

## CHEMISTRY

**Powerful, Better Magnet Opens Research Field**

► SCIENTISTS soon will have a better picture of what happens to materials at extremely low temperatures near absolute zero (459.6 degrees below zero Fahrenheit), thanks to the steady and reliable field of a powerful magnet installed at the University of California at Berkeley.

The new electromagnet is much more powerful than the huge magnets in the University's cyclotrons and bevatron, although many times smaller. Although its power is exceeded by several existing magnets, it has the advantage of maintaining a very steady magnetic field over long periods, whereas the fields produced by more powerful magnets can be maintained only for a few thousandths of a second.

For California chemists who will be using the magnet, these features add up to a tool unsurpassed in the world for making precise measurements of a magnetic field's effect on properties of materials.

Information about this effect, especially at extremely low temperatures, is vitally needed for advanced work on strategic electronic devices, such as computers, missile guidance systems and radar-like detection devices.

Additionally, it will enable chemists and, particularly, plant-designing chemical engineers, to know the exact entropy or non-available energy locked up in materials. This lets them know how much energy to expect from various reactions and helps them determine when a reaction has been developed to theoretical perfection.

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## ZOOLOGY

**Skunk Odor Chemical Keeps Rattlers Away**

► SOAK BITS of charcoal in "synthetic skunk juice" and scatter them around to keep rattlesnakes away.

Thio-alcohol n-butyl mercaptan frightens rattlesnakes, Dr. Raymond B. Cowles, professor of zoology at the University of California at Los Angeles, has found in laboratory experiments. This chemical has an odor almost identical to that of a skunk.

The studies suggest that bits of charcoal soaked in mercaptan solution and scattered around a campsite or a dwelling in snake-infested areas would have a strong enough odor to keep rattlers away but not enough to be unpleasant for humans.

Field tests are planned to evaluate further the "rattler repellent's effectiveness," Dr. Cowles indicated. The research is supported by the Richfield Oil Corporation.

Actual electrocardiograph recordings of rattler heart rates were taken while odors of mercaptan and king snakes (skunks and king snakes are natural enemies of the rattler) were wafted into the rattlesnakes' cage. It was found that both of these odors markedly increased the snakes' heart rates as compared with odors of food, water and other familiar items.

The king snake odor, obtained from scales on this reptile's back, increased the rattler's heart beat slightly more than the synthetic skunk odor. But the synthetic compound is a more practical repellent, Dr. Cowles said.

Interestingly enough, a definite and consistent increase in heart beat resulted from human odor, obtained by passing air through a T-shirt (relatively clean). Thus the old horse hair rope snake repellent idea might work if the rope had absorbed enough human odor. A slightly "used" T-shirt might serve equally as well as a barrier to prowling snakes in search of a warm sleeping bag, the UCLA zoologist said.

Other interesting facts noted during the experiments indicated the rattlesnake may be an important sanitary agent in nature. The studies suggested that rattlers may have a slight preference for meat that is just beginning to decay and thus eat more carrion than has been recognized.

The rattler, as a scavenger, may clean up possible sources of disease (bubonic plague, etc.) in rodent holes and other areas that other scavenger animals and birds cannot reach, Dr. Cowles pointed out.

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## BIOLOGY

**Skim Milk Proves To Be Research Tool**

► SCIENTISTS have found a new and useful research tool: skim milk.

The milk has been found to be a good medium in which cell cultures can be successfully grown, Samuel Baron and Richard J. Low, division of biologics standards, National Institutes of Health, Bethesda, Md., report in *Science* (July 11).

In housewife fashion, the skim milk was prepared by dissolving instant nonfat dry milk in distilled water, according to instructions on the label.

The milk was then either boiled for five minutes or sterilized under pressure. The advantages of skim milk as a cell culture medium include its simplicity of preparation, low cost and frequency of feeding the cells, the scientists say.

In addition, the skim milk does not contain inhibitors or antibodies that fight the viruses that are placed in the cultures for study.

Animal serum has been a necessary constituent of most media for continuous cell cultures, but many of the sera exhibited the inhibitors that affect viruses.

Scientists have searched for a desirable replacement for animal serum that would sustain cells in a condition sensitive to viral effects.

Skim milk maintenance medium appears applicable as a standard medium for:

1. Comparative assay of a variety of viruses on a number of different cell cultures.
2. Safety testing of virus vaccines.
3. Isolation of viral agents which were not previously cultured, due to neutralization by serum-containing maintenance media.
4. Detection of proteolytic activity of cell cultures.

Science News Letter, July 26, 1958



## ASTRONOMY

**Star Seen to Explode for Third Time in 60 Years**

► ONE OF the sun's celestial neighbors, the star RS Ophiuchi in the Milky Way galaxy, was observed to have exploded on July 14 to more than 100 times its normal brilliance for the third time since 1898, the Harvard College Observatory has reported.

The star, located in the constellation Ophiuchus astride the celestial equator, normally has the visual brightness of magnitude 11.5, invisible to the naked eye. (Brightness is measured in magnitudes, the lower the magnitude, the brighter the star.) In 1898, and again in 1933, RS Ophiuchi was observed to reach a magnitude of 4.3, increasing its brightness by as much as 3.5 magnitudes per day.

In the most recent observation, made by a member of the American Association of Variable Star Observers, the star was seen to have a brightness of the sixth magnitude, or more than 100 times its normal brilliance, and clearly visible to the unaided eye.

Known as an irregular variable showing only slight normal variations, the star may not necessarily be on its way "up" to maximum brilliance at the present time. Astronomers emphasize it may well be on its way back "down" to relative obscurity, since an exploding star is known to remain at maximum brilliance for only a very brief period. Maximum may have occurred during our daytime when the star was invisible.

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## PSYCHIATRY

**Activity of Fat Women Affected by Emotion**

► THE PHYSICAL activity of fat people is little affected by eating more but is principally affected by changes of mood such as the depression to which they are particularly vulnerable.

This was revealed by a study of the daily walking of obese women undergoing long-term mental treatment. The study was reported to the American Psychiatric Association by Dr. Albert J. Stunkard of the University of Pennsylvania, Philadelphia.

Physical activity is, of course, decreased by physical illness and injury, he said. Most persons showed characteristic cycles of activity over week ends. Change in occupation and acquisition or loss of an automobile resulted in changes in physical activity. But the greatest influence affecting activity was change in mood.

Fat women were found to walk only half as far as women of normal weight and their energy expenditure was significantly lower.

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# CE FIELDS

## MEDICINE

### Japanese Perfect Blood Test for Cancer Detection

► A SIMPLE blood test that detects cancer growth in the human body has been reported by three Japanese scientists.

The test produces a red spot easily identified by the paper-chromatography method if there are malignant cells traveling within the blood stream. The exact substance that the scientists can tag as an indication of malignancy is their own discovery, malignolipin, a phospholipid, that could never be found in normal tissue. Takekazu Kosaki, Shinya Nakagawa and Toshiko Saka of the department of biochemistry at the Mie Prefectural University School of Medicine, Tsu, have reported their work in the *Proceedings of the Japan Academy* (May).

The detection of malignolipin in blood by this method was negative with the blood of 18 normal persons and eight patients not bearing malignant tumors, but suffering nephritis, aplastic anemia, leukemia, duodenal ulcer, prostate hypertrophy, eczema and axillary odor. The test was positive, however, without exception, in 25 patients bearing cancer of the lung, stomach, rectum, maxilla, uterus, mammary gland, urinary bladder and prostate.

In addition, after the removal of a tumor, the test responds negatively unless removal is incomplete.

Tests of the effect of malignolipin on ascites tumor growths in mice indicate that the substance accelerates and promotes cancer cell growths.

Malignolipin is believed by the investigators to be the first natural substance acting as a promoter of malignant tumors, isolated from human malignant tumors and identified in its properties.

Malignolipin has not been detectable in the normal tissue of liver, kidneys, alimentary tract, lungs, heart, pancreas, spleen, urinary bladder and prostate.

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## PSYCHIATRY

### Psychiatric Treatments Aid Retarded Child

► PSYCHIATRIC treatment of mentally retarded children and their parents can help the child to function more normally and might reduce considerably the population of institutions for the mentally defective.

But the attempt to do something for the child should not be put off until the child is of school age, warn a group of psychiatrists, Dr. Katharine F. Woodward, Dr. Miriam G. Siegel and Marjorie J. Estis of Lenox Hill Hospital, New York.

The scientists describe in the *American Journal of Orthopsychiatry* (April) a study

of nine mentally retarded children. All the parents of these children were of at least average intelligence. Three of the fathers were professional men and the others were white collar workers. But without exception, all the parents showed personality problems. Treatment of the parents proved to be of major significance in the study and treatment of the children.

Mental disturbance underlies the mental retardation in the children to a sufficient extent so that it can be considered as instigating the slow-down of mental development, it was found. After two years of psychiatric treatment of themselves and their parents, all but one of the children showed improvement. Those children in whom psychotic features were less marked showed more improvement.

Mental retardation is not a diagnostic entity in itself, the scientists conclude, but a symptom for which a cause must be found.

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## SURGERY

### Technique Evaluates Heart Valve Surgery

► A TECHNIQUE that allows a more accurate evaluation of heart-valve surgery during such operations has been reported by a team of surgeons and cardiologists at the National Heart Institute, Bethesda, Md.

With this technique, direct measurements are made of the heart's output of blood and of differences in pressure on each side of abnormally narrowed, or "stenosed," valve openings just before and after these openings are surgically enlarged.

Previously, evaluation of such surgery was accomplished by measuring pressures and output of blood before and after, but not during the operation.

Surgeons can now determine what percentage of the valve's function has been restored and whether to enlarge the valve opening still further during the same operation, Drs. Herbert Tanenbaum, Eugene Braunwald and Andrew Morrow of the Heart Institute Clinic of Surgery said.

The method is applicable in operations for stenosis of any of the four valves of the heart. Its value was demonstrated in studies of 24 patients undergoing valve surgery at the Heart Institute.

The technique consists of:

1. Measuring, simultaneously, pressures in the chambers immediately upstream and downstream from the diseased valve by puncturing these chambers with hypodermic needles. (Pressure changes, transmitted up the needles, are converted into electrical pulses that are projected as two parallel tracings across an oscilloscope screen.)

2. The effect of the surgery in relieving the abnormal pressure difference is apparent when these measurements are repeated immediately after the surgeon opens the heart and inserts his finger, or an instrument, into the valve opening to enlarge it.

3. Measuring the output of blood just before and after this operation is accomplished by tracing the concentration of a special dye and its transit time through the circulation.

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## CHEMISTRY

### Sunlight's Role in Smog Investigated

► THE BATTLE against Los Angeles' smog has turned to a close scrutiny of natural sunlight and its role in the air pollution cycle.

Use of sunlight is part of the effort by the Air Pollution Test Facility Project at the University of California at Los Angeles to simulate, for controlled experiments, the atmosphere over a modern city.

To make the simulation as realistic as possible, the project leaders, Harry Buchberg, associate professor of engineering, and Dr. Katherine W. Wilson, associate chemist, decided to take the project out of the laboratory and construct it outdoors, on the roof of the UCLA Engineering Building.

The dominating feature of the system is the air reaction chamber, a huge inflated plastic tube, in which clean air is mixed with doses of pollutants. It resembles a tremendous elongated doughnut, the tube being some 190 feet long and 20 feet in circumference.

The project demands teamwork among the engineer, the chemist, and the psychologist. In current experiments, Wilbur C. Middleton, associate research psychologist, is measuring degrees of eye irritation on a group of volunteer UCLA psychology students exposed to simulated smog.

"The ultimate goal of our project," says Prof. Buchberg, "is preventive action. As new industries, processes and fuels are developed, we want to be ready in advance to determine the control measures that will prevent the creation of an air pollution problem."

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## GENERAL SCIENCE

### Russians Invite Top Scientists to Moscow

► RUSSIA's increasing emphasis on science and her challenge to become the world's number one scientific nation were evidenced by Soviet invitations this year to hold two important international gatherings in Moscow.

The Soviet Union has made a bid for the Eighth International Cancer Congress in 1962 and the Ninth International Conference on High Energy Physics in 1959. Both groups have just recently met in London and Geneva, respectively. (See SNL, July 19.)

Each of the international gatherings brings together the highest authorities in their fields to exchange their most recent research results formally and informally.

Dr. Harold Dorn of the National Institutes of Health, Bethesda, Md., reported that the head of the Soviet delegation to the Seventh International Cancer Congress, Prof. Nicolai Blokhin of the Academy of Medical Science, said that his country "was prepared to issue visas for delegates from all countries of the world."

This offer was made even though the next Congress is still four years away.

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