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PROTACTINIUM YIELDS TO ATOM SPLITTING

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RARE protactinium has now joined heavy uranium and thorium on the list of elements that undergo splitting into two parts under the bombardment with neutrons.

The cyclotron at Columbia University made possible the new discovery, according to an announcement in the *Physical Review* by Professor John R. Dunning and Dr. E. T. Booth, of Columbia University, and Dr. A. von Grosse, of the University of Chicago.

Protactinium has atomic number 91, midway between uranium No. 92 and thorium No. 90. Its atomic weight is 231. Dr. von Grosse was among the first to isolate protactinium and made available the small specimen that served as the target for the neutrons shot out by the cyclotron.

Chemical separation of the "splitter" products of protactinium's fission show that rubidium and caesium are created. At the same time enormous amounts of atomic energy are released of the order of 200,000,000 electron volts and about the same order of magnitude as the energy released in the fission of uranium and thorium.

The splitting of protactinium can only be accomplished with "fast" neutrons. In this the new discovery is similar to the findings already known for thorium's fission. In contrast uranium can be split by very weak "slow" neutrons.

One hope that lies, little mentioned, in scientific reports on atom splitting and the releasing of atomic energy is that by this process atomic power might somehow be made available in a useful form. It does not appear that protactinium can serve as a "fuel"—even potentially—for such use. Releasing atomic power is possible on an economical hypothetical basis only if each splitting can somehow set off a similar fission in near-by atoms and the whole matter perpetuated by a "chain reaction." For uranium, where weakly energetic neutrons appear to have the power to do this splitting, the idea of "power" from atoms is not beyond the realm of possibility. With protactinium, however, the need for fast neutrons to do the splitting probably means that a chain reaction would not be set up and that power (in any real economical sense) would not be forthcoming.

PAPERS READ BEFORE THE INTERNATIONAL CONGRESS OF GENETICS

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GENES, the bearers of life, and viruses, that bring disease and death, may be very much alike. This suggestion was laid before the meeting of the seventh International Congress of Genetics at Edinburgh on August 28 by Professor John W. Gowen, of the Iowa State College. Professor Gowen also told of his use of x-rays as measuring tools, to get an estimate of the size of both these types of vitally important particles, which are too small to see with even the most powerful of microscopes. He found the virus particles to be super-sized molecules, with a molecular weight of approximately 16 million. This is in fairly close agreement with measurements obtained by other means. Regarding the possible essential similarity between genes and virus particles, the American scientist said: "Possibly the only difference between these small viruses and the gene is that the latter is attributed a place in the cell chromatin whereas the former is free to move, making its isolation in relatively pure form possible. But even this difference is likely to break down. With better techniques of recognizing gene effects, these substances may very possibly be found within the cell cytoplasm or even in the circulation of the animal or plant."

DEFINITE hereditary physiological traits go along with visible bodily character in different breeds of fowl, according to Professor F. B. Hutt, of Cornell University. Thus, White Leghorn hens lay thicker-shelled eggs than do heavier breeds like Plymouth Rocks or Rhode Island Reds, and they adjust more readily to changes in outside temperature. Inheritance of abnormalities in fowls, producing the seldom-seen "freak" breeds, such as Creeper and Dark Cornish, were reported by Professor Walter Landauer, of the Connecticut Agricultural Experiment Station. In these breeds there is a hereditary shortening of the leg and wing bones, producing a kind of Dachshund-in-feathers effect. In the purest-bred (homozygous) specimens this shortening extends to other bones, and the phenomenon may be so pronounced that the chick is unable to hatch at all, but dies within the shell.

SOME of the strangest cells ever seen through a microscope were described by Dr. Charles A. Berger, S.J., of Woodstock College. If twice or four times the normal number of the heredity-bearing chromosomes are found in the cells of an animal or plant, that is considered something worth mentioning at a scientific meeting. But Dr. Berger has found cells in the lining of the digestive tract of mosquito larvae that have 48, 96 and once in a while even 192 times the normal chromosome number. Ordinarily a doubling in chromosome number within a cell is the preface to division into two cells. But these strange cells in the mosquito "wigglers" just pile up their chromosome counts without dividing. Finally, when the larva is preparing to change into a winged adult, the divisions appear all at once, and the chromosome numbers go back to normal in the new cells.

IT is hard to think of an insect no bigger than a gnat being afflicted with tumors. Yet such is the case. Professor Mary B. Stark, of the New York Medical College, told of such growths which she has studied in the larval stage of Drosophila, the gnat-sized fly that is the favorite animal of geneticists. In certain strains of Drosophila these tumors appear generation after generation, in the digestive tract. They are sex-linked, appearing only in males—and they kill half of these. In another strain, the tumors appear in both sexes, but are not lethal.

FAILURE to grow a full set of teeth is a hereditary trait,

that "runs in families," and it is linked to hair color, according to Dr. Barbara S. Burks, of the Carnegie Institution of Washington. Tooth deficiency may manifest itself in any of the teeth: incisors, pre-molars, molars. Perhaps the commonest form is the failure to develop third molars or wisdom teeth. This is due to the same genetic factor that causes failure to grow teeth farther forward in the jaw. Sometimes, instead of a total absence of a tooth, the deficiency will be expressed by the growth of a very small, almost rudimentary tooth—a "peg" or "rice" tooth. Study of all available family histories, supplemented by examination of all brother-and-sister combinations exhibiting the deficiency that could be found, indicates that tooth deficiency and hair color are linked. That is, members of a family strain exhibiting tooth deficiency tend to have the same color of hair.

SUDDEN shocks of heat or cold speed the production of the abrupt evolutionary changes known as mutations, was reported by Dr. H. H. Plough, of Amherst College. With his colleagues, Drs. George P. Child and Philip T. Ives, Dr. Plough subjected the small insects, Drosophila, to quick jumps and drops in temperature. Mutations appeared at considerably higher rates than they did in control groups of the insects kept at ordinary temperature levels.

ITEMS

SUN-SPOT groups so large they can be seen with the unaided eye behind smoked glasses are now visible according to photographs taken by the U. S. Naval Observatory. Eighty spots are seen in all, arranged in seven groups. The total area of the spots covers 41.5 square degrees on the sun's surface. Since a square degree on the sun amounts to 725,000,000 square miles, the total sun-spot area now visible is about 30,000,000,000 square miles. Over 600 "earths" could be dropped into the sun-spot area that may now be seen.

PERSIMMON wilt, the new and deadly enemy of persimmon trees, has crossed the Mississippi. It has been found as far west as Oklahoma, by Drs. K. Starr Chester and W. W. Ray, of Oklahoma Agricultural and Mechanical College. Persimmon trees have a threefold importance: their wood is ideal for golf club heads and similar small objects, their fruit is one of the most important wildlife foods, and their tough, ropelike roots made them favorites with soil conservation workers as plantings to check erosion. The disease is caused by a fungus known as Cephalosporium. Its course is terribly rapid; trees usually die within a few weeks after they are attacked. There is no known cure or preventive. It is quite possible that all the persimmons of America may join the chestnut trees, wiped out by the chestnut blight several decades ago.

AMERICA'S medical schools are in better shape now than ever before to educate medical practitioners, with the aid of intern training hospitals, according to a report of the council on medical education and hospitals of the American Medical Association. In the past five years, millions of dollars have been spent to improve organization, equipment and resources of medical schools. Among the 67 approved medical schools, 24 of the lower ranking schools have added more than a million dollars to their annual budgets, an average of $47,000 each. In 20 schools the cost of improved facilities for clinical teaching has aggregated $10,000,000. There are 734 hospitals approved for internships and 518 hospitals offering approved residencies and fellowships in specialties.

NORWAY gets undeserved blame when it is named as the original home of the Norway rat, the biggest and most aggressive of man's undesired house guests. Researches of Dr. Ernst Schwarz, of the Smithsonian Institution, indicate that it was first heard from in southeastern China, but even that may not have been its point of origin. The black rat, which the bigger Norway rat bullies and persecutes, originated in a species of wild rat in the Malay region. It "adopted" man in the New Stone Age, as a house pest in India. It followed its unwilling hosts to the shores of the Mediterranean and spread thence over Europe, and to all lands where European ships have gone. Other rats being traced by Dr. Schwarz include the lesser Malay rat and the East African Negro rat, which have more restricted distribution, mainly in the tropics. Another uninvited housemate of man is the Indian musk shrew. Although this animal looks something like a mouse it belongs to an entirely different and even more primitive class of animals, the insectivores.

NEW help in tracing the family tree of the American Indian in Asia was announced by Dr. Franz Weidenreich, of the Peiping Union Medical College. His study of the bones of a family of seven, who lived in a cave at Choukoutien, near Peking, in the latter part of the Old Stone Age reveals that this family included oddly assorted types similar to types found not infrequently among America's Indians. One woman had a skull like a modern Melanesian's. Another woman's head was of modern Eskimo type. The old man of the family resembled a late Old Stone Age European, with a touch of Asiatic about him. Finding such varied types in one family in the Asiatic region from which the American Indian must have migrated, Dr. Weidenreich pointed out that "It seems no longer necessary to assume that there were immigrations differing widely according to the physical character of the immigrants and the regions they came from." In the family of seven, the woman with the Melanesian type of skull had an artificially deformed head, which leads Dr. Weidenreich to speculate that this custom may have originated in Asia. The late Old Stone Age, to which the cave family of seven belonged, lasted in Europe from about 100,000 to about 20,000 years ago.

NEW evidence that the climate in Texas was nearly the same ten million years ago as it is now can be found in fossil leaves described in a new publication on plants of Eocene geologic time, by Professor O. M. Ball, of the Agricultural and Mechanical College. The fossils described by Professor Ball were found in various locations in southern Texas, mostly in thin beds of clay. They had lain undisturbed for ages, since some long-gone autumn when they fell from the trees and bushes and were covered by the silt of a stream in flood, or settled into the muck at the bottom of a lake. Some of the best of them came from what is now a claypit for a brickyard.