SCIENCE NEWS

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THE SEARCH FOR CHEMICAL ELEMENTS HEAVIER THAN URANIUM

THE problem of creating super-heavy chemical elements by the bombardment of uranium with neutral atomic particles, the neutrons, apparently is now proved impossible by elaborate and careful experiments performed by the Italian physicist, Dr. Emilio Segrè, working at the radiation laboratory of the University of California. Describing his results in the current issue of *The Physical Review*, Dr. Segrè concludes that "transuranic elements have not yet been observed." Such elements more massive than uranium—heavyweight of all chemical elements—were suggested by the 1934 experiments of Professor Enrico Fermi, of Rome, who is now at Columbia University. Dr. Segrè was one of the group that worked with Professor Fermi in these earlier experiments.

By bombarding uranium with neutrons, Dr. Segrè found that the well-known radioactive isotope of uranium—having a half-life of 23 minutes—was produced. This isotope disintegrated with the emission of an electron, a so-called beta particle. A search for alpha particle emission was unsuccessful.

While he was not able to demonstrate its presence chemically, Dr. Segrè concludes that the beta emission means the isotope breaks down into element 93, which is extremely long-lived. This is in keeping with the present picture of radioactive disintegration, but furnishes only very indirect proof, and makes true Dr. Segrè's conclusion that transuranic elements have not yet been observed.

BLIND LANDING APPARATUS

ALL landings blind, if need be. Airlines, come fog or high water, virtually as regular as the railroad. That this dream will gradually become reality during the next three years is predicted by government radio experts as blind landing studies begin at Indianapolis.

Minimum ceiling requirements—now 300 feet at the best airports and higher elsewhere—will be lowered a hundred feet at a time as pilots become skilled in the use of landing instruments and as equipment is more widely installed. Paying passengers then will be making regular trips in safety in almost all kinds of weather. A development that has been promised for "next year" for many years now will actually be accomplished.

The engineers foresee early adoption of a standard and practically fool-proof instrument landing system by the airlines and the Civil Aeronautics Authority on the basis of three months of the intensive study to be started at Indianapolis. In Indianapolis to dedicate the authority's first field station, training in earnest of the hundreds of airline pilots in how to come down out of the sky on a radio highway will begin this summer.

Ten airports throughout the United States will soon be equipped with similar blind landing apparatus. The airports are to be chosen so as to encounter the widest possible variety of conditions and afford training facilities to the maximum number of pilots. The new Civil Aeronautics Authority unit at Indianapolis is the only one involving four sets of equipment to allow landings in whatever direction the wind requires. This system, worked out by the radio technical committee for aeronautics and the airlines, and built by the International Telephone Development Corporation, will be adopted as standard with but slight modifications.

Differing somewhat from previous systems, it gives the pilot both sight and sound indications of when he is near the airport and when he is passing over its edge. The glide path is formed by the intersection of two planes of radio waves. A vertical plane is generated by a localizer beam similar to the radio range in regular use. It tells the pilot whether he is to the right or left of his course. A second transmitter sends out its signals from a point 400 feet to the side of the end of the runway, in a plane slanting upwards. The pilot can slide down any part of this plane and reach the ground, but he slides down the particular path marked by the vertical plane of signals. He can come in all the way by radio or guide himself by the boundary lights once he reaches the field, for he is then but 60 to 80 feet up. The weather will have to be phenomenal to make lights invisible at that altitude.

—LEONARD H. ENGEL.

NEW USES FOR COTTON

COTTON experts, about ready to give up attempts to dissipate by purely economic means a growing cotton surplus, are in the market for new uses of cotton which will remove the downy white stuff from the textile field and which do not compete with already overabundant materials of other kinds, as the only immediate hope for permanent solution of one of America's most serious farm problems.

Hundreds of suggestions for its use have been made, but only two thus far give any hope of absorbing significant amounts of cotton without at the same time striking hard at some other material produced in the United States. The addition of five per cent. of cotton to cheap wood pulp paper and of 15 per cent. to superior grades of paper would at the same time improve the quality of the paper generally used here and cut down on American imports of wood pulp, as well as reduce to a slight extent cutting of America's forests.

A second possibility for consumption of cotton bales by the ten thousand is use of a cheap cotton fabric base for secondary roads. Most of the side roads in this country are still unsurfaced, though miles of concrete highway give a contrary impression. The cotton fabric serves as a cheap reinforcement for the crushed stone dressings and bituminous materials widely used.

Neither of these suggestions is, however, capable of application this year on the scale required to move a substantial portion of the surplus. The difficulties are due partly to the rise of other cotton-producing areas outside the United States and partly to the growth of synthetic

fibers. In 1926 world rayon production represented only 400,000 bales of cotton, but in 1937 the synthetic fiber, which is made usually from wood pulp, represented 4,000,000 bales of cotton—11 per cent. of the 1937 cotton crop throughout the world and 15 per cent. of the 1938 crop.

Rayon will continue its phenomenal growth as long as it is superior to cotton for many purposes. Among the leaders in the manufacture of artificial fibers, incidentally, are precisely those countries which were among the largest customers for American cotton: Japan, Germany and Italy. A new fiber—nylon, a synthetic substitute for silk—may be expected not only to hit silk, but cotton as well.

It would require an incredible amount of clothes to move the mountains of cotton that must be disposed of. About 683,000,000 shirts can be made from 1,000,000 bales of cotton—more than five shirts for every man, woman and child in the United States, according to an expert of the U. S. Department of Agriculture. And the government is currently keeping out of the market 11,391,000 bales—almost the amount of an entire year's crop. Finding methods of putting more cotton into textiles would, therefore, achieve little. Almost every pound of government cotton put into cloth would mean one pound less of currently grown cotton used.

A number of investigators are even suggesting now that the trend of decades of plant breeding—to produce more lint and less seed from a given cotton plant—be reversed and that efforts to produce more seed and less cotton be made instead. Not only would that serve to reduce the amount of cotton produced, but it would also increase the amount of a highly desirable commodity—cottonseed. The hundreds of products made from cottonseed and cottonseed oil have given the seed a larger market than growers have been able to fill.

But just as it required years for cotton to get into its present plight, it may take years before such long-range developments as new uses can take effect on a large scale.—LEONARD H. ENGEL.

SPRING FOREST FIRES

THE U. S. Forest Service states that forest fires thus far this spring have been more numerous than average, but less destructive. To date, there have been 3,871 fires in national forests, as against a five-year average of 3,497 for the five months January to May. However, the burn-over has been at the rate of only 331 acres per million of national forest lands, as compared with the five-year average for the same months of 468 acres per million.

In New England, which was made the most critical of the nation's potential forest fire areas when last fall's hurricane blew down most of its finest trees, large-scale purchase of salvaged timber and energetic organization of the hazard-abatement work have improved the situation considerably. Government purchases amounting to 345¼ million board feet of timber have already been completed. Of this quantity, 63 million board feet have been sawed into lumber. Additional 1,436 million board feet are under agreement to purchase. The agreements have been signed with nearly 10,000 timber owners.

An army of 12,000 men, including CCC and WPA workers, has been in the field all winter and spring, working on fire hazard abatement, and 21 new 50-man camps are now being added. Primary work, such as opening roads and rebuilding telephone lines, has been completed for some time, and efforts are now being concentrated on clean-up work, opening of fire lanes, etc. Thanks to a long and snowy winter and to fairly good rains during the spring, the situation is described as "not serious."

Over the country at large, the fire hazard situation is currently somewhat uneven. East of the Great Plains generally, the classification "low to medium hazard" prevails. In the West and Northwest, from Colorado and the Dakotas through the Great Basin to the Pacific coast, there is greater danger, and in the Southwest the hazard is described as "high."

ITEMS

THE next outburst of sunspots should occur early in 1944 and the next maximum of sunspots should come in the summer of 1948, it is forecast by Professor John Q. Stewart and Forrest C. Eggleston, Princeton University Observatory astronomers. Communicating their forecasts in a letter to the editor of *The Physical Review*, they note that since 1749 A.D. sixteen sunspot cycles have been completed. The seventeenth outburst is not yet complete. The next outburst, number 18, may be expected to commence roughly two thirds of a year after the sunspot number has fallen to one tenth its maximum value. This places the date early in 1944. The new forecast is made by fitting curves to the graphs made in plotting the number of sunspots monthly.

AN infantile paralysis outbreak this summer is very unlikely to occur, health authorities in Washington believe on the basis of reports to the U. S. Public Health Service for the season's critical week. For the week ending June 3, reports of new cases in 27 states already heard from are only 18. If an epidemic were in sight, signs of it would be expected in the most recent reports. Reports from Charleston, where there has been an outbreak, show a decrease. There were only three cases in the city and only seven brought into the city hospital from the surrounding county.

SMALLPOX, in spite of the outbreak in Onondaga County Penitentiary, N. Y., shows signs of a decrease. With 20 cases from New York counted in, the total from 27 states was only 96 for the week ending June 3.

THE new drug, sulfanilamide, has extended its sphere of usefulness to cover otitis media, that extremely painful disease of the middle ear that often is the forerunner of a mastoid operation. Eighty-eight patients with otitis media due to beta hemolytic streptococcus were given sulfanilamide in a recent series of cases and only seven required a mastoid operation, according to the report of Dr. Gilbert E. Fisher, of Baltimore, in the *Journal* of the American Medical Association. In a control group of 95 patients who were given the regular treatment of puncturing the membrane for drainage and irrigation, 66 required a mastoid operation. Moreover, the patients treated with sulfanilamide recovered in one third the time taken by the other group.