

THE AMERICAN ASSOCIATION.

THE preliminary programme of the fiftieth meeting of the American Association for the Advancement of Science, to be held at Boston August 22-27, has just been issued by the local committee.

Some changes have been made in the officers of the Association by death and resignation. The revised list is:—President: Frederick W. Putnam. Vice-Presidents: Section A (Mathematics and Astronomy): Edward E. Barnard. Section B (Physics): Frank P. Whitman. Section C (Chemistry): Edgar F. Smith. Section D (Mechanical Science and Engineering): Mortimer E. Cooley. Section E (Geology and Geography): Horace L. Fairchild. Section F (Zoology): Alpheus S. Packard. Section G (Botany): W. G. Farlow. Section H (Anthropology): James M. Cattell. Section I (Social and Economic Science): Archibald Blue. Permanent Secretary: Leland D. Howard. General Secretary: James McMahon, to fill vacancy caused by the death of David S. Kellcott. Secretary of the Council: Frederick Bedell.

The meetings will be held at the Massachusetts Institute of Technology, the Harvard University Medical School, and the Boston Society of Natural History. Association headquarters will be at the Rogers Building of the Institute of Technology (named after Prof. Wm. B. Rogers, last president of the Society of American Geologists and Naturalists, from which the American Association was organised fifty years ago). The hotel headquarters will be at the Copley Square Hotel.

The general programme begins with the meeting of the Council on August 20. The first general session of the Association will be held on Monday, August 22, at 10 a.m., at Huntington Hall in the Rogers Building. The retiring president, Prof. Wolcott Gibbs, will introduce the president-elect, Prof. F. W. Putnam, of Harvard University. Addresses of welcome will be delivered by Governor Roger Wolcott, of Massachusetts; Mayor Josiah Quincy, of Boston; and President James M. Crafts, of the Massachusetts Institute of Technology. President Putnam will reply. The several sections will then commence their sittings.

The addresses of the several vice-presidents will be given on Monday afternoon as follows:—

At half-past two o'clock: Vice-President Whitman, before the section of physics, "On the Perception of Light and Colour"; Vice-President Cattell, before section of anthropology, on "The Advance of Psychology"; Vice-President Farlow, before section of botany, on "The Conception of Species as affected by Recent Investigations on Fungi."

At half-past three o'clock: Vice-President Barnard, before section of mathematics and astronomy, on "Development of Astronomical Photography"; Vice-President Blue, before section of social and economic science, on "The Historic Method in Economics"; Vice-President Packard, before section of zoology, on "A Half-century of Evolution with Special Reference to the Effects of Geological Changes on Animal Life."

At half-past four o'clock: Vice-President Smith, before section of chemistry (subject to be announced); Vice-President Fairchild, before section of geology and geography, on "Glacial Geology in America"; Vice-President Cooley, before section of mechanical science and engineering (subject to be announced).

The address of the retiring president, Prof. Wolcott Gibbs, on Monday evening, will be "On some Points in Theoretical Chemistry," after which will be a reception to the Association and invited guests.

The meetings of the several sections for the reading of papers will be held on Tuesday and Thursday, morning and afternoon; and some sections will also hold meetings at Cambridge on Friday. Sections F and H will meet on Tuesday evening at the Harvard Medical School, when Dr. Thomas Dwight will lecture on "Variations in Human Bones."

Wednesday will be "Salem Day," and will be devoted to an excursion to Salem, where the museum of the Association is located. On the return, in the evening, lectures will be given in Huntington Hall on the Boston Park System and the Metropolitan Water Supply and Sewerage System.

Friday, Cambridge Day, will be spent at Harvard University, and an address will be made in the evening at Sanders Theatre by President Charles W. Eliot.

The general closing session will be held on Saturday morning at 10 o'clock; and the concluding meetings and adjournment of the sections in the evening.

Besides the excursions to Salem and Cambridge, an excursion will be made on Tuesday afternoon, under the auspices of the American Forestry Association, to Middlesex Fells; on Thursday afternoon to the Arnold Arboretum and the Blue Hill Meteorological Observatory; and on Saturday a choice between (a) Wellesley College, (b) Concord and Lexington.

On the following Monday, August 29, excursions will start to the following places:—White Mountains, Plymouth, Provincetown (ocean excursion to Cape Cod), Wood's Hole (the Marine Biological Laboratory and the United States Fish Commission), Newport, Clinton (the new Metropolitan Water Supply), Lawrence Experiment Station (of special interest to chemists, biologists and students of public hygiene).

The foreign guests at the Boston meeting will be entertained by the City of Boston. The officers of the committee on foreign invitations are Dr. Henry P. Bowditch, chairman; Mr. A. Lawrence Rotch, secretary.

The local secretary for the Boston meeting is Prof. H. W. Tyler, of the Massachusetts Institute of Technology, to whom all correspondence should be addressed.

Meetings of affiliated societies will begin on August 18, including American Forestry Association, Geological Society of America, American Chemical Society, Society for the Promotion of Agricultural Science, Association of Economic Entomologists, Botanical Club of the Association, American Mathematical Society, Society for the Promotion of Engineering Education, American Folk-Lore Society, National Geographic Society, Botanical Society of America, and conference of Astronomers and Physicists.

FOLK-MEDICINE IN ANCIENT INDIA.

"THE most primitive witchcraft," says Sir Alfred Lyall, "looks very like medicine in the embryonic state." This is pre-eminently the case in ancient India, where it is not difficult to trace the history of medical science—such as we find it in scientific works on medicine, like the *Charaka* or *Susruta*—back to its early beginnings in the charms and witchcraft practices of the *Atharva-veda*, the most ancient compendium of sorcery.

In India, as elsewhere, the general doctrine of disease prevails that all abnormal and morbid states of body and mind are caused by *demons*, who are conceived either as attacking the body from without, or as temporarily entering the body of man. The consequence is that primitive medicine consists chiefly in chasing away or exorcising these hostile spirits. This is done, in the first instance, by *charms*. The spirit of disease is addressed with coaxing words and implored to leave the body of the patient, or fierce imprecations are pronounced against him, to frighten him away. But these charms, powerful as they are (in fact, there is nothing more powerful to the primitive mind than the human *word*, the solemn blessing or curse), are yet not the only resource of the ancient physicians or magicians.

From the earliest times people had become aware of the curative power of certain substances in nature, especially of herbs. This knowledge was first gained by experience, and, after it had once been obtained, people began to ascribe similar curative power to plants, as well as to animal and mineral substances for various other reasons. Analogy or association of ideas serves to explain not only many of the practices of primitive medicine, but also accounts in many cases for the belief in the curative power of certain substances. The principle that *similia similibus curantur* prevails throughout the whole range of folk-medicine. Thus dropsy is cured by water. A spear-amulet is used to cure colic, which is supposed to be caused by the spear of the god Rudra. The *colour* of a substance is of no small importance in determining its use as a medicine. Thus turmeric is used to cure jaundice. Red, the colour of life-blood and health, is the natural colour of many amulets used to secure long life and health. A black plant is recommended for the cure of white leprosy. But even the *name* of a substance was frequently a reason for ascribing to it healing power. One of the most powerful medicinal or magical plants is called in Sanskrit *apamarga* (*Achyronthes aspera*), and it owes its supposed power essentially to its etymological connection with the verb "apamarj," meaning "to wipe away," and in Hindu charms the plant is constantly implored to wipe away disease, to wipe out demons and wizards, to wipe off sins and evils of all kinds.

To wipe a disease away, is a very common and a very natural

means of getting rid of it. This seems to be the meaning also of that ancient method of curing disease by *the laying on of hands*, which is already mentioned in the *Rig-veda*, though it is also possible that it was intended to press the disease down by means of the hands, in order to make it go out of the body. Some of the charms used with the laying on of hands point to still another explanation. As the priest had to *touch* the person for whom he was offering prayers and sacrifices, so it was thought that the imprecations could only have effect on a person if there was an actual connection between the medicine-man and the patient. There is a striking similarity between this ancient Hindu custom and the modern practices of faith-healing, in which, after all, prayer has merely been substituted for the ancient charms.

The two chief resources of folk-medicine, then, are charms and magic rites, the principal object of the latter being to bring the body into contact with some supposed curative substance. These substances are frequently applied in the shape of amulets or talismans.

The most ancient collection of charms is that found in the *Atharva-veda*, an excellent translation of which, with extracts from the ritual books, has just been published by Prof. Bloomfield in the "Sacred Books of the East" (vol. xliii., 1897). In the medical charms of the *Atharva-veda* the diseases are always personified. It is only our way of speaking when we say that diseases are supposed to be *caused* by demons. As a matter of fact the diseases themselves are addressed as personal and demoniacal beings. Thus *Fever*—"the king of diseases," as it is called in the "Susruta," the great work on Hindu medicine—is addressed as a demon who makes men sallow and inflames them like a searing fire. He is implored to leave the body, threatened with destruction if he does not leave it, and yet at the same time worshipped as a superhuman being. "Having made obeisance to the Fever, I cast him down below." This is a very characteristic way of dealing with evil spirits, which we find among all primitive people. The healing power, too, is addressed as a supernatural being, and invoked to destroy the demon of disease. Thus the plant *Kushtha* (*Costus speciosus*), which was always considered by the Hindus as one of the most potent remedies against fever, leprosy, and other diseases, is addressed with such words as: "O plant of unremitting potency, drive thou away the Fever that is spotted, covered with spots, like reddish sediment." In some of the charms against fever, we meet with vivid descriptions of all the symptoms of malarial fever. We read in one charm: "When thou, being cold, and then again deliriously hot, accompanied by cough, didst cause the sufferer to shake, then, O Fever, thy missiles are terrible: from these surely exempt us!" And the *Kushtha* plant is again implored: "Destroy the Fever that returns on each third day, the one that intermits each third day, the one that continues without intermission, and the autumnal one; destroy the cold Fever, the hot, him that comes in summer, and him that arrives in the rainy season!"

The frequency of fever during the rainy season probably accounts for the belief that lightning is the cause of fever, as well as of headache and cough. A very symbolical cure of fever consists in making the patient drink gruel made of roasted grain, the dregs of the gruel being afterwards poured from a copper vessel over the head of the patient into fire, which must be taken from a forest-fire. A forest-fire is supposed to have originated from lightning, and that the cure of a disease is effected by that which causes it, is an almost universal belief. Both the roasted grain and the copper vessel are symbolical of the heat of fever. Here we have the rudiments of homœopathy. Another magic rite is intended as a remedy against cold fever. By means of a blue and a red thread a frog is tied to the couch on which the patient reclines, and a charm is recited in which the fever is invoked to enter into the frog. The frog represents the cold element, and the cold fever is expected to pass into the cold frog. A very similar charm is met with in Bohemia, where the peasants, in order to cure chills of fever, catch a green frog, sew it into a bag, and hang it around the neck of the patient.

The cure of a disease by making it enter into some animal, is one of the most general devices of medical witchcraft both in India and elsewhere. According to Jewish law, a living bird is "let loose into the open field with the contagion of leprosy." Jaundice is cured, in parts of Germany, by making it pass into a lizard. In ancient India, jaundice was cured by seating the patient on a couch beneath which yellow birds were tied. The yellow disease was expected to settle on the yellow birds.

NO. 1497, VOL. 58]

The principle of curing a disease by something similar to its cause or symptoms is also apparent in the cure of excessive discharges by means of water. Dropsy—the disease sent by *Varuna*, the god of the sea and of the waters—is naturally cured best by the use of water. A very simple cure of dropsy consists in sprinkling water over the patient's head by means of twenty-one (*three times seven*) tufts of sacred grass (*Poa cynosuroides*), together with reeds taken from the thatch of a house. The water sprinkled on the body is supposed to cure the water in the body.

But there must have been many other reasons, too, which pointed to *water* as a great healing power. To the present day the Hindus look upon rivers as divine beings, or as the abode of spirits. And we may credit even the ancient Hindus with a certain knowledge of medicinal springs. Nor is it surprising that in a tropical climate the rain waters were hailed as "divine physicians." And it may be that actual experience of the beneficent influence of water on health suggested the eulogy found in a Vedic charm: "The waters verily are healing, the waters chase away disease, the waters cure all diseases."

That dropsy is ascribed to *Varuna*, one of the great gods of the Hindu pantheon, is quite exceptional. For, as a rule, diseases are caused by godlings rather than by gods. More especially, all such diseases as mania, fits, epilepsy, convulsions, &c., are ascribed to possession by *Rakshas* (devils) and *Pisāchas* (goblins). Even in the scientific works on medicine, e.g. in the "Charaka-samhitā," assaults of evil spirits and possession by demons are enumerated among the causes of disease. In the *Atharva-veda* we find a special class of charms, the so-called "driving-out charms," which are considered as most effective remedies against possession.

But the most powerful enemy and destroyer of all devils is the *Fire*. "Slayer of fiends" is one of the most common epithets of *Agni*, the god of fire. Hence we find that *Fire* is invoked in charms against mania to free from madness him who has "been robbed of sense by the devils." Sacrifices to the god of fire, burning of fragrant substances, and fumigation are among the principal rites against possession by demons.

Besides the *Rakshas* and *Pisāchas* (devils and goblins) whose special province it is to cause all kinds of mischief, we find in ancient India also the world-wide belief in *incubi* and *succubi*, who pay nocturnal visits to mortal men and women. These are the *Apsaras* and *Gandharvas* of Hindu mythology, who correspond to the elves and nightmares of Teutonic belief. They are really godlings of nature. Rivers and trees are their natural abodes, which they only leave in order to allure mortals and injure them by unnatural intercourse. To drive these spirits away the fragrant plant *ajasringi* "goat's horn" (*Odina pinnata*) is used, and certain charms are pronounced. According to Teutonic belief also fragrant herbs (e.g. *Origani antirrhinum*, *Hypericum perforatum*, and especially thyme) are excellent means for frightening away devils and witches, as well as nymphs and elves.

That the spirits of trees and waters are occasionally identified with the spirits of disease, may to some extent account for the healing power ascribed to water and trees. In fact, the far-spread custom of transferring diseases to trees seems to have originated from a desire of infecting the *spirit* of a tree with a disease which may have been caused by the same or an allied spirit. Amulets as a protection against diseases, hostile sorcery, evil eye, and other calamities are frequently taken from trees. Thus, an amulet consisting of splinters from ten kinds of holy trees was considered by the ancient Hindus as a potent remedy against hereditary disease, and also against possession by demons. Nine kinds of wood are used for a similar purpose in German folk-medicine.

As these malevolent spirits are the sworn enemies of mankind, it is only natural that they should be most anxious to injure the new-born infant, and even the embryo. Numerous, therefore, are the charms and rites concerned with the protection of mother and child against the attacks of evil spirits. Hence the custom of keeping a fire or a light burning in the lying-in room—a custom found among tribes of the Malay Peninsula, prescribed in the sacred books of the Parsis, and still practised in Germany, as it was in ancient Rome. In ancient India, the rule was to keep a fire burning near the door of the lying-in room, in which mustard-seeds and rice-chaff were sacrificed every morning and evening for ten days. Visitors, too, were requested to throw mustard-seeds and rice-chaff into the fire before entering the room.

The chapter of children's diseases is as large in medical witchcraft as in modern medical science, and in the Hindu charms we find numerous names of demons to whom the various diseases of children are ascribed. One of these demons is called the "Dog-demon," and is said to represent epilepsy (though the barking dog would remind us rather of whooping-cough). When a boy was attacked by the dog-demon he was first covered with a net, and a gong was beaten, or a bell rung. Then the boy was brought into a gambling hall—not, however, by the door, but by an opening made in the roof; the hall was sprinkled with water, the dice cast, the boy laid on his back on the dice, and a mixture of curds and salt poured over him, while again a gong was beaten. To drive evil demons away by means of loud noises, such as the beating of a gong, was a device frequently resorted to in ancient Hindu rites, and bells and drums are still used in India as scarers of demons. Interesting is the practice of bringing the child into the hall through an opening in the roof—that is, *not by the door*. To enter a house by any other opening but the door seems to be a means of escaping the demons who are haunting the threshold. Thus, according to a German superstition, it is conducive to the health of a child to lift it out of the window when it is taken to church to be baptised.

Of course, the ancient Hindus knew that some maladies and derangements of the human body were not caused by any mysterious power; they knew that wounds were inflicted by weapons—they knew something about the effects of poison, and had an idea that certain diseases were caused by animals, such as *worms*. But in ancient India, as well as in German folk-medicine, the term "worms" includes all kinds of reptiles, and snakes and worms are not kept very distinct. Moreover, all kinds of diseases were ascribed to worms. And both worms and snakes are actually considered as a kind of demoniacal beings. The imprecations against worms are, therefore, not much different from the charms against the demons. Thus we read in a charm against worms in children: "Slay the worms in this boy, O Indra, lord of treasures! Slain are all the evil powers by my fierce imprecation. Him that moves about in the eyes, that moves about in the nose, that gets to the middle of the teeth, that worm do we crush." This fierce imprecation is accompanied by a rite symbolical of the destruction of worms in the patient. An oblation of black lentils, mixed with roasted worms and with ghee, is offered in the fire. Then the sick child is placed on its mother's lap, and, with the bottom of a pestle heated in the fire and greased with butter, the palate of the child is warmed by thrice pressing upon it. Then a mixture of the leaves of a horse-radish tree, and butter is applied, and twenty-one (*three times seven*) dried roots of *Andropogon muricatus* are given to the child upon whom water is poured.

The words of the charm leave no doubt that not only intestinal diseases, but also pains of the head, the eyes, &c., are ascribed to worms. Thus, German folk-medicine knows of a "finger-worm" as the causer of whitlow (*Fanaricium*), and even spasm in the stomach is ascribed to a worm, the so-called "heart-worm" (*Herzwurm*). As the Hindu charm mentions a worm "that gets to the middle of the teeth," so worms are believed to be the cause of toothache almost in every part of the world. "If a worm eat the teeth," says one of the prescriptions in an English "Leech Book," "take holly rind over a year old and root of carline-thistle, boil in hot water, hold in the mouth as hot as thou hottest may." In Madagascar the sufferer from toothache is said to be "poorly through the worm."¹ In a French charm against toothache it is said: "Si c'est une goutte de sang, elle tombera, si c'est un ver, il mourra." In Germany a sufferer from toothache will go to a pear-tree, walk three times round it, and say: "Pear-tree, I complain to thee, three worms sting me, the one is grey, the other is blue, the third is red—I wish they were all three dead." A young Hindu friend of mine (now a student at Oxford) tells me how he remembers the witch coming to his father's house (in Calcutta) to cure persons suffering from toothache, and how after some hocus-pocus she would point to some cotton threads she held in her hand, saying: "Look, here are the worms which I have taken out from your teeth."

In the Buddhist scriptures we read of an extremely clever physician, Jivaka, who performed many marvellous cures. Once upon a time, we are told, there lived in the capital of Magadha a rich merchant who had been suffering for seven years from a disease in the head. Many renowned physicians

came to see him, received much money, and went away without effecting a cure. At last the physicians agreed that the merchant must die; some said on the fifth day, others on the seventh day. Now Jivaka, the physician in ordinary to the King of Magadha, was sent for, and he promised to cure the merchant if he would give him a good fee. "All that I possess shall be yours, doctor, and I will be your slave," said the merchant. "Well, my good householder, will you be able to lie down on one side for seven months?" asked the doctor. The merchant said he would. Would he be able to lie down on the other side for seven months, and on his back for another seven months? The patient thought he would be able to do so. Upon this the doctor ordered him to lie down, tied him fast to his bed, cut through the skin of the head, drew apart the flesh on each side of the incision, pulled *two worms* out of the wound, and, showing them to the people, said: "See, sirs, these two worms, a small one and a big one. The doctors who said that the patient would die on the fifth day had seen the big worm, those who said he would die on the seventh day had seen the small worm." Then he stitched up the skin of the head, and anointed it with salve. But after seven days the merchant said he could not lie down any longer on one side. Jivaka ordered him to lie down on the other side for seven months. Again, after seven days, the patient said he could not bear it any longer. The doctor ordered him to lie down on his back for seven months, but he could bear this for seven days only. Then the doctor told him that he was quite well now, and that he knew beforehand the patient would be well in *three times seven*¹ days, but if he had told him so at the outset he would never have lain down even for so short a time.

This Jivaka was a respectable man, an esteemed friend of Buddha himself, and a pious Buddhist. That the science of medicine had reached a comparatively high stage of development at the period when the Buddhist scriptures were compiled (say about 350 B.C.) is proved by the chapter on medicaments found in the "Vinayapitaka,"² and by the various stories told of Jivaka. Yet there are traces even in these stories showing that physicians were considered as a class of uncanny creatures. "The physicians are cunning people," says King Pajjota, one of Jivaka's patients. In the ancient Hindu, *i.e.* Brāhmanic, law-books, a very low social position is assigned to the physicians. They rank with temple-priests (who are in attendance to some popular idol), sellers of meat, hunters, usurers, women of bad character, outcasts, thieves, and eunuchs. They are not admitted to funeral meals and sacrifices, they receive no hospitality from members of the highest castes, and no orthodox Brāhman is allowed to accept food from a physician.

This degraded position of the medical profession in ancient India is, no doubt, due to the fact that in India, as in other countries, the physician is the direct descendant of the wizard and sorcerer. And although I do not believe that Sir Alfred Lyall³ has succeeded in proving witchcraft to be "the aboriginal and inveterate antagonist of religion or theology"—the witchcraft practices of the ancient Hindus, and of all primitive people, rather prove an intimate connection between witchcraft and popular religious belief—yet I think he would be right if he had said only "theology" instead of "religion or theology." Witchcraft is always opposed to theology, and there is a natural rivalry between the wizard and the priest. And, as in India, the Brāhmins, the professional theologians, became the most dominant class, their antagonists—the wizard and his descendant, the physician—were naturally degraded and excluded from the higher ranks of society.

This antagonism between witchcraft and theology is the same as that between science and theology in more recent times. For the witch who depends not merely on supernatural agencies, but on actual observation of natural phenomena and on some sort of reasoning (which may not be *logical*, but can always be justified on *psychological* grounds) is, after all, the humble precursor of the man of science. To quote again Sir Alfred Lyall, "he is just touching, though he may only touch and let go, a line of thought which points, albeit vaguely and most crookedly, towards something like mental independence." It is this historical connection between witchcraft and science that gives an intrinsic scientific interest to the study of folk-medicine.

M. WINTERNITZ.

¹ Compare the importance of this number in the witchcraft practices mentioned above.

² See "Sacred Books of the East," vol. xvii. p. 41 *seq.*

³ "Asiatic Studies," 1884, p. 76.

¹ See W. G. Black, "Folk-Medicine," p. 32 *seq.*