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Edited by Watson Davis

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### EXPLOSION DESTROYED FIFTH OF GERMANY'S NITRATE PRODUCTION

(By Science Service)

Washington, September 26. -- One-fifth of Germany's nitrate production was wiped out in the explosion that wrecked the Oppau Works of the Badische Anilin and Soda Fabrik on the Rhine in Germany, Wednesday morning.

This plant, which was the German mainstay for nitrate production during the war, was capable of producing 100,000 tons of nitrogen a year, according to information obtained from governmental sources here.

The yearly nitrogen output of all the by-product coke oven plants of this country would just about equal the production of the destroyed plant, while the Oppau output was  $2\frac{1}{2}$  times as great as that planned for our war-built Muscle Shoals nitrate plant which Ford is negotiating for. The wrecked German plant could have supplied one-third of all the nitrogen that we are using yearly for fertilizer, chemical, and all other purposes.

Germany has another nitrogen plant, using the same Haber-Bosche process, which was half way built at the time of the armistice, and which has since been finished. This is located at Merseburg on the Stassfurt deposits, and it can produce twice as much nitrogen as the Oppau plant, or about 200,000 tons a year. From plants that employ the cyanamid and the atmospheric nitrogen fixation processes Germany has a production of an additional 200,000 tons of nitrogen.

The Oppau plant, which is now in ruins, has been visited by a number of allied military missions since the war. From official sources, the following details have been obtained:

Although Oppau was erected during the war absolutely no expense was spared. The buildings were of concrete and brickwork, the power houses were lined with white tiles, the office and laboratories were most extensive, thoughtfully designed and ornate in their decorations. The plant is said to have cost nearly \$60,000,000.

Over a hundred buildings made up the factory and docks on the bank of the Rhine, and the whole plant was laid out systematically with ample railroad facilities. The laboratories were located in a fine building, with analytical, physical, technical, and catalytic rooms and lecture room, and this building alone cost \$800,000.

Features of the plant were compressors of enormous strength that compress a mixture of hydrogen and nitrogen at 200 atmospheres or 3000 pounds per square inch. There were also large tanks for holding lignite and water gas, and large storerooms for the chemicals.

The direct process for nitrogen production or the Haber process used in the Oppau plant begins with the generation of hydrogen from water gas. This hydrogen is purified and placed under great pressure along with nitrogen obtained from the air by liquefaction. This mixture of gases is brought into contact with what is



what is known as a "catalyst", usually a rare metal like platinum, which helps one atom of the nitrogen to combine with three atoms of the hydrogen and form the ammonia gas whose smell all of us know.

From ammonia can be obtained the nitric acid and ammonium nitrate, for explosives or the ammonium nitrate, ammonium chloride and mixed salts that used to keep farms fertile and assure food supply.

Germany began building the Oppau works in 1912, two years before the war, after preliminary experiments at Ludwigshafen nearby. At the beginning of the war, the plant was able to produce only one-tenth of its post-war output.

Due to the war-time expansion of her nitrate plants, Germany became independent of Chile saltpeter, her former source of nitrogen and America's principal source during the war and today. Even with the loss of Oppau, Germany will be able to supply all her own needs for nitrate and will have a surplus to export.

During the past month a plant at Syracuse, New York, which uses a modification of the Haber process used at Oppau has been placed in operation by the Atmospheric Nitrogen Corporation, an American concern. The capacity of this plant, however, is just about one-thirtieth of that at Oppau.

No definite explanation of the explosion can be offered by government explosives and nitrogen experts, on the basis of the current cable reports, but they are interested in obtaining details of the disaster. Dr. Charles E. Munroe, chief explosives engineer of the Bureau of Mines is also obtaining details of the nitrate plant explosion at Bodio, near Berne, Switzerland, which on July 21 killed twenty persons and injured a hundred.

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DISTINCT AMERICAN TYPE DEVELOPING,  
STUDIES OF OLD AMERICAN STOCK INDICATE  
(By Science Service)

Release, Tuesday afternoon, September 27.

New York, September 27.- To determine whether there is in this country an approach to an American type of man and woman, the Smithsonian Institution, with Dr. Ales Hrdlicka, curator of the Division of Physical Anthropology in the U. S. National Museum, in charge, has been carrying on an extensive investigation, which has covered eight years, of the physical and physiological features of the oldest and most American element in the population of this country. Dr. Hrdlicka made the first announcement of this fundamental study in a paper given this morning before the Second International Congress of Eugenics at the American Museum of Natural History here.

"There is no American type of either man or woman as yet; yet there is an approach to such a type in physiognomy, stature, build, pigmentation and in other directions," Dr. Hrdlicka said. "Heredity is still most in evidence, but is no longer absolute. The old Americans are to an important degree still the English, Scotch, or Dutch of their ancestry, but in part they are already something new, common, acquired in this land; they are American. Were it possible for this stock to breed exclusively among themselves for several more centuries they, according to all indications, would produce as distinct a national type as have the various older European nations. But intermarriage with more recent elements of the population is so common, that no hope can be entertained for any rapid progress in this direction. Form of head, that was supposed once to show rapid changes, was found, under the new environment to be one of the most persistent of characters."

"Another prevalent notion that finds no support in the results of these investigations, is that of any physical difference between the old Americans of the northeast, the Yankees, and those of the south; there is no difference of any importance. The people of the south are not darker, the Yankees are not taller. The only regional differences in the Old American stock are such as are due to different ancestry (English, Scotch, Huguenot, etc.). But the whole strain shows a plain tendency towards darkening of hair and diminution of blondness."



"The main characteristics of the Old Americans are, first of all, a tall stature. They are, if we disregard a few small groups, the tallest of whites, averaging 5 ft. 8 in. in the men and 5 ft. 4 in. in the women. This superiority is in part a distinctly American acquisition."

"They are mostly relatively 'spare' in early adult life, with rather a tendency to overweight later on. In this connection there appears one serious feature - many of the younger women are behind their due standard. Their chest, their muscles, are relatively not as well developed as are those of the men. The men, in the average, are in every way a fine lot. The non-working women, many of them, are physically somewhat neglected, which calls for an improvement. Naturally this does not apply to the farm girl or the athletic girl, or the one whose development has been supervised and assisted in a high-class college; but there is a large proportion who do not fall into these classes and it is these who show sub-development."

"But the American woman shows a superior head. The size of her head is somewhat above what it usually is in relation to the average head of the male, and it is also perceptibly above that indicated by her stature. As the size of head means a corresponding size of brain, we have here a highly favorable condition."

"The form of the head in the Old American stock differs widely, according to parentage."

"A much greater progress in 'Americanization' is shown by the face. This has lost the prominence of the cheek bones and that of the angles of the lower jaw; and in the well nourished approaches a characteristic straight-sided, rather high oval."

"The nose is variable, with tendency to convex (aquiline) in males, and concavo-convex in females. The hands, feet, mouth, ears <sup>are</sup> not large, but also not small."

"Only healthy men and women between 24 and 65 years of life and at least three generations American born on each parental side were included in the study, and the majority of the subjects were examined under standardized conditions and with best instruments as well as care at the U. S. National Museum," Dr. Hrdlicka explained. "They included unselected individuals from all walks of life and all occupations. The length of the study was caused by the unexpected rarity of those who could fill the requirements. The total studies extended to 1700 persons, but to obtain so many it was found necessary to make trips to parts of New England as well as southward. A particularly interesting group was obtained among the mountaineers of Tennessee and neighboring regions."

The temperature, pulse, and respiration standards of these old Americans were determined and will undoubtedly furnish a standard figure for use by physicians and anthropologists. The mean temperature, taken at rest, sitting, with thermometer under the tongue, in the males is 98.6, in females 98.8; mean pulse, under same conditions, is in males 71, in females 76 per minute; respiration is in males 17.1, in females 18.2 per minute.

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MUSICAL TALENT CAN BE  
ENHANCED BY SCIENTIFIC MATING.

(By Science Service)

Release Wednesday, September 28.

New York, September 27.- The gift of music may be enhanced in children from generation to generation by scientific forethought in mating. This was the contention of Professor Carl E. Seashore in a paper read before the Second International Congress of Eugenics held here today.

The speaker pointed out that, to this end, we must clarify our concept of musical talent, recognizing that it is not one but a group of hierarchies of talent, each more or less independent of the others. The tonal talents, for example, are



as independent of the rhythmic talents as the color of the eyes is independent of stature.

Knowledge of the laws of the inheritance of musical talent must be based upon accurate scientific measurements and statistics on the same biological principles as are employed in the study of inheritance in plants and animals. This, Dr. Seashore contended, can be done. Such factors as the sense of pitch, the sense of rhythm, musical imagination, musical memory, musical intellect, creative imagination, quality of voice, range of voice, and volume of voice, may be isolated and measured or rated in a given individual and the findings may be compared for successive generations.

"Such of these factors as should be found to be heritable, as we believe them to be, may then be predicted just as we can now predict stature with various degrees of certainty on the basis of family history of stature," Dr. Seashore said.

"Such knowledge will be used in the future, not primarily in formal eugenic guidance which is quite within the range of possibility, but rather through the situation that scientific facts of this kind will become a part of the store of common knowledge and will enrich and improve our common sense knowledge and natural reactions in courtship and mating. As the rare rose is more beautiful to the botanist and the floriculturist than to the ignorant peasant, so organized knowledge of the laws of musical inheritance will give direction and warmth to nature's spell of love in mating a rare talent with a rare talent in the possession of knowledge of what this implies."

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(Editors: This is another story of our astronomical series. The eclipse will some day darken the sun as seen from our own country, but now it is only starting from near the South Pole to make a periodic journey northward.)

#### NEWS OF THE STARS

The Total Solar Eclipse of October First.

By Isabel M. Lewis,  
of the U.S. Naval Observatory

(Science Service)

Upon the first of October there will be a total eclipse of the sun of less than two minutes duration invisible in the northern hemisphere. The path of totality passes over the Southern Pacific and Antarctic Oceans just grazing Tierra del Fuego and also passes very close to the south pole. There is little chance, then, that any scientific observations of this eclipse will be made, although in the past observations of eclipses have been made in polar regions by several polar expeditions.

It is a peculiarity of solar eclipses that they occur in cycles. A certain eclipse first puts in its appearance as a very small partial eclipse just grazing the north or south pole. After a lapse of eighteen years and ten and one-third days there will be a reoccurrence of this eclipse, shifted westward upon the earth's surface, however, one hundred and twenty degrees in longitude owing to the rotation of the earth on its axis in the one-third of a day.

This eclipse will resemble the previous one in all its circumstances except that it will encroach a little farther upon the earth and the partial phase will be a little larger. Gradually at successive returns it will increase in size and importance until it becomes a small total solar eclipse in polar regions similar to the eclipse that will occur October 1. On later appearances the eclipse will be seen farther away from the pole and in the course of time will attain the importance of a large total eclipse visible in equatorial regions. After this, successive eclipses begin to decrease in size and importance and the path of totality passes into the opposite hemisphere. The eclipse finally disappears from the earth as a small grazing partial solar eclipse at the opposite pole of the earth. It is



one of the tasks of the eclipse computer to be on the watch for the appearance of a new series at either pole and include the new eclipse among the predictions for the year. A solar eclipse usually has from 68 to 75 returns, depending on the circumstances, and the total interval elapsing from its first appearance at one pole to its last appearance at the other pole is about 1260 years.

The eclipse of October 1 will be visible in its partial phase in South America south of ten or fifteen degrees south latitude, and the magnitude of the partial phase increases as the path of totality is approached. In the extreme southern part of Chile and Argentina and at Cape Horn the eclipse will be nearly total shortly after sunrise.

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CHILD'S EARLY HEIGHT  
FORETELLS LATER STATURE

(By Science Service)

Release, Tuesday, September 27.

New York, September 26.- How much will Johnnie and Mary grow? Dr. Bird T. Baldwin, Director of the Child Welfare Research Station of the University of Iowa has been periodically measuring and weighing a thousand boys and girls for periods of eight to twelve years, and he is able to prophesy how children under good conditions will grow. At the Second International Congress of Eugenics here today he said that a mother can measure the height of her seven year old child, increase it by a third and know within an inch or so the height that her son or daughter will attain when seventeen years old ten years from now. Girls are likely to attain the height at a somewhat earlier age than the boys.

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SUGGESTS NEW SOLUTION  
OF RUST MYSTERY

(By Science Service)

Release Friday, September 30.

Lake Placid Club, N. Y., September 29.- A new theory explaining the rusting of iron was advanced here today by J. Newton Friend of Birmingham, England, at the meeting of the American Electro-Chemical Society.

What happens when iron rusts is a metallurgical mystery. Mr. Friend believes that the corrosion starts "by the formation of colloidal ferrous hydroxide, which latter is alternately reduced by contact with iron and oxidized by contact with air, thus continuing the corrosion and the production of rust."

He also has found by experiment that although a piece of iron rusts badly when in water moving about a half a mile an hour, that when the velocity is 2½ miles an hour or more, there is practically no rusting at all.

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3,233 PERSONS MADE  
STERILE BY LAW IN U.S.

(By Science Service)

New York, September .- A total of 3,233 persons have been made sexually sterile under the statutes of several states since the beginning of legal eugenical sterilization in the United States in 1907 until January 1 of this year, Dr. H. H. Laughlin, of the Eugenics Record Office, Carnegie Institution of Washington, at Cold Spring Harbor, N.Y., declared at the Second International Congress of Eugenics here. These persons are of poor heredity, mostly feebleminded, or of criminal character whose offspring would be a burden and a menace to the community.

From the experience in the last fourteen years, the best administrative machinery for legal sterilization is known, and if the principle of eugenical sterilization has public support, Dr. Laughlin declares, practically any state legislature is in a position to enact a well-functioning law. Among the 15 states which have enacted eugenical sterilization statutes, the law is still on the statute books, unattacked by the courts and therefore still available for use, in ten states.

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(Editors: This is another batch of six groups of "shorts" that can be used as a daily feature or as fillers.)

DO YOU KNOW THAT-

Sensitiveness to high-pitched sounds generally weakens with age. Many old people cannot hear the shrill squawk of a bat.

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A monster locomotive on the Erie Railway has moved a train of 250 loaded freight cars on a level track. This locomotive has 24 driving-wheels.

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Diminutive shrunken human heads made by the Jivaro Indians, of South America, are found in most large museums. They are prepared by removing the bones of the skull and introducing hot stones, which are replaced by others as they cool. The process of shrinking lasts several days and the head is reduced to the size of an orange.

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The most commonly misspelled scientific term is probably "sidereal," which is very often written "siderial." Printers are much addicted to spelling "meteorology" "meterology."

DO YOU KNOW THAT-

The largest volcanic crater in the world has recently been discovered in Iceland. It is 5 miles long and 3 miles wide.

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People have been resuscitated after being under water as long as 40 minutes.

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At a large coal mine in Tuscarawas County, Ohio, belonging to Allied Power Industries, of Columbus, a plant is being erected which will generate 50 million cubic feet of gas a day to relieve the shortage of natural gas in that part of the country.

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In 1822 a vessel was wrecked in the Gulf of Guinea, its cargo consisting of barrels of palm-oil. A year later one of these barrels was washed up at Hammerfest, Norway, having drifted more than 11,000 miles.

DO YOU KNOW THAT-

The odors of tropical vegetation growing on islands in the West Indies can at times be detected on board vessels 25 or 30 miles from shore.

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A dense fog contains anywhere from 20,000 to a million droplets per cubic inch, according to the size of the droplets.

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In burning raw bituminous coal we lose every year in this country by-products to a value of more than \$400,000,000. These are chiefly coal tar, ammonium sulphate surplus gas, benzine and toluene.

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At the greatest depths of the Black and Caspian Seas there is no animal life. In the case of the Black Sea this is on account of the presence of sulphuretted hydrogen in the water, while in the Caspian there is not enough oxygen at great depths to maintain any form of animal life.



DO YOU KNOW THAT-

All the radium extracted from its ores and now available for use throughout the world is estimated to be worth nearly \$17,000,000.

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Before the war very little industrial alcohol was used in this country. Production on a large scale was begun to supply the needs of munition makers, and now the annual production of denatured alcohol exceeds 90,000,000 gallons.

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An ornithological colonel in the British Army during the late war trained his men in anti-aircraft duties by making them take observations on the flight of birds. From abundant data thus obtained, it appears that the speed of birds has been much exaggerated. None of them can approach the speed of the swiftest aeroplanes.

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A four-foot seam of coal contains enough ammonium sulphate to fertilize the land above it for more than 500 years.

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DO YOU KNOW THAT-

Whale fat is used on a large scale in Denmark in making oleomargarine.

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A recent scientific treatise on pheasants, in four volumes, sells at the modest price of \$250.

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At the American Museum of Natural History, New York, blind children are permitted to handle various exhibits, models, relief maps, etc., while listening to lectures.

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Oyster shells and other objects planted on oyster grounds to provide points for the attachment of the spawn are called "cultch." Tin cans, bits of crockery, brush, etc., were formerly much used for this purpose, but now cultch consists almost entirely of shells, and especially oyster shells.

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DO YOU KNOW THAT-

Plans have been made to connect the two principal islands of Japan by a tunnel 10 miles long under the Strait of Shimonoseki.

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The longest ocean waves are usually met with <sup>in</sup> the South Pacific, where their lengths vary from 600 to 1,000 feet.

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The science of the weather and the atmosphere is called meteorology, and has very little to do with astronomy. Yet the public almost invariably confuses meteorologists with astronomers and calls upon the Weather Bureau for information about comets, sunspots, eclipses and the calendar.

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Isotopes are substances that are identical in chemical properties but have different atomic weights. Several varieties of lead, for example, are thus distinguished.