

● RADIO

January 13, 4:00 p. m., E.S.T.
SAVING MINDS WITH INSULIN—Dr. Z.
M. Lebensohn, St. Elizabeth's Hospital.

January 20, 4:00 p. m., E.S.T.
HOW SAFE ARE YOUNG DRIVERS?—Dr.
Harry M. Johnson, Highway Research
Board.

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

records for tests of patients. False diagnosis, it appears, might otherwise be made.

Dreams, apparently, come in more than one stage of sleep. The investigators found that in some cases the sleepers reported dreams when the brain-wave records showed neither alpha waves nor large delta waves. In other cases dreams occurred during the deeper stage of sleep when both delta waves and the 14-per-second waves were recorded.

Adoption Helps I. Q.

Children adopted into good homes as very young infants are likely to grow up with superior intelligence regardless of the intellectual and social deficiencies of their own mothers.

Babies coming from very poor homes and with own mothers of low intelligence levels were tested at the Iowa Child Welfare Research Station from one to five years after entering good foster homes. Prof. Harold M. Skeels reported the results to the American Association for the Advancement of Science.

No child scored below normal. More than half (65 per cent.) are of superior intelligence. No relation was found between the intelligence of the children and their true mothers.

Science News Letter, January 8, 1938

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PHYSICS

New Gas Is Discovered High In Atmosphere of the Earth

Nitrogen Pentoxide, With Two Atoms of Nitrogen to Five of Oxygen, Is Probably Rarest of Gases in Air

A NEW and hitherto unknown atmospheric gas, a combination of oxygen and nitrogen, exists 10 to 25 miles above the earth's surface, Drs. Arthur Adel and C. O. Lampland of the Lowell Observatory, Flagstaff, Ariz., announced to the American Association for the Advancement of Science at the Indianapolis meeting.

It is nitrogen pentoxide, its molecule consisting of two atoms of nitrogen and five of oxygen. It is probably the rarest of gases of the air, present only in the outer regions where the ultraviolet rays of the sunlight bring oxygen and nitrogen into combination.

Existence of the new gas in the ozone layer of the atmosphere was demonstrated by delicate spectroscopy of the far infra-red region of the spectrum. If the new gas existed nearer to earth in the air around us, it would not be detectable by the most refined chemical and physical methods. Because the nitrogen pentoxide takes out certain portions of the sunlight as it comes through the atmosphere to earth, its existence could be detected.

The situation of Lowell Observatory high on a mountain in a dry atmosphere contributed to the discovery.

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PHYSICS

Existence of All Matter Rests on Intra-Atomic Force

THE EXISTENCE of all matter in the world is possible only because there exists an attractive force within atoms that acts only through a distance of less than a million-millionth of an inch. This estimate of the "radius of action" of this fundamental force of nature was presented by Prof. Gregory Breit of the University of Wisconsin in an address before the American Physical Society at Indianapolis.

Prof. Breit—who has been a leading analyst of the theoretical and mathematical implications of this basic force binding atomic particles into the nuclei of atoms, and hence makes possible all matter—reviewed the present knowledge of nuclear structure.

He reported on new measurements at the University of Wisconsin which give additional check on the small magnitude of the distance through which acts the binding force within atoms.

Quantitative experiments by Prof. R. G. Herb and his colleagues with the high-voltage, pressure-tank electrostatic accelerator at Madison have extended

studies of atomic particles (protons scattered by protons) to energy ranges of 2,400,000 volts, said Prof. Breit.

These measurements extend to a new range of energy, the pioneering work of Drs. M. A. Tuve and N. P. Heydenburg and L. R. Hafsted of the Carnegie Institution of Washington on such proton-proton scattering.

The much higher voltage of acceleration employed by Dr. Herb's research

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Prof. George R. Green
Director of Nature Camps
THE PENNSYLVANIA STATE COLLEGE
State College, Pennsylvania

group at Wisconsin, said Prof. Breit, has been possible by the operation of the apparatus within a pressure tank. This tank prevents electrical sparkover and similar losses and permits much more effective operation. Moreover, the unit is very compact for this type of equipment.

An additional refinement in the Wisconsin apparatus has been the discovery that a small amount of carbon tetrachloride (cleaning fluid) or Freon (the new fluid used in electric refrigerators) within the pressure tank will improve the

operation. Now under construction at Washington and at East Pittsburgh are other pressure-tank atom smashers.

The key point of investigations on the forces within atom nuclei, indicated Prof. Breit, is that the apparatus must perform without fluctuation so that the results are quantitative. Only when exact knowledge is attained can theoretical interpretation be made. Qualitative measurements only enable one to make an intelligent guess as to the forces acting within the atom.

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More of the Meetings From Page 21

currences, both mechanical and electrical, which the tiny pump goes through during each pulsing beat.

The apparatus, necessarily exceedingly light and delicate, is made of glass and silver. On one side of a sheet of photographic paper it makes permanent an oscillograph trace responding to the electrical changes. Through the back of the paper it photographs the shadow of a hair attached to the mechanograph.

X-Rays "Paint" Flowers

X-raying flower buds while they were still quite small and closed produced some pronounced changes in color and shape of the flowers when they opened, Dr. Edna L. Johnson of the University of Colorado reported.

White dots, spots, and streaks appeared on the corolla margins of the three species treated—tobacco, phlox, and salpiglossis. The margins in some cases also came out with a dissected or

frayed appearance. In salpiglossis about ten per cent. of the flowers developed as dwarfs.

Buds had to be rayed early in development, or effects were not obtained. Toward the end of the blooming period, normal blossoms appeared in greater number.

Virus Survives Heat

Virus of mosaic, one of the worst diseases that afflicts growing tobacco, is not killed by the heat of flue curing as has been commonly supposed, Dr. J. A. Pinckard of the Tobacco Research Laboratory, Chatham, Va., declared. Laboratory and greenhouse tests with samples of flue-cured tobacco showed the virus to be still alive and ready for action.

The growers themselves are users of flue-cured tobacco for their personal smoking and chewing needs, so that they become "carriers" of the plague to their own fields. Experiments have

shown that young plants infected with the virus from flue-cured tobacco sources actually resulted in losses approximating \$180 an acre in 1937, Dr. Pinckard stated.

How Leaves Keep Cool

Leaves and coolness have long been practically synonyms: photographic studies with the invisible infra-red rays at Iowa State College, by Drs. W. E. Loomis and P. H. Carr, have shown why. Leaves reflect almost all of these heat-engendering rays, instead of absorbing them, as has always been supposed. Thereby they save their own lives; if they absorbed all of the infra-red radiation it would literally cook them.

A curious special condition was observed for the leaves of evergreens, like spruce and pine. In summer they reflect infra-red as all leaves do. In winter, however, they change in some way and absorb it. In this way they are able to keep warm enough to manufacture food on days when they would otherwise be frozen.

Cancerous Protoplasm Thicker

Protoplasm in cancerous and other tumor cells is more viscous, or "thicker," than it is in normal cells, Drs. M. F. Guyer and P. E. Claus of the University of Wisconsin demonstrated before a group of zoologists.

This was shown by whirling cells of both types in an ultra-centrifuge to a force many thousand times gravity. The contents of normal cells separated out into layers or strata much more readily than did those of the diseased cells.

When cancer cells were whirled at a force of 400,000 gravities for an hour, their nuclei frequently divided without the rest of the cell following suit, so that cells with two or more nuclei resulted.

Strange Tadpoles

White tadpoles, two-tailed tadpoles, and other abnormalities were hatched from frog eggs that had been whirled in an ultra-centrifuge and thus subjected to a force many thousand times gravity, Drs. H. W. Beams and R. L. King of the State University of Iowa reported. They suggested that the abnormal color was due to disturbed development of the hypophysis, one of the internal glands.

Two Heads—Two Minds

Two heads are not better than one, if both are on one body and both try to govern it. Being of two minds about what to do in an emergency may result in no action at all, which may result in disaster if danger is impending.

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