BIOPHYSICS

Jaw Bone Fluid

Make first measurements of the electromotive force, resistance and electric current generated by a filling, with the jaw bone fluid acting like the battery liquid.

➤ THE FLUID in jaw bones can act like battery fluid, and a single gold or silver amalgam filling in the mouth constitutes an electric cell.

First measurements of the electromotive force, resistance and electric current through the filling in the case of such cells were reported by William Schriever, professor of physics at the University of Oklahoma at Norman, Okla., at the meeting of the American Association for the Advancement of Science in St. Louis.

The current, although very small, is enough to cause pain and irritation in the mouth, gums and tongue, as dentists have found.

With a specially devised electrometer-tube potential difference meter, Prof. Schriever was able to get usable data on 78 single fillings in the mouths of 66 persons from 18 to 30 years old.

The largest observed values of each of the electrical quantities reported for a gold filling are: resistance to bone, 0.31 megohm; resistance to saliva, 1.4 megohm; total resistance, 1.5 megohm; normal electric current, 1.07 microamp; electromotive force, 245 mv. One megohm, Prof. Schriever explained, is one million ohms, 1 mv is one thousandth of a volt, and 1 microamp is one millionth of an ampere.

The figures for amalgam filling are: resistance to bone, 0.42; resistance to saliva, 1.7; total resistance, 2.0; normal current, 3.4; electromotive force, 160.

The single metallic dental filling, contacting both saliva and bone-fluid, Prof. Schriever explained, constitutes an electric cell because the bone-fluid contacts the saliva through the tissue outside the tooth.

The kind of trouble that can be caused by metallic fillings is illustrated in a report from Dr. G. Aasgaard of Bergen, Norway. His experience, Prof. Schriever related, was with a patient who had a four-piece gold bridge and two large amalgam (silver) fillings with a potential difference of 330 mv between the bridge and one amalgam filling. Symptoms, such as irritation of the gingiva (gums) and the tongue, existed and the patient complained of pain in the tongue and in the palate.

When the two amalgam fillings were replaced by baked porcelain, the pain in the palate disappeared and the pain in the tongue was less. The gold bridge was removed and an amalgam filling was found under a gold crown. When this amalgam restoration was replaced with gold, the pain disappeared, the tongue regained its normal appearance, and the patient has remained without symptoms ever since.

The potential difference between two gold restorations was around 70 mv. This report indicates that the galvanic electrical effects due to dissimilar metallic dental restorations may cause pathologic conditions in the mouth.

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GENERAL SCIENCE

Scientist Supply Doubled in 12 Years

➤ THIS NATION has doubled the number of its scientists in the past 12 years. So has Russia.

The supply in this nation is still short of the demand and will remain so for several years to come. So Dr. Dael Wolfle, director of the Commission on Human Resources and Advanced Training, told the American Association for the Advancement of Science.

We now have about 200,000 scientists, about 46,000 of whom have earned Ph.D.'s or the equivalent, Dr. Wolfle revealed. To this may be added about 500,000 engineers and about 300,000 physicians, veterinarians and others in the health field.

"We can take considerable satisfaction in the amount by which we have expanded our own scientific resources in the past dozen years," Dr. Wolfle said. "But the USSR can take as much satisfaction in its efforts. The comparison gives no grounds for complacency that we have insured our continuing scientific superiority."

Looking ahead, Dr. Wolfle saw the most optimistic picture as being in the production of new Ph.D.'s. During the years just ahead, he said, we will have three times as many Ph.D. scientists with from three to eight years of experience as we have had during the recent past.

"Within this young and vigorous group we can expect to find many good research investigators and many good project and laboratory directors," he pointed out.

However, the production of scientists with bachelor degrees, needed to help the Ph.D.'s and to teach neophyte scientists, is not so good. During the next five years, about 190,000 will receive bachelor's degrees, only about two-thirds as many as in the past five years. Many of these are in ROTC or have been deferred to complete their college educations and therefore will be in the armed forces. Some have no intention of being scientists, some will marry and some will become teachers. Only a comparatively small number will be available for immediate scientific work.

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• RADIO

Saturday, Jan. 17, 1953, 3:15-3:30 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

John Stack, assistant director of the Langley Aeronautic Laboratory, National Advisory Committee for Aeronautics, Langley Field, Va., discusses "Designing Faster-Than-Sound Airplanes."

AGRICULTURE

Quality Independent Of What Soil Contains

➤ QUALITY OF soil has no significant effect on the quality of food grown on it, Dr. L. M. Turk, Michigan State College soil scientist, told the meeting of the American Association for the Advancement of Science in St. Louis. And animal products, including milk, reflect soil deficiencies even less than plants, Dr. Turk added.

The closest relation between soil and human nutrition lies in the quantity of food that a soil can produce, he said. Soils deficient in necessary minerals or organic materials cannot produce the amount of food a healthy, balanced soil can.

There need be no alarm about food supply for the nation's increasing population, Dr. Turk said, if good management practices, including proper use of fertilizers and lime, are put into effect.

If all the nation's farm managers worked as efficiently and with as much attention paid to soil nutrients as is done by the upper 10% of them today, our farms could double their output, without using a single acre more, Dr. Turk said.

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