



DIATOMS TEST LENS QUALITY

Finer and more even than any lines that can be made by human device are the sculplings on the silica shells of the one-celled water-plants known as diatoms. They have long been used as critical test objects for determining the quality of microscope lenses. The two tips (at right) and the two center portions (on front cover) are from the neighborly pair shown in lower magnification at left. The photomicrographs are by Dr. Charles Goosmann of Cincinnati.

GENERAL SCIENCE

Low Cost "Atom Sifter" Sorts Atoms By Their Weight

Reports From Scientists in All Fields Are Gift To Public at Christmas Meetings in Columbus, Ohio

A NEW low cost "atom sifter" that sorts out atoms by weight and which will have important value for investigations of human, plant and animal physiology and in organic chemistry was described before the American Association for the Advancement of Science, meeting in Columbus, by Dr. Alfred O. Nier of the University of Minnesota.

Speaking before the symposium of the AAAS on "Isotopes," Dr. Nier told of a small mass spectrograph by which it is readily possible to determine the abundance of isotopes in a given sample. Isotopes are varieties of an element which have the same chemical properties but slightly different atomic weights.

In normal carbon, Dr. Nier explained as an example, 99 out of every 100 atoms have an atomic weight of 12 and one atom has an atomic weight of 13. If sufficient quantities of these heavy carbon atoms can be obtained, they can serve as "tracers" to study how plants transform

the atoms of carbon dioxide of the air into their body substance, how organic compounds containing carbon are created, or how the human body utilizes so many of the carbon compounds of which it is composed.

By a variety of methods, Dr. Nier explained, scientists have learned how to concentrate heavy carbon and increase its concentration over its normal one per cent. Enriched samples of carbon have been obtained containing 30 per cent. heavy carbon of mass 13.

However, for exact experiment with plants and animals and in chemistry it is not merely sufficient to have these heavy carbon atoms present. The investigator must also know exactly the relative abundance of the heavy carbon present.

And that is where Dr. Nier's atom sifter comes in. This apparatus, a small mass spectrograph, bombards a gas or vapor of the element (it may be carbon,

or oxygen, nitrogen or hydrogen) with a stream of electrons. The neutral gas atoms are thus turned into ions with an electric charge, which makes them susceptible to electric and magnetic fields.

By a suitable adjustment of these fields in the mass spectrograph it is possible to sort out the different weights of ions present. Since the ions carry an electrical charge the number present for each isotope is proportional to the electric currents, which can be read off on sensitive electric meters. The ratio of these currents is thus a ratio of the abundance of the isotopes present. For some elements there may be several isotopes.

Ordinary mass spectrographs have large magnets costing \$500 or more and they consume several kilowatts of power to generate their magnetic fields. Dr. Nier's new, compact unit has a magnet costing only \$20 for materials and consumes only 20 watts of power, about enough to light a dim, weak electric light. Several hundred dollars of auxiliary equipment is also needed but this is necessary no matter what type of mass spectrograph is employed.

In other reports to the symposium on isotopes Dr. Hugh S. Taylor of Princeton University showed how light and heavy nitrogen isotopes are being used to study the chemical reactions which produce ammonia synthetically in the presence of a catalyst.

Dr. Lloyd P. Smith of Cornell University told of a new kind of electric ion source which makes available large numbers of ions for use in mass spectrographs.

Dr. W. W. Watson of Yale University described the construction and operation of a multi-stage thermal diffusion apparatus for the concentration of heavy carbon of mass 13.

Science News Letter, December 30, 1939

Acadians Are Americanized

ACADIAN Frenchmen in Louisiana, descendants of exiles from Nova Scotia of "Evangeline" fame, are now physically Americanized. Only their accent and social customs distinguish these French-speaking people, who have maintained a high degree of isolation in their southern home, Prof. Harley N. Gould of Tulane University reported.

The Acadian in Louisiana today is strikingly taller than Frenchmen in France, and also taller than American soldiers of French ancestry in the U. S. Army, Prof. Gould learned by measuring 100 of the young men. There were few



DETECT RADIOACTIVITY

Mickey and Minnie showed visitors at the Carnegie Institution exhibit how radioactive salts can be detected in the body. As Mickey passes the Geiger counter in the apparatus being demonstrated by Dean B. Cowie, the clicks betray his diet.

true blonds and no red heads in the group measured. Merging of the Acadians into American stock, which is likely to take place, will have little effect on physique of future generations, the study shows.

Science News Letter, December 30, 1939

Leaders a Strong Force

NOTABLE success of Canada's Iroquois and Blackfoot Indians in adapting to civilization was attributed largely to able leadership of their far-seeing chiefs, by Dr. Diamond Jenness anthropologist of the National Museum of Canada.

Citing these Indians as examples of a frequently overlooked truth, Dr. Jenness declared that "the strongest forces for the regeneration or upbuilding of peoples come from within their own ranks, not from without." The ideal capable of stimulating a people may lie dormant for years or centuries, "as did the longing for liberty in Finland and Poland" unless some great leader arises to give it voice and to carry the people with him, the Canadian anthropologist stated.

"Every administration that deals with a native race," he advised, "should aim, first of all, to inspire or foster in that race some desirable goal and then to promote the evolution of native leaders who will command the confidence of their

people and guide them toward that goal."

Dr. Jenness stated that the steadfast belief of Canadian governments has been that the Dominion's aborigines should gradually fuse with whites. He predicted for the American Arctic a population of hardy frontiersmen carrying in their veins a strain of Eskimo blood, but speaking a European language.

Science News Letter, December 30, 1939

Either Foot Can Hurt

YOU may be able to kick better with your right foot than your left, but a corn will be equally painful on either side, Dr. L. Pearl Gardner, psychologist of Cornell University, told the meeting.

Blindfolded and running their toes delicately over different grades of sandpaper, different sizes of corks and marbles, and other articles of various shapes, 85 college students demonstrated in Dr. Gardner's experiment, that people are not pronouncedly either right-footed or left-footed in ability to feel.

Although most of the group were slightly faster in sorting by feel with the right foot than with the left, the right foot was responsible for more errors.

There is more evidence of laterality in the hands, however. Left hands are quicker but slightly less accurate than right hands. But left-handed persons prefer to use the left hand for sorting by feel and are justified in so doing; their left hands would select more rapidly and more accurately.

Girls are either more sensitive than men or they take time to make sure about minute differences in perception, Dr. Gardner found, for although the men had a higher speed, they made more errors.

The matter of sidedness is important, Dr. Gardner explained, because when a naturally right- or left-handed person is forced to use the other hand, he may be retarded in reading, writing, or spelling. Dr. Gardner is investigating the importance of sidedness in sensitivity as compared with sidedness in motor skill.

Science News Letter, December 30, 1939

Bad Health No Excuse

THE COLLEGE boy or girl who makes low grades needn't blame illness or physical defect. With less than 9% of students do physical conditions cause failure, Dr. A. S. Edwards, of the University of Georgia, reported on the basis of a survey made at that University.

If any relation can be found between physical defect and academic achievement, it is an inverse one, he said—the more physical defects and the more serious they are, the higher the grades. Those in the top third of the class in academic standing have as high a percentage of defects and illnesses as those in the lower groups.

Science News Letter, December 30, 1939

Conditioned Under Hypnosis

A MAN psychologically "conditioned" in a deep hypnotic sleep by smelling creosote during the ringing of a bell will afterwards have a vivid image of the odor of creosote whenever in the waking state he hears the ringing of that bell.

Results of a number of such experiments linking under hypnosis visual, auditory, olfactory, tactual and pain sensations in various combinations, were reported to the meeting by Dr. Clarence Leuba, of Antioch College.

Combinations learned in this way, he found, will later be reproduced automatically without any conscious process or the consciously remembered associations postulated by the classic laws of association.

Science News Letter, December 30, 1939

Recovered Plants Immune

BEHAVIOR of tobacco plants after recovering from the virus disease known as curly top was described by Dr. James M. Wallace of the U. S. Department of Agriculture. The plants were immune to further attacks of the same and closely related viruses, just as a human being who has had smallpox once is immune to that disease.

Unlike the human convalescent, however, the recovered plants continue to harbor the virus, and healthy plants can be made sick by transfer-inoculation from them. However, it does not seem to be as potent for mischief as virus taken from plants while they are still actively sick.

It was also found that tomato plants could be protected against the virus to some extent at least, by grafting upon them shoots from recovered tobacco plants.

Science News Letter, December 30, 1939

In making a muskrat coat several thousand pelts may be examined before about 75 are chosen for matched color and quality.