

## ASTRONOMY

# Planets Have Composition Similar to That of the Sun

**T**HE earth and the other planets are apparently made of the same stuff as the sun.

Prof. Henry Norris Russell, the Princeton astronomer, discussing the subject at Mt. Wilson Observatory, Calif., observed that not only are the same elements present to a large extent both on the sun and the earth, but that contrary to previous notions there seems to be about the same proportions of each in the two cases. This fits the notion that the planets were formed of masses of matter ejected from the surface of the sun.

The new ideas on this subject came about from an investigation of the interior as well as the surface, or crust, of the earth. Of course, one cannot get down to the center of the earth, but with the help of chemical and seismographic studies scientists (especially Dr. V. M. Goldschmidt of Göttingen) have been led to the conclusion that the earth has a 2,000 mile core, called the siderosphere, composed of metallic stuff, mostly iron, cobalt and nickel. The earth's gold and platinum are also concentrated there where we can never get at them.

Outside the core is a dense shell or chalcosphere of sulfur compounds. Up towards the surface is a crust or litho-

sphere of more familiar material, mainly silicates. On the very surface, of course, is the hydrosphere and above it the atmosphere.

Some substances common in the sun are apparently less common on the earth because they are concentrated in the lower regions where we can not get at them. Sometimes substances are apparently rare because they mix with anything and do not form minerals of their own. For example, scandium and germanium were thought to be exceedingly rare on the earth, but fairly common on the sun. It is now known that there is plenty of scandium but it is so widely and thinly scattered that it never makes much of an impression.

It is lucky for us, Prof. Russell said, that the carbon and oxygen are mainly in the lithosphere, hydrosphere and atmosphere for these elements are essential to life as we know it. Actually about half of the original oxygen of the atmosphere has gone to make iron rusty, for that is the reason why we find red clay and sandstone. Ultimately all of the oxygen of the atmosphere will be removed by iron and then the human race will have to manufacture its own breathing material. Probably that explains the situation on Mars, which

has little atmosphere and practically no oxygen. The original oxygen must have combined with the iron to form rust and it is this rust which gives the planet its ruddy appearance.

Carbon dioxide, which is essential to plants, is continuously being exuded from the interior. But plants, especially those in the sea, are turning it back into minerals such as calcite. If there were no plants the atmosphere would become loaded with carbon dioxide and presumably that is what has happened on the planet Venus which has been found to have such a heavy atmosphere of this gas.

Thus, everywhere in the solar system the original materials seem to be the same, but the history of their development has been different in each case and has left on the surface different substances. This lends strong support to the already plausible notion that the matter in the planets was once part of the surface of the sun.

*Science News Letter, November 3, 1934*

## ENGINEERING

## World's Largest Elevator, Lifting Ships, Being Made

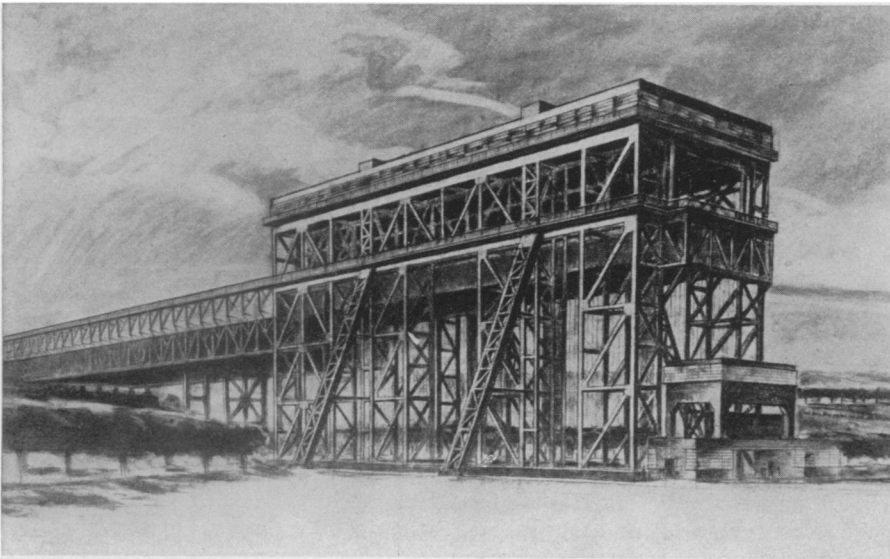
**T**HE WORLD'S largest elevator is nearing completion in Germany. It will lift, not men or merchandise, but whole ships weighing up to 1,000 tons.

Another step to make Berlin an ocean seaport, the huge ship elevator is more than half completed at Niederfinow on the Oder River. The foundations are finally finished and within three years the completed structure is expected to lift river steamers 120 feet—as high as a ten story building—in about twenty minutes.

At Niederfinow now, series of canal locks do the same thing but take two hours for a single boat. A marine traffic problem likened to some of New York's taxicab jams results with undesirable frequency. Sometimes a hundred vessels were waiting to go through the locks and had to stand idle for days for the "lift" that sent them on their way.

After a vessel steams into the elevator tank, only five minutes is expected to be required to raise the tank with its contained water and ship up 120 feet. The additional fifteen minutes are needed to bring the vessel in and out of the tank.

Actually the weight to be lifted on each trip is about 4,200 tons or some 8,400,000 pounds. But nearly all of



**LARGEST IN THE WORLD**

*Architect's drawing of an elevator, now under construction in Germany, which will be able to lift an entire ship.*

this is compensated for by a system of counterweights. So delicately will the giant structure be poised that engineers estimate only four electromotors of 75 horsepower each will be required to raise and lower the elevator.

Germany's problem of bringing Berlin closer to the Baltic Sea—or what amounts to the same thing, allow larger

vessels to sail right into Berlin—utilizes the navigation of the Oder River to Niederfinow and a ship canal from there to Berlin. This is the famous Hohenzollern Kanal which, near Eberswalde, passes over a railroad instead of beneath a railroad bridge as is the normal practice.

*Science News Letter, November 3, 1934*

MEDICINE

# First Anti-Influenza Serum Is Produced in Horse

## British Scientists Who Last Year Isolated Virus Of Influenza Announce Mice Can Also Be Used

**A**N anti-influenza serum has been produced in a horse by the three British scientists who last year isolated the influenza virus. The same scientists have found a way of systematically using mice, the most widely available of all animals used in medical research, for their intensive experiments in the long-continued war against flu.

This dual announcement is made (*The Lancet*, Oct. 20) by Drs. C. H. Andrewes, P. P. Laidlaw and Wilson Smith, all of whom are working at the National Institute for Medical Research Farm Laboratories, at Mill Hill, a suburb of London.

Dr. Laidlaw was last November awarded the Royal Medal of the famous Royal Society of London for his part in discovering a vaccine for protecting dogs from distemper, which is believed to be the canine counterpart of flu.

The isolation of the influenza virus reported by these physicians last year, since confirmed in America by Dr. R. Shope of the Rockefeller Institute at Princeton, N. J., resulted from their having previously discovered that ferrets are susceptible to infection with human influenza.

### Only Animal

The extreme importance of this discovery was due to ferrets being the first animals in which systematic infection with human influenza was shown to be possible. Before last year it had seemed to many scientists that the only way to tackle the flu problem thoroughly was to call for human volunteers, who, living for the time as laboratory animals, would allow themselves to be deliberately infected with the disease so that its

cause, cure, and prevention might be intensively studied, and who might, of course, die. Earlier experiments with apes and monkeys had occasionally given hope that these animals might be used for this purpose, but further trials had proved that results were negative more often than not, and that certainly no dependability of response to infection could be expected.

Rapid progress has followed the use of ferrets. What is at present its zenith is referred to in the *Lancet* report quite briefly only:

### Five Mice

Drs. Andrewes, Laidlaw and Wilson Smith state that five mice given mixtures of virus and undiluted serum—the serum from a horse which had been hyperimmunized with tissue from ferrets that had been infected with a strain of human influenza—survived, while five controls (which, of course, did not receive the serum) all died.

Last year's discovery enabling ferrets to be infected with flu was an essential step in the obtaining of the serum from a horse.

Details concerning this horse serum will, the doctors add, be published later. For the moment medical men and laymen alike have to wait as patiently as possible for the promised full account of what may prove to be one of the most important medical advances for many years.

Meanwhile it must not be forgotten that these three scientists have made another discovery of the first importance. They have learned a method—probably the only method—by which mice can be infected, with more or less

## NEW

### McGraw-Hill Books

#### The Problem of Mental Disorder

A study undertaken by The Committee on Psychiatric Investigations, National Research Council. Members of the Committee: Madison Bentley, Chairman, Cornell University; and E. V. Cowdry, Washington University. 390 pages, \$4.00.

#### Introduction to Mechanics and Heat

By NATHANIEL H. FRANK, Massachusetts Institute of Technology. 339 pages, \$3.00.

#### Principles of Mathematical Physics

By WILLIAM V. HOUSTON, California Institute of Technology. *International Series in Physics*. 268 pages, \$3.50.

#### Chemical Engineering Plant Design

By FRANK C. VILBRANDT, Iowa State College. *Chemical Engineering Series*. 335 pages, \$4.00.

#### Introduction to Atomic Spectra

By HARVEY E. WHITE, University of California. *International Series in Physics*. 450 pages, \$5.00.

#### Experimental Physical

**Chemistry.** New second edition By FARRINGTON DANIELS, J. Howard Mathews, and John Warren Williams, University of Wisconsin. *International Chemical Series*. 499 pages, \$3.50.

#### Infant Behavior. Its Genesis and Growth

By ARNOLD GESELL, Yale Clinic of Child Development; and Helen Thompson. Assisted by Catherine S. Amatruda. 342 pages, \$5.00.

#### A Study of Crystal Structure and Its Applications

By WHEELER P. DAVEY, Pennsylvania State College. *International Series in Physics*. 695 pages, \$7.50.

#### The Kinetic Theory of Gases

New second edition By LEONARD B. LOEB, University of California. 687 pages, \$6.00.

#### Earth, Radio and the Stars

By HARLAN TRUE STETSON, Harvard University. 330 pages, \$3.00.

#### Elements of Astronomy

New third edition By EDWARD ARTHUR FATH, Carleton College. *McGraw-Hill Astronomical Series*. 360 pages, \$3.00.

#### Textbook of Systematic

**Botany.** New second edition By D. B. SWINGLE, Montana State College. *McGraw-Hill Publications in the Agricultural and Botanical Sciences*. 270 pages, \$2.25.

#### Unit Processes in Industrial Organic Synthesis

By P. H. GROGGINS, U. S. Department of Agriculture. *Chemical Engineering Series*. In press.

#### Quantitative Chemical Analysis

By ALFRED STOCK, Technical High School, Karlsruhe; and Arthur Stähler, formerly of the University of Cologne. Translated by L. M. Dennis, Cornell University, and Winton Patnode, General Electric Company. *Chemical Engineering Series*. In press.

Send for copies on approval

**McGraw-Hill Book Co., Inc.**  
330 West 42nd Street New York