PHYSICS

Cosmic Ray Plateau Found

It is some 34 miles overhead. Instruments in a V-2 rocket were fired up to an altitude of 100 miles to determine the top of the atmosphere for cosmic rays.

➤ THE top of the earth's atmosphere for the cosmic rays that bombard us from outer space has been discovered by scientists who put their instruments into a captured Nazi V-2 rocket that was fired up to 100 miles over the White Sands, N. Mex., Proving Ground last July.

Some 34 miles over our heads, the intensity of the cosmic ray bombardment begins to become constant. This is the beginning of what scientists call the "cosmic ray plateau." From this high-altitude region out into space the cosmic radiation is believed to remain virtually constant.

Discovery of the start of the cosmic ray plateau was announced in the *Physical Review,* (Feb. 1), by Dr. J. A. Van Allen of the John Hopkins University Applied Physics Laboratory, Silver Spring, Md., and Dr. H. E. Tatel of the Carnegie Institution of Washington, formerly with the Applied Physics Laboratory.

They put a Geiger counter in the rocket fired at White Sands, July 29, last year. As the rocket shot up to an altitude of 100 miles, the scientists received a record of the cosmic ray count by means of a radio telemetering system. The rocket's flight gave them counts of cosmic rays at the highest altitudes at which the mysterious rays have been studied.

Two important discoveries were made from records of the flight:

1. Start of the cosmic ray plateau is at about 34 miles altitude. From this height up to the peak of 100 miles, the cosmic ray count was nearly constant.

2. The intensity of cosmic rays in the space out from the earth is two to three times greater than scientists had calculated on the basis of lower altitude observations.

Below 55 kilometers, or approximately 34 miles, the cosmic rays varied from one or two counts a second at sea level to a peak of 49 counts per second in the neighborhood of 12 miles above the earth. But for the highest 66 miles of the flight, the cosmic ray count was steadily a little more than 22 counts per second.

It is believed that this intensity of cosmic rays extends out into space until the still-unknown source of the radiation is approached.

Dr. Van Allen has left for White Sands to make arrangements for another rocket flight scheduled Feb. 19. This flight, if successful, will give the scientists more information about these new discoveries.

Science News Letter, February 14, 1948

GEOLOGY

Find Mineral Deposits

➤ AMERICA'S minerals, of the kinds we have, will last longer than some predict, due to new discoveries by government and other agencies, the Secretary of the Interior, J. A. Krug, indicates in his annual report. There are, of course, essential minerals not found within the United States.

Old-time prospecting for minerals is out. Surface deposits, most of them, have been found and many exhausted. Below the surface, according to Dr. W. E. Wrather, director of the Geological Survey, lie enormous volumes of rock which contain concentrations of useful minerals which in many instances are as abundant as those closer to the surface.

Modern scientific explorations, carried out by geologists, geophysicists and geochemists must be used to discover this hidden wealth. The Survey, he states, has developed highly refined techniques in its program of exploration and appraisal of deeply buried ores. They are already in use.

Additions to the nation's mineral reserves are reported by the U. S. Bureau of Mines. They include copper, iron, and lead-zinc ores, not in large amounts but sufficient to produce commercial metals. One deposit contains 21,000,000 tons of black sand composed of 54% titanium, 15% zircon, 14% staurolite, and other minerals. This is important with titanium oxide now becoming a principal pigment in white paints and the wider uses of zirconium in electrical and chemical porcelain and in metals and alloys. A new mica deposit and a barium sulfate deposit are also reported.

Important activities of the Bureau of Mines are concerned with the development of processes to recover metals from low-grade ores which must be increasingly used as the better grades are exhausted, or to make America independent of imports. The developed processes accomplish purification largely by electricity. They include electrolytic cobalt and the extended use of electrolytic manganese and chromium in ferroalloys.

Fuel oil from oil shale was a major accomplishment of the Bureau of Mines during the year. A pilot plant at Rifle, Colo., is now producing 100 barrels a day, and new laboratory facilities have been completed at Laramie, Wyo. From work at both, oil shale promises relief from future shortages such as now exist. Progress also is reported in making fuel oils from coal and lignite.

Science News Letter, February 14, 1948

MEDICINE

Suggest Figuring Age After 40 Biologically

➤ A NEW way to tell how old a person is after he has passed his fortieth birthday has been worked out by Dr. Harry Benjamin of New York City. Instead of counting birthdays, you count up the age of various organs and organ systems of the body, taking into account also heredity, living and dietary habits and personal history of illnesses, accidents and the like.

By this method of determining age, a man of 70 years may be found to have a biologic age, as Dr. Benjamin calls it, of 55 years. Then, since he has the life expectancy of a man of 55, which for a white American is 18 years, the 70-year-older has a good chance of living to "the ripe old age of 88." This gives him a life expectancy of nine years more than he would have from figuring his life expectancy on his calendar age of 70.

A nice part about this way of figuring age is that it gives a person a chance to make himself younger. The example Dr. Benjamin gives of this is someone who is not dangerously ill or disabled, yet not well enough to be considered in average good health. The favorable points in such a person's health might make him 10 years younger than the calendar says he is. But the bad points would make him about 15 years older. The two cannot be balanced off against each other, but the bad points might be improved,

and the age thereby lowered, by treatment and other measures.

To get your biologic age you will have to pay a visit to your doctor. After he has examined you, he can estimate the age of your heart and blood vessels, your nervous system, your mental functions, your digestive system, skin, eyes, ears and other of the 20 items in Dr. Benjamin's health inventory. Your heart and blood vessel system could change your calendar age by five to 30 years. Heredity, living habits and nervous system could modify it by five to 20 years. Skin, eyes and ears would modify it by only five to 10 years. Details on estimating biologic age appeared in the *Journal of Gerontology.*

Science News Letter, February 14, 1948

MEDICINE

Check Resistance in Germs

Penicillin sensitivity is restored to resistant disease germs by briefly associating them with germs of another family such as streptococci.

➤ THE frightening idea that penicillin will become useless as a remedy in a few years because the disease germs it now checks will all have developed resistance to its action is somewhat dispelled by a discovery of Dr. A. Voureka, British Council Research Scholar working in the Wright-Fleming Institute at St. Mary's Hospital, London, where penicillin was discovered.

Germs that have developed resistance to the famous mold remedy can be made sensitive to it again in a few minutes. All that is necessary is for the resistant germs to associate briefly with germs of another family. Resistant staphylococcus germs, for example, were made sensitive by associating with streptococci or with diptheria, typhoid and pneumonia germs.

Dr. Voureka started with the idea that sensitivity to penicillin might depend on some chemical or physical factor. In that case, resistant germs, he reasoned, might be able to borrow some of the factor from sensitive germs. So he grew resistant and sensitive germs together. The resistant ones duly became sensitive.

Then he found he could achieve the same result by letting the two kinds of germs stay together for five minutes. Mere association in the same tube was enough. It did not matter about temperature, either. Resistant germs acquired sensitivity in the refrigerator, the incubator or at room temperature. They even acquired it from germs which themselves were resistant to penicillin, and from substances produced when other germs were destroyed by bacteriophage.

The penicillin-sensitivity restored to germs that had grown resistant lasts a long time.

The work is still preliminary and so far only seven out of 20 strains of germs tested have had their penicillin resistance reversed. Dr. Voureka does not say, in his report to the *Lancet,* (Jan. 10), British medical journal, how his discovery will be applied in the case of a patient for whom penicillin has become useless because his germs have developed resistance to the mold chemical. But, he points out, germs often grow in association with other germs in the human body. And he believes that the idea that all strains of staphylococci will become resistant to penicillin in the near future "must be reconsidered."

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PLANT PATHOLOGY

One Moldy Lemon Ripens 500 Others Too Soon

➤ THE old adage about one rotten apple spoiling the whole barrel holds true, in modified form, for lemons. One thoroughly green-moldy lemon can cause 500 others to ripen before they are wanted—which is equivalent to spoiling them.

Lemons are commonly kept in storage for five or six months before ripening, states Dr. Jacob B. Biale, University of California horticulturist, but if one of them becomes infested with green-mold fungus it will produce enough ethylene gas to speed the ripening and yellowing of the sound fruit to as short a period as ten days.

To prevent molding, Dr. Biale recommends storage at lower temperatures, also under an atmosphere containing only 5% of oxygen instead of the 21% present in ordinary air.

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GIANT TUBER—This root of a perennial wild cucumber dug up on the campus of Occidental College, Los Angeles, Calif., is 27 inches tall, 36 inches in diameter, 74 inches in circumference and weighs about 200 pounds. Dr. Frank J. Smiley, botany professor at the college, estimates that it is at least 20 years old. Not only is it unusual in size but shape also, for the usual wild cucumber root looks like a turnip.