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THE ASSOCIATION OF GERMAN SCIENTIFIC MEN AND PHYSICIANS

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New evidence that there is another world of almost infinite minuteness, beyond the electron which only recently replaced the atom as the smallest thing in the universe, was brought forward by Professor Felix Ehrenhaft, of the University of Vienna, speaking before the Düsseldorf meeting of the Association of German Natural Scientists and Physicians. His data were obtained by means of a new and highly powerful apparatus for ultra-microscopic examination devised by himself, which makes possible the observation of particles far below the limits of ordinary microscopic visibility, floating freely in a gaseous atmosphere in a magnetic field.

He observed in this magnetized sub-microscopic field the behavior of globular bits of gaseous selenium with diameters of only one two-hundred-fifty-thousandth of an inch. Their rate of drift, under the influence of the magnet, indicated that the electric charges they carried were less than the equivalent of one electron. This would indicate, according to Professor Ehrenhaft, that the electron is subdivisible and therefore that something smaller than the electron exists.

Harnessing yeast-power to convert alcohol into fats for motor fuel and other industrial uses is the possibility held out by Dr. Paul Lindner, of Berlin. He suspended cultures of certain species of fat-forming yeasts in an atmosphere of dilute alcohol, and found that the organisms accumulated as much as forty per cent. of their weight in fat. Dr. Lindner is of the opinion that in the future it will be possible to get great quantities of material of high energy-content by cultivating such yeasts in an atmosphere made alcoholic by the fermentation of waste vegetable matter.

The Germans are apparently going in for railway efficiency through saving of weights. Herr Peterson, an engineer of Frankfort, reported to the association on two new trains for a Berlin local railway, the construction being entirely of aluminum alloyed with lithium. Aluminum is the lightest of present industrial metals, and lithium, though it adds strength to the alloy, weighs only one fifth as much per given bulk.

Bringing the dead to life, or at least restoring life to persons apparently dead of paralysis of the lungs and heart stoppage, is the miracle of modern surgery described before the meeting by Professor O. Bruns, of the University of Königsberg. This is a disease combination that has up to the present been regarded as hopeless.

Professor Bruns opens the chest of an apparently lifeless patient and massages the motionless heart, at the same time administering oxygen by artificial respiration. He has found that the blood will absorb as much as 86 per cent. of oxygen, and he credits the success of his operations more to its use than to the surgical massage. The oxygen, he says, stimulates the heart to renewed action by irritation of the cardiac muscles.

A second discovery which is regarded as of great future importance in medicine and surgery is the hormone, or ductless gland secretion, responsible for the action of the heart. This was found by Professor Ludwig Haberlandt, of the University of Innsbruck, Austria. The substance was obtained in an extract made from the hearts of frogs. It is soluble in alcohol but not in ether, and will pass through animal membranes when in solution. It is not destroyed by heating at ordinary laboratory temperatures. It powerfully accelerates the pulse and at the same time decreases the blood pressure. So potent is the substance that it will cause even a totally dead heart to contract. Physicians here believe that it will soon come into use as a new cardiac tonic.

A chemical study of the poisons of spiders and their zoological relatives, the scorpions, was reported on by Professor Ferdinand Flury, of Würzburg. These toxins, he said, are not proteins, or nitrogenous substances related to the white of eggs, as has hitherto been supposed, but belong to the class known as "sapotoxins" and are united to proteins by loose chemical bonds.

The poison of the hemp plant, important both in legitimate medicine and in drug addictions under the name of hasheesh or bhang, has been studied and standardized by Professor W. Wiechowski, of the German University of Prague. Professor Wiechowski has discovered that the poisonous principle can be entirely extracted with petrol ether. One tenth of a cubic centimeter of this extract, or about two drops, will kill a laboratory mouse. It is stated that it will now be possible to control the strength of medical preparations using hemp, which have hitherto been of uneven potency and hence sometimes unsafe to use.

Malaria, the most obstinate of the tropical diseases in its resistance to the advance of modern medicine, is to have its hold broken at last, by a synthetic drug resembling quinine but much more powerful, produced in the laboratories of the Elberfelder Farbenfabriken. The discovery created a sensation when it was announced, and it was declared that it has a significance comparable to that of Bayer 205, the remedy for African sleeping sickness, which converts vast areas hitherto plague-stricken into potential homes for men.

Quinine, for centuries the only known specific for malaria and still the standard remedy, does not wholly

conquer the disease, especially some tropical forms of it. It is quickly fatal to certain of the malarial parasites, but other strains of the microbes resist it. The new remedy, which has been christened "Plasmochin," wipes them all out impartially. It is thus regarded as a complete cure, in contrast to the merely partial effectiveness of the extract of natural cinchona bark. Physicians say that there is now hope of killing off malaria germs until they are as extinct as the dinosaur and the dodo, simply by clearing up the blood of all malaria patients until there are no more of the dreaded microbes for the Anopheles mosquito to carry. Exactly the same sort of thing has been done with yellow fever, they point out, and that without a specific curative drug with which the physician might help the sanitarian. With plasmochin the conquest of malaria should be easier than that of "yellow jack," in spite of the wider incidence of the former malady.

The new remedy is said to be easier to take than quinine because it has no bitter taste. Heavy doses are sometimes followed by cyanosis or blueness of the skin, but this is of brief duration. Upsetting of the stomach rarely occurs, and the patient's blood cells are not attacked.

The discovery of plasmochin was not a matter of lucky chance, but the result of a deliberately planned campaign of chemical and biological research. Not one preparation, but several, in a series of increasing potency, were sought. The first malaria cure worked out was one for a mild form of the disease that afflicts birds and sometimes makes life miserable for pet canaries. Then a second compound was elaborated which would cure the type of malaria with which physicians sometimes inoculate men to cure them of progressive paralysis. Finally the attack was made on severe cases of malaria, naturally acquired.

The exact chemical structure of plasmochin was not revealed. It was frankly stated in the meeting that the discoverers feared that their work might be pirated and exploited by outsiders.

LIFE brought forth from death: children born alive though their mothers were already dead. Tales of triumphs amid tragedy, won by modern surgical methods, were reported. Dr. Hugo Hellendahl, a Düsseldorf specialist, has assisted at or examined the records of eighteen authentic cases of post mortem births. These pitiable little waifs, orphans before they ever saw the light, were brought into the world at times varying from one half hour to twenty-four hours after the deaths of their mothers. Apparently such births are possible if the physiological processes preliminary to normal birth are started before the death of the mother occurs. After this the muscular contractions of the uterus and associated organs continue automatically, and the infant has a chance of being delivered alive.

Dr. Hellendahl has made experimental studies on the subject on laboratory animals, and has demonstrated that post mortem births can be accomplished with these under controlled conditions.

A specific hormone, or ductless gland secretion, responsible for the specific physiology of female animals, was described by Professor Edward Laqueur, of the University of Amsterdam. This substance, which Professor Laqueur calls "menformon," is so powerful that a dose of one tenth of a milligram, or about three one millionths of an ounce, will cause typical mating reactions in spayed female laboratory animals.

The substance seems to be a veritable elixir of youth to the experimental animal. The sexual organs of females, even of those far advanced in age, are increased in size, and the general physiological processes of the animal are speeded up, by continued treatment. When the substance is administered to male animals, however, it seems to have a reversing effect. The physiological processes are not affected, but the size of the sexual organs decreases. The effects continue for months after the injections have been stopped.

The nature of ergotin, a poisonous drug responsible for abortion in cattle and sometimes used in human medicine, has come in for investigation by Professor Hedwig Langeker, of the University of Prague. Professor Langeker has discovered that in addition to the alkaloid which affects the sexual processes ergotin also contains substances that decrease the sensitiveness of the sympathetic nervous system. The drug may therefore be of use in cases of over-excitement of this tract. Similar effects may also be obtained by the use of three other drugs, yohimbin, hydrastis and quinine.

EVOLUTION is a one-way process, never back-tracking from the complex to the simpler; sex plays a very important speeding-up rôle in its progress; simpler organisms are more likely to develop new species than are complex higher forms. These were among the doctrines laid before the meeting of the association by Professor Carl Mez, of the Botanical Institute of the University of Königsberg.

Professor Mez designates his first evolutionary principle as the law of irreversibility. An organism, once changed, does not return to its earlier state of simplicity. Horses, which have learned to run on one toe, will never again descend to the use of all five, like the little Eohippus. Monkeys, specialized for life in trees, are unlikely to become ground dwellers. Coupled with this law, as a sort of corollary, is the principle of "reduction of variability." According to this idea, the more highly developed an organism becomes the less is its potentiality for further development. A lowly creature like a sponge or an earthworm is more likely to give rise to new forms than a much specialized animal such as a frog or a dinosaur.

Animals and plants, originally without sex, greatly increased the speed of their evolution by the development of a method of reproduction requiring two parents instead of only one. Organisms that give rise to offspring simply by dividing into parts naturally form new individuals exactly like themselves; or at best new forms develop very slowly. But where two individuals cooperate there enters the opportunity to mix the characters or qualities of both parents to form entirely new combinations. This increases the rate of evolution enormously, changes occurring in a single generation that might require hundreds of years to

produce by the slow variation of lines from single-parental reproduction.

This idea is regarded as a possible answer to the riddle of "why sex?" It used to be asserted by naturalists that sexual reproduction maintained the vigor of offspring, but it has long been demonstrated that this is not necessarily the case. Plants and animals that can reproduce by either method have been compelled by experimenters to follow the asexual course, sometimes for hundreds of generations, and there has been no sign of "running out" in their descendants. This left the question of sex begging for a biological answer, which the idea of evolutionary speeding up by means of hybridization may supply.

A fourth evolutionary principle discussed by Professor Mez was that of "multipotentiality." This means that lower forms are not only more likely to change than are higher ones, but that their evolution is also less limited in the number of directions it may assume. An evolving slug, for example, can branch out more than an evolving eagle, as they build their respective family trees.

A final observation of Professor Mez is that while the number of bodily organs increases as one ascends the evolutionary ladder they also become smaller relative to the size of the entire organism. Thus, a man has a pancreas and a thyroid gland and definitely developed eyes, and a lot of other organs which an oyster, for example, does not have; but the liver, which is an organ held in common by both oysters and men, makes up a much larger proportion of the body of an oyster than it does of the body of a man.

Professor Mez also explained to his German colleagues his method of determining the relationships of plants by a serum diagnosis similar to that used in modern detective work, which he had presented in America a few weeks before, at the International Congress of Plant Sciences at Ithaca, N. Y.

ITEMS

ACCORDING to Professor W. C. MacKenzie, director of the National Museum of Australian Zoology, students of medical science can learn much of the structure and function of human embryology from such zoological curiosities as the platypus and the kangaroo. It is fairly generally conceded that the study of abnormal and diseased tissue, such as cancer, is most advantageously carried out by comparison with normal tissue. Really normal tissue, Professor MacKenzie asserts, can best be furnished by the primitive mammals of Australia and Tasmania that have lived for millions of years in a natural environment, unaffected by the artificial conditions and diseases of domestication. The platypus, or duckbill, is particularly mentioned by Professor MacKenzie as offering a remarkable standard for human comparison on account of its peculiarly highly developed ductless glands, three of which up to the present have not yet been demonstrated in man. A research reservation of about eighty acres near Canberra, known as the Continental Arboretum, has already been set aside by the government where live specimens of Australian animals will be kept in their natural state. When the buildings under contemplation are completed every facility will be offered not only to native research workers, but to those from abroad who may wish to study at Canberra comparative anatomy and its application to modern medical and surgical practice.

WIPING machines are the latest wrinkle to be added to the mechanism of fruit packing. The Apple Growers' Union of Washington is one of the first to install this apparatus which is designed to remove spray residue from apples packed during the season of 1926. The fruit will pass over horizontal revolving rollers and is slapped clean by 500 pieces of canvas. The machine is electrically driven and provided with a fan to remove dirt and dust. This invention is doubtless designed to counteract the impression that seems in some regions to have gained considerable ground that poisoning has resulted from the arsenic residue left on apples during spraying.

MERCURY, which in one form or another is a specific for various human ills, is the very last word in fungicides for nursery stock. Treatment with organic compounds of mercury during the operation of grafting apple nursery trees has been found by Department of Agriculture experts to reduce very materially subsequent infection of the stock with crown gall. Formaldehyde has been used in the past for this purpose but the more recently developed mercury compounds have proved much more efficacious in checking the spread of the fungus growth.

KAOLIN, a constituent of porcelain and toilet powder, is a beneficial remedy for Asiatic cholera. This feldspar clay, named for the Kao-Ling hills of China, has been used for centuries in that country not only in the manufacture of porcelain but by physicians for fevers and intestinal disorders. Toward the end of the nineteenth century Julius Stumpf, of Wurzburg, employed it externally for septic wounds and ulcers and internally for cholera. But its modern medical applications with this exception appear to have been confined, according to editorial comment in the *Journal* of the American Medical Association, to use as a filtering material, a base for poultices, and dusting powder for wounds. Recent research puts these early uses, however, on sound scientific basis. It has been found that though it is not an antiseptic agent, in fluid media if kept in motion it will carry down large numbers of bacteria. Thirty to sixty grams daily, it was ascertained, will change materially the reaction of the intestinal contents. Medical workers in this field are now using kaolin very successfully not only for Asiatic cholera but bacillary dysentery and other acute intestinal disturbances as well.

PRESSED flowers in botanical collections are too delicate to stand the wear and tear of classroom and museum use, so F. M. Woodruff, curator of the Chicago Academy of Sciences, has invented a process to make them last longer. The whole card on which the flower is mounted is passed through a solution of transparent liquid celluloid, allowed to dry and the whole operation repeated three times to assure a permanent coating.