



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