SCIENCE

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*KNOW, THEN, THYSELF.**

LONG ago, as history measures time, when our planet was regarded as a flat disk girt by an unknown sea, and heaven was no farther away than the fair summit of Mount Olympus; when learning centered about the eastern curve of the Mediterranean, and a knowledge of music, mathematics and philosophy constituted a liberal education, a master mind emphasized the seemingly simple precept, 'Know thyself.'

Centuries later, when the disk had rounded into a sphere; when Jehovah had superseded Jove; when civilization had become continental; when the classics, modern languages and literature had been added to the list of scholarly pursuits, a keen little Englishman echoed the injunction of the ancient Greek.

And to-day, when scientific research has extended beyond the confines of the habitable portion of the earth, invaded the depths of the sea, explored the uttermost heights of the atmosphere and mapped the heavens; when God is worshipped as a spirit and ever more reverently as we begin to comprehend the marvels of his creation; when the making of many books has given this knowledge entrance through every door open to receive it, how much more reason have we than had Alexander Pope to re-

* Address of President of American Folk-lore Society at annual meeting, Chicago, January 1, 1902.

echo the advice of the sage of old, 'Know thyself.'

Man may boast that he has conquered a universe, but what does he know about his own nature? He began to study it but a little more than a generation ago, when the publication of the 'Origin of Species' and the confirmation of the conclusions of Boucher de Perthes rendered possible the organization of the science of man.

Instead of a few individual writers and an occasional investigator there is now a well-trained corps of anthropologists. Active national societies have been formed, costly laboratories are maintained, and excellent journals are published. The science is taught in the leading universities of most civilized countries: in the United States some degree of instruction in it is offered in thirty colleges. It has seemed to me worth while to set forth my reasons for believing that anthropology should be taught in every college in America, both because of the information it imparts and the discipline it gives.

As a branch of education, anthropology has passed the pioneer period. In some of our older institutions, where instruction in it has been given for more than ten years, the number of instructors and students is continuously increasing. Always offered as an elective, anthropology has thus demonstrated its ability to win its way.

As an objection to the introduction of this new science it is sometimes said that college curricula are already crowded. But with the rapidly extending elective system the number of courses offered far exceeds the time limit of any individual. At Harvard, for example, the undergraduate might study one hundred years before obtaining his bachelor's degree if he took all the courses open to him. I presume that the authorities of our universities of a hundred and fifty years ago would have considered their curricula threatened by an appalling congestion if to the subjects of that time had been added simply the increase of courses due to the present status of knowledge in those branches. And yet, besides all these, additional departments—electricity, biology, psychology—have been admitted, not only enriching the schedule of studies, but winning prominent rank therein. Similarly, anthropology, 'the crown and completion' of the sciences, is assuming its rightful place; and I shall endeavor to show why it may be added with special advantage to even a crowded curriculum.

Since anthropology has become clearly defined we hear fewer protests that it embraces too much. Its very comprehensiveness is a virtue; for thereby it is rendered suitable to serve as a framework for all other knowledge whatsoever, a symmetrical framework, lacking which the student but too often builds a series of mental watertight compartments, so to say, that give no unity or harmony to the intellectual edifice.

Mathematics, for example, though a discipline study based upon necessary reasoning and thus perhaps the most remote from anthropology, nevertheless finds its appropriate place in this ideal educational structure. The anthropologic student learns that among some peoples the mastery of the number concept does not extend beyond the ability to count two or three; that all grades of mathematical comprehension exist from this primitive condition up to our own denary system. He learns that culture may be most profoundly influenced by the reaction of the number concept upon human thought. The basic number may determine the number of gods that are selected to rule; through the calendar it influences agriculture, and, indeed, most of the industrial arts; it affects the pleasures and religious ceremonies of the people. Wherefore I maintain that the addition of the 'human touch' to mathematics gives

new meaning to the limited portion of the science with which the average student is acquainted.

In the case of geology the relation to anthropology is more obvious. With the general outlines of geology, the earth building processes, the sequence of strata, and the like, the student is familiar before he takes up the study of anthropology. Passing over the rapidly increasing importance of the economic uses of geologic materials from mine and quarry, we observe that the later geologic periods are of supreme interest in the discussion of the great problems of the time and place of man's origin. Back to the confines of the tertiary we have traced the remains of man and his handiwork, and beyond that barrier we are constantly hoping to pass. Therefore, at each new archeologic discovery the question of geologic age must be answered. After these primal problems come those of the distribution of mankind during the glacial and other cosmic changes. At other points in geology the 'human relation' is likewise established, and without it the allied sciences, geography and meteorology, would be poor indeed.

Permit me to cite one more example, drawn, not from the sciences, but from beliefs. During his course in anthropology the student receives instruction in the so-called 'science of religion,' studying it wholly as a product of human thought or imagination. It is a revelation to him to discover the vital part religion has played in the history of the human race. He learns that religion dictates to millions of his fellow creatures what they shall eat and drink, what they shall wear, how they shall work and how they shall play, what they shall think about, and some things about which they may not even think. Says Brinton of the savage, "From birth to death, but especially during adult years, his daily actions are governed by ceremonial laws of the severest, often the most irksome and painful, character. He has no independent action or code of conduct, and is a very slave to the conditions which such laws create." Not only among savages does this intimate connection between religion and all other elements of culture manifest itself, but also in all other grades of development, in all times and places. He must have breadth of view who realizes the significance of it. The theological student, however liberal, views but one side; the art student sees little more than the influence of religion upon painting or architecture or music; the sociologist deals primarily with Caucasian culture; the anthropologist alone investigates religion impartially in relation to other phases of thought.

Furthermore, the erection of this framework brings before the attention of the student the rooms that are incomplete and vacant, so that he may set about furnishing them. With this guidance he will study modern geography, with its complete survey of environment and life; comparative religion, with its breadth of view; the fine arts, as the highest expression of universal feeling; history which he will approach with a correct sense of proportions and time relations. For he will see that the adoption of the first articulate word by man, as distinguished from the mere animal cry of his ancestors, was an event of infinitely greater importance than the foundation of the Roman Empire; that the discovery of the art of kindling fire was vastly more significant in history than the battle of Tours.

Modern anthropology does not formulate theories from travelers' tales nor indulge in metaphysical speculations. It proceeds to its conclusions by the scientific method of direct observation and experiment, a method that is obtaining so much popularity that most students desire some acquaintance with it. By proper training

in any of the natural sciences this knowledge may be acquired, but it frequently happens that students having no taste for these branches will not take them under the elective system. Thus they may be graduated with an excellent store of linguistic, literary or mathematical information, and yet be sadly deficient in the power of observation and of correct inference, important requisites for success in this workaday world. To such students anthropology opens a new field. He who may abhor the smell of zoological specimens and the sight of laboratory dissections will, perhaps, take kindly to the examination of fictile objects, or textiles, or the various other art products that we study to determine the cultural status of this or that group of men, or for the purpose of tracing the course of industrial or æsthetic development. He who may be indifferent to the wonders revealed by the lens of the botanist may engage with enthusiasm in research relating to the music, mythology or ceremonies of alien peoples. He whose interest is not held by the marvelous story of geology fixed in lifeless stone may be zealous in the study of living humanity.

Among his fellows the anthropologist finds abundant opportunity for cultivating his powers of observation. After studying the problems of heredity, miscegenation, degeneracy, and the like, it becomes an instinct with him to note the color of hair and eyes, the shape of the head and face, and other individual peculiarities of those around him. A friend tells me that he relieves the tedium of a long examination of which he may have charge by tabulating statistics concerning the busy writers before him; how many are left-handed, part their hair in the middle, wear glasses, are blonds or brunettes and the like. Here it is little more than a pastime, but it illustrates the manner in which the habit of observation is fixed.

In the field the anthropologic investigator quickly discovers that to record accurately requires the keenest watchfulness. Let us suppose that we are witnessing the annual festival of the Jicarilla Apaches. The event is the relay race. The runners are marching in column through the surging mass of spectators. Drums are beating, rifles and revolvers are fired, shouts and cries add to the confusion. What is the signal that causes the column to divide? Why do all march to one goal and then half of them march back to the other? Soon the crack of the starter's pistol sends the best runner of each of the two groups down the course on the first relay. The excitement is intense. The walls of the narrow lane down which the brown forms are flitting yield to the pressure from without and threaten to collapse. The observer struggles to obtain a position near the goal. Does the winner touch his successor of the next relay? Does he hand him any object to carry? What is the purpose of these branches of cottonwood that are moved up and down the line? What is the meaning of the tufts of down that are added to the scant attire of the runners? Why are they cooled by spraying their backs from the mouths of their attendants? What are the methods of imparting speed resorted to by the opposing factions? For half an hour the observer hurries from point to point with camera and pencil in hand, and then suddenly the uproar becomes deafening. The race is ended. Offerings of bread, grapes and other fruits from the distant Rio Grande—even watermelons—are thrown from the crowd to the victors. A dozen observers are needed now to complete the account. Indeed, some measure of ubiquity is often longed for by the field-worker. He has every incentive to become proficient in quickness and accuracy of observation.

Again, the student may be so fortunate

as to witness a Maricopa medicine dance. The shaman is in doubt as to the nature of the disease; he must consult the dead for guidance in treatment of it. Followed by his awe stricken friends he approaches a grave, but not too closely, and calls to the resident spirit. Out of the darkness of the night come ghostly whispers in reply. The medicine man grows more confident and emphatic; his followers shrink farther back. To them the dialogue is conclusive evidence of the power of the shaman. To the observer it presents an opportunity for the detection of fraud. Is he clever enough to discover the identity of the confederate? Can he see without seeming to do so?

The nature-quickened keenness of observation of those whom the field investigator studies affords him an example wherefrom he must needs profit. In no other science is the object of research at once an example and also laboratory material. Again and again I have been impressed by the degree of perfection in observation manifested by Indian hunters in all parts of America. Old Peter, the Assiniboine, for example, with whom I hunted big horn in British Columbia, taught me as much about observing as any college professor ever did. Of course I appreciated the fact that his livelihood depended upon the cultivation of this trait, and it was not surprising that he should manifest proficiency in that one line when practically all others were excluded. Peter led the way into the mountains through passes yet choked with the late snows of winter, riding an old cayuse whose speed was not in the least accelerated by the tattoo of Peter's heels on its ribs. A band of green mosquito netting kept Peter's hat-rim against his ears on cold days, and served to protect his eyes on bright ones. But my attention was soon drawn from his attire to the skill with which he read the half obliterated signs. I could see the tracks as well as he, but I could not follow a single one through a maze as complicated, apparently, as the crowded street through which the dog trails his master with unerring swiftness.

Contrast with Peter's keenness the lack of it exhibited by the Gila freighter, who had made a dozen trips to Tempe, and yet wagered his team that the butte that overlooks the town was on the left as one approaches the place. There are no hills to confuse one's memory within twenty miles along that road, so that he had no excuse to offer, no word to say, when he found the butte on his right as he entered Tempe. He simply left the team and wagon to his more observing companion and walked home.

Incidentally, field research enables the student to travel, and thus add to his resources for happiness throughout life. For it is not alone the viewing of new scenes and new peoples that gives him pleasure, but there is the more lasting enjoyment resulting from the addition of new territory to his literary domain. For example, it is well known that he who visits the realm of arctic frost is ever tempted to return. He also finds the keenest pleasure in reading of the experiences of others in that region of infinite vastness. After the lapse of ten years I feel as deep an interest in that 'Land of Desolation and Death' as when I left it. Again, those who know the great arid Southwest find in its tragic history and in the writings of its pioneer anthropologists a source of perennial pleasure. He who has felt the spell of the desert has added a priceless treasure to his experience. He can sympathize with the belief of the desert dwellers that the wraith-like *remolinos* sending their columns of sand toward the bluest of heavens are not miniature whirlwinds, but spirits of air; that the pillars and other strangely eroded forms of sandstone are the figures of men transfixed there in the early twilight of time; he

himself has felt the clutch of the demon of thirst that camps ever close upon the trail.

The student engaged in field research in archeology can usually find but few facts at best from which to reconstruct the history of the past, and those few are often obscurely hidden in the mud of the swamp or the sand of the desert, where a careless blow of the spade may annihilate the record forever. For example, the shape of ancient wooden implements may be known from the mold of clay in which they decayed; but this form may be destroyed by a single stroke. Many old skulls, also, are so fragile when found that after a few minutes' exposure to the air they crumble to dust. Careful treatment may save some of them, but quick and accurate observation is absolutely necessary.

But correct observation is not the sole requirement for success. It suffices to render a man useful and helpful in minor positions, but ere he can become a leader in thought and action he must have the ability to interpret the data accumulated. In other words, he must develop his reasoning powers, and here again anthropology presents her opportunity. In the domain of culture history, particularly in its genesis, he ventures upon so much controversial ground that he must wield his weapons well in order to pass safely through. It was to this opportunity for diversity of opinion, and the innate bellicose tendency of man, that Huxley attributed the growing popularity of the science a quarter of a century ago. I have found that the presentation in the lecture room of the interjectional, gesture, and other theories of language usually leads to the liveliest discussion with the students, discussions that are sometimes adjourned to the home of the instructor. The ascertainable evidence relating to the origin of beliefs gives rise to widely differing inductions. A venerable friend who is preparing a treatise upon religion told me that he had found sixty-two theories accounting for its origin—and I had the pleasure of calling his attention to a sixty-third. In the examination of any considerable portion of that array of arguments, the student must exercise his judgment to discriminate between the plausible and the reasonable. He aims to discover fundamental principles and laws, and to that end his attitude must be, not credulous, but critical. Folk-lore, too has its debatable problems of myth migration, acculturation and relationship. In the arts opportunities for independent reasoning abound; for example, the student may examine the weapons, utensils and ceremonial objects of a tribe, and by comparison and analysis determine the character and course of development of its decorative art. He may study primitive scales of music, and investigate the theories of Darwin, Spencer, Grosse and others accounting for its origin.

The ethnologic study of technology is by no means the least in its power to stimulate thought. The college student all too frequently loses sight of the importance of the part that manual labor plays in the maintenance of civilization, and is usually ignorant of the extent of its contributions to cultural development. It extends the range of his thoughts to learn of the age-long gropings of his forebears in their discovery of the value of a newly fractured flint as a cutting instrument, and their improvement of it until it became a symmetrical blade. He sees a deeper meaning in the simpler industrial activities as he learns that the training of the muscles reacts upon the brain. The savage who binds a rawhide netting around a rough frame for his snowshoes, finds that the untrimmed edges of the wood soon cut through the leather. He makes many pairs, perhaps, before he

notices that when he scrapes the surface of the wood the lashing wears longer. He derives a sensation of pleasure, also, from the contact of his hand with the smoothed surface, and this gradually develops a mental pleasure at the sight of well-made frames. His skill in cutting and carving increases with practice, so that decoration of implements and weapons becomes possible, or, as we say, 'the manual concepts react upon the æsthetic mental concepts.'

When the student of anthropologic habit of thought contemplates that wonderful product of this industrial age, the ocean liner, he takes it 'by and large.' His mental vision sees beyond it the long line of less and less ambitious craft that terminate with the floating log propelled by a pole, or with the naked hands. Yet more than this: he sees migratory movements probably initiated by the food quest that required the use of boats to cross, now a river, now an arm of the sea. He sees a resulting development of commercial routes forming a vast network, which even in the earliest historic times was the product of centuries of growth and the interplay of forces ultimately environmental. The vista is a long one, and in viewing the evolution of this single industry the student perceives something of the complexity and grandeur of the laws that have moulded the modern arts. And so, because based upon broad lines, and yet balanced by exhaustive special researches, the science of anthropology develops a sane and wholesome mind.

The inherited proclivity of the Anglo-Saxon to despise all non-Caucasians becomes in the anthropologist a passion for studying them. He knows that his self-assumed superiority has its limitations, that his own ancestors in times geologically recent were tattooed cannibals as primitive in habit as the Digger Indians of the Sierras. He knows that his culture is in a measure due to environment, to the chance that led those early immigrants to a continent whose vast extent of shore-line rendered it immeasurably superior to all others as the home of commerce. His people were surrounded by animals capable of domestication, while the American race, for example, was handicapped by their absence.

Not only does the anthropologist take a more modest view of the virtues of the Caucasian, but he also learns to credit the savage and barbarian with many praiseworthy qualities. He finds that our aborigines are more devout than we, their happy family life most exemplary, their patience and courage under the wrongs of border 'civilization' most admirable. This knowledge induces forebearance and respect. Brought into contact with these and other alien races through field research, the anthropologic student discovers that they can estimate his worth with surprising quickness; they may not have heard of the nebular hypothesis, they may be unacquainted with the units of the metric system, but they can take the measure of a man with a glance.

Anthropology, with ever-widening knowledge of the peoples of earth, promises to make real that dream of the poets, the brotherhood of man; not a relationship based upon sickly sentimentality, but a brotherhood resulting from an understanding of the capacities and limitations of our fellow beings. We shall then have appreciation without adulation, toleration not marred by irresponsible indifference nor by an undue sense of superiority. Anthropology leads to a more charitable attitude toward the diverse philosophies of men, dealing as it does with the basic motives of all systems. It induces religious toleration, 'which,' says our greatest of college presidents, 'is the best fruit of the last four centuries.' And yet, although the sun

of enlightenment has absorbed the flood of mediæval religious persecution, we have all seen remnants, noisome pools of intolerance, in localities where the cleansing rays seldom and feebly penetrate. I know of no instrument with a potency equal to that of anthropology for their removal.

The proverbial tendency in the college student toward self-complacency is checked and corrected by a knowledge of the broad lines of cultural development, of the primal principles of all human activities. Vanity cannot thrive in the contemplation of a plan that requires an eternity for its fulfilment. 'Wisdom is before him that hath understanding.'

The somatologist discovers in the human body a record, kept by the vital principle of heredity, of its upward struggle from the simplest animal forms. This living history dates from a past beside which the glacial epoch is but as yesterday, yet it is not vague and indecipherable; it is boldly written. Pages are inscribed in our muscles; others in vein, artery and gland; in the digestive system and the epithelial tracts; and others in that most conservative of tissues—the nervous system. In head, trunk and limbs these functionless 'fossilized structures' abound, not only useless to us now, but positively dangerous, as they frequently become the seat of disease.

In like manner, the folk-lorist finds in the body politic survivals of belief and practice that antedate and supplement written history. Backward they lead through ever simpler social organizations to the primitive period when men walked in the fear of gods innumerable that influenced every waking moment and filled with dread their dreams. Yet farther, and the investigations of the folk-lorist mingle with those of the comparative psychologist along the border line between brute and lowest human. These survivals, also, are a menace to individual welfare, as I doubt not that more than one person will be executed for witchcraft within the boundaries of these United States in this year of grace, 1902. It is not long since a Pima Indian was killed by his fellow villagers in Arizona because he knew how to use a carpenter's spirit-level. With the magic stick he had begun pushing at unheard-of speed the preliminary survey for an irrigating ditch. That night a jury of his peers tried, convicted, and shot this Piman martyr to progress.

Not only the individual, but the tribe or community also, may be injured by the continuance of traditions from a lower cultural stage. 'The power of tradition' is an accepted aphorism. An illustration of the power and possibilities of evil in such a survival is seen in the case of the city of Mexico. Six centuries ago a migrating band of aborigines was led by a myth to select an islet in a stagnant lake as the site of their pueblo, a choice that it is extremely improbable they would otherwise have made. But the eagle with the serpent in his talons alighted on a cactus there, and thus determined the location of Tenochtitlan. The village became a city and throve in material prosperity, but it suffered one serious disadvantage; it was subject to submergence under the waters of the lake, so that protection was sought in a great causeway seven or eight miles in length. Later a drainage canal was begun; as the centuries passed, millions on millions were spent in the work, thousands and hundreds of thousands of peons perished in that ditch. In the mean time, the city of Mexico suffered the odious distinction of having the highest death rate of any capital in the world.

Not alone in its origin, but also in its downfall as the seat of Aztec power, did this city illustrate the effect upon the community of traditional belief. In the golden

age of the empire the fair Quetzalcoatl taught the useful arts, and of the lands of Anahuac he formed a paradise. Cotton had not then to be cultivated, but grew wild, ready colored the hue of every dye. The maize plant was of such a size that a single ear was a carrier's load. Melons o'ertopped their owners' heads. Not the favored class alone, but all men possessed palaces of silver and gold. But the adversary came in the form of an old man who roused in Quetzalcoatl a desire to wander to other lands. With his departure the fruit-trees withered and the singing birds took flight. Then arose the belief that he would return, and it was the expectation of his second coming that unnerved the fierce courage of the Aztec warriors before the pale-faced Cortez. Was he the white god of their fathers? Credulity, doubt and dissension hastened their undoing.

For more than a millennium England has been a Christian nation, yet in the museum at Oxford we see images, bristling with rusty nails and needles, which demonstrate the late survival of a belief in sympathetic magic in the rural communities whence these objects came. Within the university itself I secured a desiccated specimen of a familiar vegetable which an officer of one of the colleges had carried for years as a preventive of rheumatism! Neither centuries of enlightenment nor the revolutionary changes of this progressive age have exterminated such beliefs. They even adapt themselves to the new conditions, as in the case of the lady living within the shadow of the walls of Harvard University, who maintains that carbons from arc lamps are a sure preventive of neuralgia!

I am aware that the study of these beliefs sheds light upon the history of the mental development of the race, and is of the highest value in certain theoretic considerations, but I involuntarily think of folk-lore as a study that will influence practically the life of him who engages in it. He learns that much that he has accepted from childhood without thought as truth is mere superstition and error. Not until he has had his attention called to the existence of these survivals does he realize their abundance, or the part they play in the daily lives of those around him. They are by no means confined to the servants' quarters; they are also in his own family, to whatever class or country he may belong. The nature and the prevalence of error are literally brought home to him. We all admire truth and natural law—in the abstract—and seek the widest possible knowledge of them by means of a most admirable educational system. And yet the graduate seldom possesses the power of applying theoretical knowledge to his own individual life. This is not an argument for what is termed 'a practical education,' but an explanation of a condition which I believe can be greatly improved by thorough training in anthropology.

By the comparison of customs and beliefs it was discovered several years ago that striking similarities exist whenever like environmental conditions prevail. It was the discovery of this principle of unity that led anthropologists to seek among the savages and barbarians of to-day an explanation of survivals in the Caucasian group. Hundreds of examples of these 'Ethnographic Parallels' have been observed. One will serve our purpose here. In savagery the functions of priest and physician are combined in the medicine-man. He fits himself for his profession by a rigorous training, and has the utmost faith in his own power to enlist the sympathy of the beneficent gods and to expel the evil ones. Disease he banishes with a formula of magic words, or with ceremonies that are oftentimes elaborate. Upon analysis it is found that the success of the shaman de-

pends upon two elements, the credulity of man, and the power of the sub-conscious mind. The parallel is observed in the medicine-men of that modern cult which numbers hundreds of thousands of otherwise intelligent Americans. Their healers proceed by methods no more rational than those of the aborigines, and in some respects similar to them. Their success depends upon the same two factors. The red shaman calls the headache an evil demon and proceeds to suck it through a tube. The white shaman terms it sin and dispels it by a 'demonstration.'

The student of folk-lore learns of the rise and fall of many an 'occult' belief. As this phase of human experience is intangible and variable, those only who have been instructed concerning the characteristics of thought can profit by an accumulated knowledge.

While anthropology may not be classed as a 'bread and butter' study, it does equip the student who is to become a merchant, physician, attorney, with a practical knowledge of the motives of his competitors and clients. He learns in youth the significance of the folk-saying, 'Human nature is the same the world over.' His interest in the science cannot terminate with the pass-mark of the final college examination, but must be coextensive with his interest in his kind. He will employ it in his vocation and enjoy it as an avocation.

To the aspirant for honors in the diplomatic service, anthropology offers an admirable training. He learns the significance of the racial factor in national welfare; the measure and condition of progress; the principles of ethnologic jurisprudence; and, also, the characteristics of the particular people among whom his duties lead him.

For the legislator, anthropology must become a necessary preparation. America has problems whose solution calls for the widest knowledge of races and cultures. Such knowledge, free from political bias and hereditary prejudice, can best be gained by the study of the science of man. The list of these problems is a formidable one, including Philippine slavery, Mohammedan harems, Tagal insurrections, Spanish-American complications, coolie labor, the negro problem, the Indian question, not to mention the demands for legislation that shall regulate the immigration of Poles, Russian Jews, Italians, Hungarians and others.

Anthropology prepares the law-maker and the jurist for the task of coping with crime. Criminal anthropology has explained the character and causes of criminality and degeneracy, and led to revolutionary changes in the methods of crime prevention. While it is difficult to accept all the claims of the school of which Lombroso is the accomplished master, we must acknowledge our indebtedness to it for the reforms that it has directly or indirectly inaugurated.

For the injurious effects of exclusive specialization, anthropology offers a corrective. It is particularly fatal to narrowness in the teacher, who oftentimes leads young people to specialize in his particular field before they are aware of their own aptitudes and wishes. It forearms the teacher of inferior races, who usually ignores the traditional mental activities of those he would instruct. It induces a more considerate attitude in the missionary who calls the religion of his parishioners mere superstition, and speaks with contempt of their mode of thought, not appreciating the manner of its growth through uncounted centuries of struggle.

These few representative examples but suggest the extent of the utility of the science in the affairs of men. In the training of youth anthropology furnishes a com-

prehensive outline of human knowledge, showing the relations existing among its several branches, and giving the student a correct sense of the proportion between what he knows and what there is to know. Employing the scientific method, it teaches how to observe. College training in it is continued directly in subsequent experience with the world. The material is ever at hand. Dealing with the vital problems of all epochs, it inculcates breadth of mind and develops the reason. It induces consideration and awakens appreciation of other men and other races. It supplies an available touchstone of truth and error. Wherefore it is that a new and deeper meaning now abides in the words:

"Know, then, thyself; presume not God to scan;
The proper study of mankind is man."

FRANK RUSSELL.

AMERICAN MORPHOLOGICAL SOCIETY.

II.

Notes on Cyanea Arctica: CHAS. W. HARGITT.

The early cleavage phases are passed while the eggs are still within the gonads or in the complicated folds of the manubrium. A gastrula is formed, following total cleavage, by invagination, and an early closure of the blastopore ensues. The embryo becomes ciliated before its escape from the egg membrane, within which it may be seen slowly rotating. On emergence it is almost spherical but soon assumes the ovoid shape characteristic of the Cœlenterate planula. While details as to the formation of the entoderm are not yet complete they seem in the main to confirm the observations of Hyde, Smith and the recent work of Hein.

The encystment noted by Hyde and McMurrich has been common in the specimens under consideration, though I have been able to show that the process is rather incidental than essential as claimed by McMurrich. It seems wholly conditioned upon the environment; where favorable and natural the process is rare or absent.

The scyphistoma stage of development was attained in variable periods depending again upon conditions. Under favorable conditions it may occur in from eight to ten days, while under other conditions it may not take place within as many weeks. Thus also with the changes involved in strobilization and the release of the ephyræ. Under favorable circumstances they have taken place in the aquarium within a period of eighteen days from the escape of the planula to that of the ephyra.

Stolonization occurs as in *Aurelia,* but much less freely, as does also the origin of buds from the stolons. Budding from the side of the polyp was not observed in *Cyanea,* its small size probably rendering such process difficult.

The entire life history from the egg to the free ephyra was followed in detail with unusually good results in aquaria of varying size from a mere watch glass or petrie dish to jars holding a gallon or more.

Notes on the Cœlenterate Fauna of Woods Holl: CHARLES W. HARGITT.

Inheritance of Color Among Pointers: FRANK E. LUTZ and ELIZABETH B. MEEK.

Dr. Francis Galton ('89) proposed 'briefly and with hesitation' a statistical law of heredity applicable to bisexual descent. Briefly stated, it was that one half the offspring's characteristics are derived from the parents (an equal amount from each), one fourth from the grandparents, one eighth from the great-grandparents, one sixteenth from the great-great-grandparents, and so on. Galton himself ('97) tested this hypothesis by the consideration of a single color characteristic—the conditions of being tricolor or non-tricolor—in