

on the other side of a suitable vertical dividing sheet of material. Thus one component of the mixture falls on the one side and the unattracted particles on the other.

Mineral granules the size obtained in commercial grinding machines were used in the tests. One difficult separation achieved was the removal of bituminous coal dust from anthracite dust. Among the difficult separations made possible were those of separating (1) galena from pyrite, (2) muscovite from lepidolite (both micas) and (3) calcite from dolomite.

*Science News Letter, May 7, 1938*

## CHEMISTRY

## Two New Vitamins L<sub>1</sub> and L<sub>2</sub> From Liver, Yeast

**T**WO new vitamins have just been added to this rapidly growing family of food essentials. The names L<sub>1</sub> and L<sub>2</sub> have been selected for these latest vitamins by their discoverers, Drs. Waro Nakahara, Fumito Inukai and Saburo Ugami of the Institute of Physical and Chemical Research, Tokyo. Reporting their discovery (*Science*, April 22), the Japanese scientists state that both L vitamins are needed by rats to produce milk for their young. Baker's yeast is the source of L<sub>2</sub> but not of L<sub>1</sub>, which comes from beef liver.

*Science News Letter, May 7, 1938*

## CHEMISTRY

## Sixth Part of Vitamin B Obtained in Crystal Form

**I**SOLATION of chemically pure crystals of vitamin B<sub>6</sub> has been reported by Dr. Paul Gyorgy of Western Reserve University School of Medicine (*Jr. American Chemical Society*, April). This part of the vitamin B complex cures a skin disease in young rats which occurs when the animals eat a diet lacking in vitamin B<sub>6</sub>.

*Science News Letter, May 7, 1938*

# ● RADIO

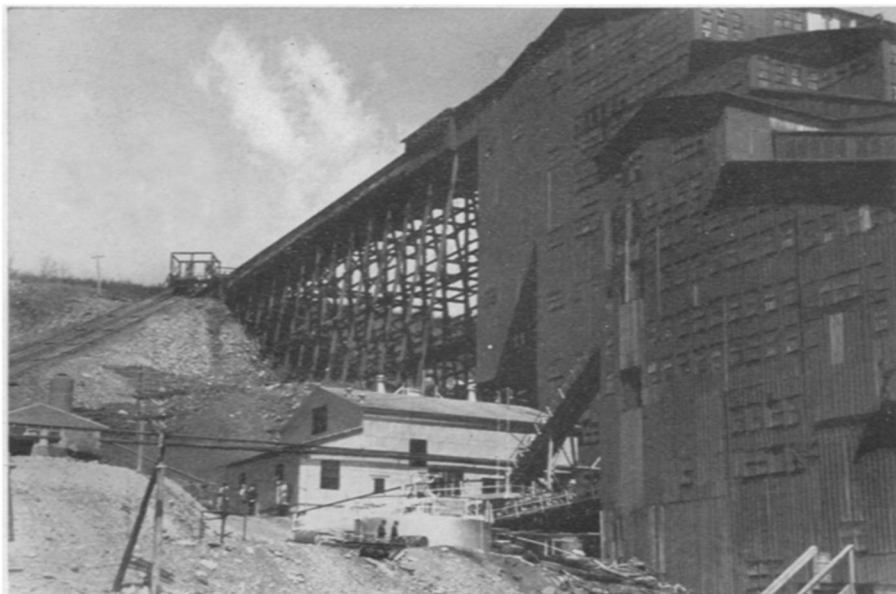
May 12, 3:00 p. m., E.S.T.

RARE METALS FIND USES—Paul M. Tyler of the U. S. Bureau of Mines.

May 19, 3:30 p. m., E.S.T.

LOST ARTS OF THE STONE AGE—Dr. H. C. Shetrone, Director of the Ohio State Museum.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.



### OLD WAS DIRTY; NEW IS CLEAN

*The silver-painted building nestled close to the large old frame coal breaker is the new coal refining building. Inside and out it gives the appearance of an oil refinery. Clean enough to allow workmen to wear white clothes, it will certainly better working conditions in the coal fields.*

## MINING

## High-Grade Fuel Made From Run-of-the-Mine Coal

**S**UCCESSFUL development of a process for the cheap production of standardized high-grade fuel from virtually any grade of material ranging from run-of-the-mine coal down to refuse has been announced.

A pilot plant for production of high-grade coal from low-grade materials is in operation at Shenandoah, Pa. Discoverers of the process, developed in research work begun in 1902, and operators of the pilot plant are the E. I. du Pont de Nemours and Company.

Made possible by the use of recently available heavy liquid compounds, the process depends on the fact that materials with different weights for the same volume can be separated by placing them in a heavy liquid the specific gravity of which is between the materials to be separated. The heavier material sinks to the bottom, the lighter one floats on top.

Halogenated hydrocarbons, such as pentachlorethane and tetrabromethane, the latter three times as heavy as water, are the chemicals whose specific gravities

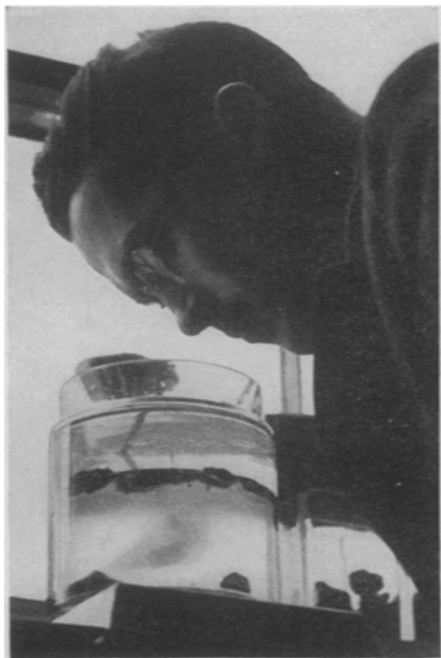
are between those of coal and slate. Slate is the refuse from which second-grade and even poorer coal must be separated in order to produce a commercially usable product.

The coal-and-slate mixture which is run through this liquid which separates coal from slate, the latter sinking to the bottom, is pretreated with an active agent solution which places a water film around the particles of coal and slate. This latter step constitutes the achievement which has rendered the process commercially feasible.

The heavy liquids used in the process do not change in specific gravity while in use so that the quality of the coal produced in any breaker or cleaning plant is not dependent on the human element. The heavy liquids can be recovered and used again, making the process cheap to operate.

Production of an improved and standardized coal through use of the new method is anticipated by the engineers who developed the process.

The sink-and-float process, as it has



#### SINK OR FLOAT

*The essence of the new coal refining process is shown here. Dr. E. F. von Wettberg picks the pure coal from the top of the bowl which is filled with a liquid of a density between that of the slate and the coal. The slate remains on the bottom.*

been named, is expected to replace mechanical sorting means now used by coal mine operators to separate some of the coal from second grade material containing slate.

The "jigs" used at present for this purpose, are relatively inefficient, leaving considerable coal on the refuse pile. The process is important economically partly because of the fact that pure veins of coal, particularly anthracite, are inadequate to meet the demand.

*Science News Letter, May 7, 1938*

#### PSYCHOLOGY

### Babies Imitate Without Any Need for Teaching

**W**HEN baby first says "Da-Da" after his proud father, it is not because he has been taught to imitate, Dr. Wayne Dennis, of Clark University, declares. In an experiment reported by Dr. Dennis, twin babies were brought up with no rewards for imitation and no attempt on the part of adults to imitate the babies. The baby naturally repeats his own actions or imitates himself, and he imitates the adult at the very first opportunity, Dr. Dennis said. The twins very seldom imitated each other, however.

*Science News Letter, May 7, 1938*

#### ASTRONOMY

## New Kind of Star Group Discovered at Harvard

**Egg-Shaped Mass Undiscovered Until Present Because Light From its Thousands of Stars is Extremely Faint**

**A** GIGANTIC star-cluster, unlike any known class of cosmic systems, possibly a member of a whole family of such star clusters previously unsuspected in the universe, has been discovered by Harvard astronomers.

The egg-shaped group is located in the southern constellation Sculptor. Because its light is extremely faint, only the most powerful telescopes can detect the individual star members. This unusual faintness probably explains why the cluster has been hidden from man until now. Otherwise, its tremendous size, including thousands of stars and extending over a range of two degrees in the heavens, would easily have revealed its existence.

Discovery of the group as described by Dr. Harlow Shapley, director of the Harvard Observatory, was largely a matter of good luck, for only the fact that an unusually sensitive photographic plate happened to be exposed on Sculptor on a very clear night, revealed its existence. The exposure was made at Harvard's South African observation station at Bloemfontein.

#### Resembles Three Types

Many characteristics of the new cluster are similar to those of three entirely different types of stellar systems, the globular star clusters, the Magellanic clouds and the spheroidal galaxies. The Sculptor group differs markedly from each of these on many points, however, and thus may be representative of a heretofore unknown class somewhere between these three.

Able to count the thousands of stars now visible in the cluster with relative ease, astronomers have not yet been successful in measuring its distance or size, characteristics essential for proper classification of the object. Astronomers are now photographically combing the cluster for variable stars whose flickerings can be used as astronomical yardsticks in determining these distances.

Except for a small elongation in the east-west direction, the cluster appears roughly globe-shaped, and its individ-

ual stars can be seen and counted easily on the best photographs. They are arranged fairly compactly at the center of the group with the space between each star increasing fairly regularly toward the cluster's rim.

The very brightest stars in the system are only about the eighteenth magnitude, extremely faint, inasmuch as the naked eye can detect stars only up to about the sixth magnitude. In general the brighter stars seem to be bunched more closely in the center, although there is no nucleus to the cluster or any outstanding nuclear stars. Off-center clusters, cloud-like formations or other irregularities which would spoil the system's marked uniformity are also absent.

#### Little Total Illumination

About 10,000 stars are in the group with magnitudes between 18 and 19.5 according to preliminary estimates. Astronomers have no idea how many fainter stars it may contain. Despite this tremendous number of stars, the cluster yields surprisingly little total illumination and Harvard astronomers are of the opinion that some unusual physical characteristics of the stars, or of the group, cause this low brightness. This conjecture substantiates the suspicion that the cluster may be typical of a large family of such objects scattered throughout the universe whose low luminosity has heretofore concealed them.

At first astronomers tentatively interpreted the faintness of the cluster as indicating they had found a super-galaxy, an unusually far-off system of thousands of island universes, each of them similar to and about the size of our own Milky Way, but later photographs showed that the cluster's separate bodies are not individual groups of millions of stars but individual stars.

Most probable of the conjectures offered concerning the nature of the cluster, in the light of evidence so far uncovered, Dr. Shapley said, is the theory that the stars may have an absolute