must be reckoned as the ennobled progeny of lower ancestry; true, the conviction grew slowly against the instinctive antagonism of the investigators themselves and the less effective (though louder) protests of contemporaries, yet the growth was so sure that the question of the ascent of man is no longer a problem in anthropology. Meantime the masters—and here Huxley and Darwin must always rank—gave first thought to normal and typical organisms; their disciples followed the same commendable course, and as other lines of man-study opened they called their work physical anthropology. One of the collateral lines reverted to the abnormal (in which knowledge commonly begins) and recurved toward the Mediterranean (where the influence of Alexandria and Athens lingers still) to mature in criminal anthropology—the science of abnormal man; another line led through prehistoric relics to archeology, and still another stretched out to the habits

and customs of primitive peoples, and eventually to comparison of these with the usages and institutions of civilized life. The last of these lines was laid out in Britain largely by Tylor, and was pursued in Germany and other European countries as general anthropology, ethnography, anthropogeography, etc.

Even before this growth began, a development not unlike that accompanying the making of Europe (save that the progress was more rapid) was under way in America; for the pioneers not only pushed out into their wilderness like their forebears of generations gone, but faced the novel experiment of life in contact with savage or barbaric tribes. To this new stimulus their vigorous minds responded promptly; the daily experiences were quickly flocked on distaffs of thought, spun into threads of knowledge, and duly woven into a web of practical science—a fabric no less independent in the making than that of Bacon in his day. Notable among the American pioneers was Albert Gallatin (1761–1849), statesman and scientist; he not only perceived, like his fellows, that the color and stature and head-shape of tribesmen were of trifling consequence in contrast with their actions and motives, but that the index to their real nature was to be found in what they habitually did; and he summed American experience up to his time in a preliminary classification of the native tribes on the basis of language. This advance marked an epoch in science no less important than that of Linné; true, it was not minted at a stroke nor finished without aid from others; yet Gallatin was the coiner, and the rough-stamped system was history's most memorable essay toward the scientific arrangement of mankind by what they *do* rather than what they *merely are*. Later Morgan (1818–1881) extended practical observation to the institutions of the aborigines in such wise as to found in-

ductive sociology;* and still later Brinton (1837-1899) made noteworthy advances toward classifying the Amerinds (*i. e.*, the native tribes) by their own crude philosophies, thus forecasting an inductive science now called sophiology. These advances seem simple and easy in the light of present knowledge, and may look small to present hindsight; yet in originality of work and boldness of conception they rank with the advances of Linné and Lavoisier—and be it remembered that they were not borrowed in any part, but bought at cost of the sweat and blood of often tragic experience. The unprecedented practicalness of American anthropology is attested by the fact that while Morgan and Brinton still wrought (in 1879) a governmental bureau was created to continue the classification of the native tribes; and its direction was entrusted to Powell, a master able not merely to occupy, but greatly to extend, the foundation laid by Gallatin. Under this impetus the new science progressed apace; American students multiplied; observations spread afar; each discovery prepared the way for others, and the new principles opened to scientific view the entire field of the humanities—that field aforetime claimed on one side by scholastic and statist, and held on the other by devotees of poesy and romance. The growing knowledge bridged the seas and the Powellian product blent with that of Tylor (both profiting by the experience of British India), and pushed on to several continental centers during the last two decades of the nineteenth century.

Toward the close of the old century, what may be called the kinetic and collective characters of humanity were brought out clearly and the American aborigines

(with other peoples as well) were defined by the *activities*, *i. e.*, by what they *do*, and this collectively—for in the realm of humanity no one lives to himself alone, but all are joined in twos and larger groups. Now it can not be too strongly emphasized that the basis of this definition differs fundamentally and absolutely from that of any other science; for all other entities—stars and planets, molecules and ions, minerals and rocks, plants and animals—are defined by what they *are* (perhaps measurably by the way in which they respond to external forces), while the humans are defined and classed by what they *do* spontaneously and voluntarily as self-moving and self-moved units or groups. Necessarily this view of humanity awakens inquiry as to why the human entity stands in a distinct class among the objects of nature; yet this is hardly a present problem, since the makers of modern anthropology find full answer in that unique nature-power lying behind the kinetic character of unit or group, *viz.*, *mentality*. So in the last analysis the modern definitions of mankind are primarily psychic; and it matters little whether men are classed by what they *do* or by what they *think*, save that doing is humanity's largest heritage from lower ancestry and hence precedes thinking—the essential point is that the practically scientific classification of mankind must rest on a kinetic basis, *i. e.*, on self-developed and self-regulated conduct.

Of late the activities themselves are grouped as arts, industries, laws, languages and philosophies, and each group constitutes the object-matter of a sub-science, thus giving form to esthetology, technology, sociology, philology and sophiology; and these (together called demonomy, or principles of peoples), with somatology and psychology, make up the field of fin-de-siècle anthropology—the last two corresponding, respectively, with the physical

* The speculative sociology of Auguste Comte (1793-1857) and the semi-speculative system of Herbert Spencer are to be noted merely as standing on somewhat distinct bases.

anthropology of most European schools and the strictly inductive mind-science of current American schools, while the first two include archeology as their prehistoric aspects. These outlines and partitions of the groups are essential, although in actual interest they lie beneath the full fruitage of the field as a wire-hung skeleton lies below the sentient body athrob with vitality and athrill with consciousness of power over lower nature. This fruitage is too large and luxuriant for ready listing; it need now be noted only that, in the modern anthropology sometimes styled the new ethnology, the peoples of the world are not divided into races (save, perhaps, in secondary and doubtful fashion), but grouped in culture-grades, and that these culture-grades are of special use and meaning in that they correspond with the great stages of human progress from the lowly and unwritten prime to the brightness of humanity's present.

The culture-grades (and progress-stages) may be defined in terms of arts or of industries, of law, of languages or of philosophies, and the definitions will coincide so closely as to establish the soundness of the system, though it is customary to define them in terms primarily of law (or social organization) and secondarily of faith or philosophy. So defined the grades (and stages) are: (1) savagery, in which the social organization is based on kinship traced in the maternal line, while the beliefs are zootheistic; (2) patriarchy or barbarism, in which the law is based on real or assumed kinship traced in the paternal line, and in which belief spreads into pantheons including impressive nature-objects as well as beasts; (3) civilization, in which the laws relate mainly to tenure of territorial and other proprietary rights, while the philosophies grow metaphysical and the beliefs spiritual; and (4) enlightenment, in which the law rests on the right of the individual

to life, liberty and the pursuit of happiness, and in which the philosophy is scientific or rational, while the faiths grow personal and operate as moral forces. The peculiar excellencies of this classification lie in its simplicity, and in the fidelity with which it reflects the unique nature-power lying behind the kinetic character of the human entity, *i. e.*, mentality; for, in the last analysis, the stages but portray and measure the normal growth of knowledge. Thereby the system sets milestones in the path of human progress, in numbers sufficient to outline its trend with satisfactory certainty; and it is especially notable that this trend is from the lower toward the higher with respect to every distinctively human attribute.

So anthropology came up, chiefly on the western hemisphere and under the stimulus of unique and strenuous experiences; and so it has assumed form and substance and spread widely over the world during two decades past. Viewed from its own high plane, the growth of the science presents no puzzling problem; yet, since no mind leaps lightly from classification on a static basis (as in somatology and its parent zoology) to classification on a kinetic basis (as in demonomy), the modern aspects of the science are full of problems to some students.

PROBLEMS OF CLASSIFICATION.

While the essential characters of mankind reside in mind-shaped activities, it remains true that the mental mechanism is planted in a physical structure derived from lower ancestry by uncounted generations of development; and the problem as to the weight properly assignable to hereditary structural characters in classifying men and peoples remains, in many minds, a burning one. As an academic problem, this may be said to distinguish the new anthropology from the old, and to divide

the anthropologists of the day into opposing schools, one chiefly American, the other chiefly European; as a practical problem of applied science, it has already engaged the attention of the world's leading statesmen (most of them approaching it empirically under the law that doing precedes thinking) and, with such help as they have been able to secure from science, they have solved it to their satisfaction, and have declared in numberless constitutional and statutory provisions that red and black, if not yellow, men share with whites the potency (at least) of enlightened citizenship, and should be led and aided and educated toward that goal despite the handicap of heredity. Here the highest statecraft and the most advanced anthropology strike hands; the statesman argues from his own experience that lowly men may be raised up, and hence that it were heartless to strike them down; the scientist but sums more numerous observations when he traces the upward trend of humanity; and both stand firmly on the rock of experiential knowledge. True, practical questions involved in the general problem are constantly arising: Can the Apache at San Carlos best be led toward citizenship by penalties for misdeeds, by rewards for righteousness, or by a combination of the two? Does the hereditary structure of the Negrito of interior Luzon debar him from hope of free citizenship, including that rectitude of conduct and nobility of impulse which free citizenship requires? Can the fellahin of Egypt be lifted from the plane of subjection to despotism to that of intelligent loyalty as royal subjects? Will the educational qualification in Maryland elevate the franchise? These are among the multifarious and ever-rising questions involved in the problem; and while the old anthropology stands aloof, they are receiving yearly solution at the hands of modern science and modern statecraft. Fortunately,

this present problem of anthropology is no less practical than were those confronting pioneer Puritans and Cavaliers in an earlier century, and like those it must be wrought out through living experience; still more fortunately, the chief factors in the problem are now grasped by students taught in the severe school of the settlers—grasped so firmly that little remains undone save the bringing up of loiterers who linger in the haze of half-knowledge and harken idly to bookish echoes of simpler science.

Connected with this problem is another no less burning: Does the mental mechanism of mankind react on physical structure in such wise as to control the development of individuals and types? As an academic problem this is well-nigh lost in the dust of ill-aimed discussion (relating to the hereditability of acquired characters and a dozen other points) which it were indiscreet to stir; yet half an eye can see that, whatsoever pedagogues proclaim, the pupils are building bone and muscle, increasing strength and stature, and manifestly promoting brain-power and prolonging life by judicious regimen. As a practical problem this might be passed over, since the world's leading millions are so well advanced in doing that thinking may be trusted to follow duly (perchance soon enough to let the masters learn the lessons their pupils live), were it not for the ever-rising ancillary questions as to rate and trend of the progress. Thus, mean length of life, or viability, is increasing, especially among more advanced peoples, who live longer in proportion to their advancement; yet, although Mansfield Merriman computed a few years ago that the median age of Americans has gone up five years since 1850, while the twelfth census reported that our mean age of death had advanced from 31.1 years to 35.2 years in a decade, it can not be said that the rate of increase is known—and still less are the factors of

increase (saving of infants, improved sanitation, bettered hygiene, shortened hours and intensified stress of labor, enhanced enjoyment of life, and all the rest) susceptible of statement in terms of definite quantity. The various questions of viability (than which no inquiries mean more to living men) are not to be answered through actuaries' tables based on selected classes, valuable and suggestive as these tables are; they must be answered through health offices and census bureaus—and their pressing importance forms one of the strongest arguments in support of permanent census bureaus in this and other countries. Thus, again, human strength is increasing, as suggested by the superior vigor and endurance found among advanced peoples and rising generations, and shown definitely by the constant breaking of athletic records; yet, while it is most significant that record-breaking progresses at an increasingly rapid rate (*i. e.*, more records are broken during each decade than during the last), the rate of increase remains problematic. Similarly, that measure of faculty expressed in coordination of mind and body is increasing, as shown by the ever-growing and never-failing ability of engineers, mechanics, builders, electricians and other specialists to master and command the strength-trying devices of modern times—locomotive and marine engine, dynamo and steam hammer, range-finder and machine-gun, and all the rest; yet both the rate and the factors of increase in human faculty remain in the realm of the unmeasured. These are but sample questions ancillary to the practical problem as to the reaction of function on structure; they merely suggest ways in which mind born of body in humanity's prime is rising into dominion over fleshly organ and constitution, as well as over sub-human nature—and these ways remain for the future to trace.

A related problem, although minor in itself, has recently risen into prominence through the impetus of importation overseas; it is that of 'degeneracy.' The observational data for the idea of human retrogression are apparently voluminous (though seen to be mainly of opposite meaning in the light of modern human knowledge) and the notion is by no means new; but the ratiocinative basis of the recent fad is obviously chaotic, *e. g.*, in that an individual is classed as 'degenerate' by reason of the inheritance of ancestral characters, or in other words, because he is no better than his sire or grandsire. True, if normal man is rising to successively higher planes of physical and mental perfection through constructive exercise, as modern anthropology so clearly indicates, the unfortunate who is no better than his ancestry is indeed below his proper place in the scheme of humanity—though not degenerate, but merely unregenerate (in non-ecclesiastical sense). It is also true that maleficent exercise may produce cumulative and apparently aberrant effects, just as does the beneficent exercise normal to mankind, the one yielding Nero and Billy the Kid as the other Shakespeare and Bacon, twin luminaries in intellectual history; but its end is destruction, with the consequent elimination of the criminal, while its middle merely marks lower layers in the constantly ascending stream of humanity. Naturally a theme filling tomes and flooding lighter literature for years is too large for full analysis in a paragraph; it must suffice to note that the 'degeneracy' of the day was not unfitly characterized even so early as when aphorism foreran writing, and the proverb beginning 'Put a beggar on horseback' gained currency. The great facts are (1) that less vigorous individuals fall short of the mean progress of their fellows in such wise as to get out of harmony with the institutions framed by

their leaders, and (2) that less vigorous peoples fall behind contemporary law-makers in such wise that their institutions are inferior to those of progressive nations; while under the conditions of modern life laggards and leaders commingle so freely that the differences are emphasized and kept in mind. Nor are these differences slight or meaningless; they touch the very fiber of living and being so deeply that primal savages can not share the thought of those in any higher culture-stage, that barbaric serf and despot are wholly alien to subjects and citizens, and that subjects are out of place among citizens. So every advanced nation has its quota of aliens through foreign or ill-starred birth and defective culture, who can be lifted to the level of its institutions only through a regeneration extending to both body and mind, both work and thought—they are the mental and moral beggars of the community who may not be trusted on horseback, but only on the rear seat of the wagon. In truth, standards are rising so rapidly that the lower half find it hard to keep up.

In one aspect the problem of the unregenerate is ever pressing, since knowledge is not yet a birthright (save in the promising germ of instinct) among human scions of lower ancestry; but even in this aspect a progressive solution is wrought with ever-increasing success through public education. The most serious side of the problem arises in the immigration or upgrowth of the unfit, who sometimes ferment in the unwholesome leaven of anarchy before education has time for perfect work; and this danger cries out for public action through the blood of both presidential and monarchial martyrs to public duty. The morbid view imported by Nordau and his ilk demands little American notice, however large the problem in Europe; for under the stimulus of that personal freedom which

is the essence of enlightenment, normal exercise of mind and body springs spontaneously, while hereditary disease, constitutional taint, idiocy, unhealthy diathesis, and all manner of transmissible abnormalities tend to wear themselves out, as our vital statistics sufficiently show.

These are a few of the present problems of anthropology involved in classifications growing out of the dual nature of mankind—the physical nature inherited from lowly ancestry and the mental nature (in all its protean aspects) built up through exercise during uncounted generations of functional development. They may seem irrelevant to that archaic anthropology which is content to define mankind by skulls of the dead; but they illustrate the living importance of that modern science which defines mankind by actions and thoughts, movements and motives.

MEANING OF ACTIVITAL COINCIDENCES.

About 1875 archeologists, and after them students of primitive folk still living, became impressed with certain similarities among industrial and symbolic devices of remote regions. One of the widespread devices is the arrow; used commonly with the bow, sometimes with the atlatl or throwing-stick, and again as a dart projected by the hand alone, it has been found on every continent and in nearly every primitive tribe. Another is a quadrate or cruciform symbol; either in the form of a simple cross or in that of the cross with supplementary arms known as the swastika or fylfot, these symbols are common to Europe, Asia, Africa, both Americas, and numerous islands, though they have not been found in Australasia. At the outset such devices were accepted as links in a chain of suppositious relationships, and as suggestions of common origin of both devices and devisers; but as observations multiplied, the hypothetical chain broke beneath its own weight; for the few similarities were gainsaid and

far outweighed by numberless dissimilarities of a sort manifestly attesting independent development. About 1880 Powell summarized the observed resemblances and differences among devices, and showed that the former are to be regarded as coincidences due to the tendency of the human mind to respond to contact with external nature in a uniform way. A dozen years later Brinton resumed the growing data and corroborated the Powellian conclusion; and on extending the inquiry to institutions, forms of expression and types of opinion and belief (in which the coincidences are even more striking than in the material devices), he formulated a theory of 'the unity of the human mind,' in which he saw a suggestion that the mind was extraneous in origin, *i. e.*, impressed on mankind from without—a view not unlike that long maintained by Alfred Russel Wallace. With the setting of the old century and the dawn of the new, the ever-multiplying facts were again reviewed, and the earlier generalizations were again sustained, but found to tell less than the whole story; for it was discovered that while minds of corresponding culture-grade commonly respond similarly to like stimuli, minds of other grades frequently respond differently—as when the savage eviscerates an enemy and devours his heart as food for courage, or the barbarian immolates a widow on the bier of her spouse, or the budding christian lends himself to the tortures of the inquisition, each reveling in his own righteousness and reprobating all the rest, though all are alike ghastly and obnoxious to enlightened thought. The new generalization rendered it easy to define the limits within which the responses of different minds to similar impressions may be expected to coincide; thereby it cleared away many of the anomalies and apparent incongruities among the observed facts, thus strengthening the law

of activital coincidences as first propounded. The introduction of a limiting term also rendered the law more specific; so that the sum of knowledge concerning the relations between mind and external nature may now be expressed in the proposition: *Minds of corresponding culture-grades commonly respond similarly to like stimuli.* By far the most important effect of the new generalization was the inevitable recognition of a cumulative mind-growth in passing from savagery to barbarism, thence to civilization, and on to enlightenment; for, in the first place, this recognition afforded a key to—indeed a full explanation of—the sequence of the culture-grades, while, in the second place, it showed forth the course of the world's mental development as a growth no less natural than that of tree or shrub, originating within, conditioned by external environment, and not derived from any extraneous source. Thus the generalization in 1900 of a quarter-century's observations on mankind brought empirical knowledge to the theoretical plane so masterfully projected by Bacon three centuries before—for it was he who first grasped the great concept that mind is at once product and mirror of other nature.

Is the Baconian foundation for all science sound; is the most sweeping generalization of anthropology safe? This problem—for the two questions are but one—is the most important presented by the science of man, indeed by all science; for it threads the whole web of human knowledge, touches every human thought, tinctures every human hope, tinges every human motive. True, it is too large for easy apprehension, too round for ready grasp, but it spans the world's intellectual structure from corner-stone to dome, and must sooner or later be wrought out personally (as are all problems in the end) by each rational being.

PROBLEMS OF DISTRIBUTION.

Anthropology arose in Britain as a branch of biology fertilized by the doctrine of organic evolution; it grew up in a field of thought dominated by a tradition of human descent from a single pair and shaped by the habit of tracing nearer ancestry to the worthier sires in otherwise neglected lineage—and the coincidence of the doctrine of differentiation with revered tradition and honorable regard for honored sires led naturally to an assumption of monogenesis. The assumption spread and pervaded the writings and teachings of anthropologists trained in the biological school; it still prevails, and is still supported by the argument from biology, though Keane and others have balked at the corollary that wavy-haired white, kinky-haired black, straight-haired red, and variable-haired brown nestled in the same womb and suckled at the same breast. It is needful to note that the assumption, albeit perfectly 'natural,' is purely gratuitous, and that it is not sustained by a single fact in anthropology as a science of observed and observable actualities: the blacks are not growing blacker, the reds are not blushing redder, no new races are arising, no old types are increasing in diversity; Graham Bell's note of warning against the danger of a deaf race advertised a solitary definite suggestion of the formation of a new human type, though even this seems to weaken with the lapse of time; indeed, it can not be too strongly emphasized that, howsoever besetting and enticing the hypothesis of differentiation or diversification of *Homo sapiens* may be, it is absolutely without direct observational basis.

When practical anthropology arose in America, it was seen by Gallatin and Morgan and other pioneers that languages and social usages tend to spread among contiguous tribes; and as Indian students ad-

vanced it was perceived that the tendency toward activital interchange extended also to arts and industries and myths, and had, indeed, resulted in the development of powerful federations (somewhat miscalled 'nations'), such as the Iroquois League and the Dakota Confederacy. Meantime it was observed that the spontaneous interchange of words and weapons, usages and utensils, with contiguous tribes was sooner or later accompanied by intermarriage, so that blood and culture blent together. Of course this observation merely reflected the unwitting experience of every generation among every people in every land; but, made as it was under the stress of practical problems of polity and peace, it awakened consciousness—and the *law of convergent development* among mankind was grasped. Once realized, the law was found of wide application; it was perceived that black folk are not growing blacker, nor brown men browner, nor red tribesmen redder, but that (among other relations) some interchange of culture and blood begins with first contact and increases with time, until at least some of the leaven of the highest humanity pervades the lump, while the ideals and standards of all progress toward unity; it was perceived that the types of *Homo sapiens* (*i. e.*, the 'races' of mankind) are not differentiating, but bent by that irresistible mimetic impulse which is the mainspring of elevation especially among the lower and measurably among the higher; it was perceived that culture is fertilized by contact with other culture more effectively than in any other fashion; and it was perceived that when the initial differences are not too great, blood fertilizes blood in such wise that the vigor of a people may be measured by the complexity of their interwoven strains—that European yesterday and American to-day led and still lead the world because the blood of each streamed

up from a more varied group of vigorous sires than that of any earlier scion. The themes of culture-union and blood-blending are too broad and deep for treatment in a paragraph; yet it must be affirmed, with an emphasis which can hardly be made too strong, that these are the dominant factors of human development, and that this development, so far as actually observed, is always convergent, never divergent.

Now it is a logical corollary of the law of convergent development that mankind were originally more diverse than now, and hence that there must have been several *loci* or centers of human origin; and this corollary leads to a theory of polygenesis, which has been much discussed during a decade or two. Some of the polygenesists, like Keane, are content with four original stocks, corresponding, respectively, to the white, black, brown and yellow 'races' of mankind (leaving the red man, or Amerind, to be interpreted perhaps as a migrated branch of the brown stock); others, like Powell, find it easier to think of an indefinitely large number of initial stocks and centers of development from a hypothetical prototype to the 'human form divine'—a prototype represented, perhaps, in a particular place by the famous fossil from Java, the *Pithecanthropos erectus* of Dubois. The alternative hypothesis is that of the monogenesis assumed in the early days of man-science; and the choice—or adjustment—between these opposing views is one of the most prominent among the present problems of anthropology. The great facts are (1) that all known lines of human development are convergent forward and hence divergent backward, and (2) that all well-known lines of biotic (*i. e.*, sub-human) development are divergent forward; how these incongruous lines are to be united across the dark chasm of that unknown time when man became man remains

a question, only made larger thus far by each advance of knowledge.

THE PROBLEM OF HUMANITIZATION.

To the comparative anatomist the gap between simian structure and human structure was of little note even before it was divided by the Dubois discovery in Java; for the differences between higher apes and lower men are less than those between either (1) lower and higher apes, or (2) lower and higher men. Yet to the sympathetic student of mankind these dead homologies are but unsatisfying husks—the great fact remains that even the lowest savage known to experience is human—man—in attitude, mien, habits and intelligence, while even the highest apes are but bristly beasts. It were bootless to deny or decry the chasm separating the always human biped from the always beastly quadruped, since it is the broadest in the entire realm of nature as seen by those who appreciate humanity in its fulness. How the chasm was crossed, either in the one place and time required by monogenesis or in the many places and times demanded by polygenesis, is a question of such moment as to rank among the great problems of anthropology until (if ever) the solution is wrought. A tentative solution has, indeed, been suggested in the modified form of mating which must have attended the assumption of the erect attitude; yet final solution awaits the future.*

THE PROBLEM OF HUMAN ANTIQUITY.

So long as the assumption of monogenesis prevailed, the question of the antiquity of man loomed large in the minds of students, while even under the hypothesis of polygenesis the date (geological or historical) of advent of the earliest man is of no small interest. So the discussion of human an-

* 'The Trend of Human Progress,' *American Anthropologist*, Vol. I., 1899, p. 418.

tiquity has grown into dozens of full volumes, hundreds of chapters and thousands of special papers, not to include the tens of thousands of ill-recorded scientific utterances and literal millions of press items. This vast literature is not easily summed; it must suffice to say that the evidence seems to establish the existence of man in Asia and Europe and northern Africa during later Tertiary times, and thus before the glacial periods of the Pleistocene; but that the earliest Americans lagged behind, coming in probably before all the ice-periods closed, possibly nearer the earlier than the latest. Despite the wealth of literature, there is a woeful dearth of definite knowledge concerning the date or dates of man's appearance in different lands—and herein lies another of the present problems of anthropology.

Such are some of the larger problems of anthropology, that youngest science whose field touches those of all the rest. The special problems are legion: those of general sort are at once problems of science and of statecraft, of the daily life and welfare of millions, of greatest good to the greatest number. Fortunately all are such as to be solved by the slow but sure processes of observation and generalization; and it is especially pleasing to see—and to say—that these scientific processes are more steadily and successfully under way now than ever before. W J MCGEE.

SCIENTIFIC BOOKS.

Post-mortem Pathology: A Manual of Post-mortem Examinations and the Interpretations to be drawn therefrom. A Practical Treatise for Students and Practitioners. By HENRY W. CATTELL, A.M., M.D. Second revised and enlarged edition. Philadelphia and London, J. B. Lippincott Co. 1905. Pp. xii + 551. Copiously illustrated. Pathological anatomy as a control of clinical observation has formed, and to a large extent still forms, the main basis of our more

exact knowledge of disease. After the study of human anatomy had revealed to them the parts into which the body is divided, it was a very natural curiosity which prompted medical men to examine after death the bodies of human beings who during life had manifested phenomena which deviated from the normal. Indeed, before the era of modern experimental inquiry developed in medicine, facts of normal and pathological physiology had for the most part to be reached through the combined results of clinical and post-mortem observation. The discovery of the seat of disease, it was believed, would be most helpful in leading to a knowledge of its cause; this idea was shared by Morgagni, the distinguished founder of the science of pathological anatomy, as is evidenced by the title of his chief treatise: *De sedibus et causis morborum per anatomen indagatis*, and it was believed in by the great pathological anatomists, like John Hunter, who followed him.

At first, post-mortem pathology confined itself largely to the determination of variations in the gross form, consistence, appearance and weight of the more conspicuous organs, but gradually this naked-eye study became extended in a methodical way to all parts of the cadaver until to-day the macroscopic side alone of a completely performed autopsy has assumed formidable proportions. The microscopic study of pathological anatomy received a great impetus in the first half of the last century through the activities of the so-called pathological-anatomical school in France, the representatives of which, including Cruveilhier, Chomel, Andral and Louis, maintained that one of the chief functions of the physician consists of a search for pathological-anatomical alterations and of the investigation of the local products of disease; this view exerted an extraordinary influence in transforming the methods and theories of medical men. The tendency was transplanted by the celebrated Rokitansky to Vienna, where it was further developed. It reached its acme, however, in the work of Virchow, who, passing from macroscopic studies to microscopic examinations and taking advantage of the histological discoveries which were being made,