BACTERIOLOGY

Silver Acts as Disinfectant For Drinking Water and Pools

ONE PART of pure silver in a quarter billion parts of water may eventually take the place of chlorine and oxygen as a disinfectant for swimming pools, artificial ice or drinking water. Minute quantities of this valuable metal added to water may form highly bactericidal solutions for washing and disinfecting purposes.

The Katadyn process for activating water with silver originated in Germany and it promises to have industrial uses. In dairies and breweries the bacteria-killing, activated water may be utilized. Investigators report that in any place where the growth of bacterial organisms takes place, such as the algae in cisterns and condensers, the Katadyn method could be used to advantage.

The silver activation process is relatively simple and lends itself to the treatment of quantities of water as large as a city supply at small cost. The actual cost of the silver added to the water is less than that used for coating the plates which are used as electrodes. The activation is carried on by a small tank-like apparatus installed in the supply pipe. In this tank are silver-coated plates, very similar in arrangement to those in a storage battery or radio condenser. An electric current of less than two volts potential is sent through the water passing by the plates, forcing silver ions into solution.

The life of the plates is determined by how deeply they are coated and the amount of silver discharged into the stream. One pound of pure silver is enough to activate nearly half a million gallons of ordinary, soft spring water.

Many silver compounds are highly injurious to human life. Silver nitrate, commonly known as lunar caustic, is frequently used in "burning off" skin ailments such as warts, while argyrol, a more dilute form of the same salt, is not to be taken internally although it is used in relieving throat and other inflammations. However, metallic silver has been found to be an entirely safe bactericide, the concentration necessary for the slaughter of microbes being much lower than one dangerous to human life.

As early as 1893 a Swiss scientist named Carl Wilhelm Naegeli doing botanical research work in Munich discovered that water in contact with pure silver or copper kills bacterial life. For this action Naegeli coined the word oligodynamic, meaning little (oligos) having much power.

Swimming pools and ice are almost everywhere considered to be more or less contaminated with microbe life. A large bathing pool in Germany is reported to have remained free from bacteria for weeks after the water was activated. The water from melting "activated ice" has also been found to kill germs introduced into it.

The Katadyn Process has not as yet been used to any extent in this country, but it is understood that contracts are being let for its installation.

Science News Letter, July 7, 1934

PHYSICS

Neutron May Not be Real Ultimate Particle of Nature

WHILE the newly discovered particle of matter, the neutron, has no electric charge that can be detected, new suspicions indicate that it may be composed of the close combination of a positive electric charge, the proton, and a negative electric charge, the electron.

If this is true the neutron would not be a real elementary particle of nature but a very stable combination of two things already known.

Prof. Alfred Lande, Ohio State University, reported to the American Physical Society meeting in Ann Arbor, Mich., that new considerations regarding the magnetic properties of atoms indicate the negative charge is bound to the lighter of two things inside a neutron, while the positive charge is joined to the heavier part. Thus the neutron would be a particle which represents a working agreement between a proton and an electron.

The principal difficulty in considering a neutron as composed of an electron and a proton comes in a study of their weights separately and in combination. The sum of the masses of a proton and an electron would be 1.0072 plus .00055, or 1.00775. This figure is larger than the mass of the neutron, 1.0068, determined experimentally by Prof. James Chadwick of Cambridge University, England, but is smaller than the neutron mass, 1.010, as measured in Paris by Irene Curie and her husband, F. Joliet.

If 1.010 is correct, physicists have been anticipating trouble, for they then would have two atomic objects weighing less in combination than their sum separately.

Dr. Lande's magnetic considerations, tackling the problem from another front, indicate that the neutron is a proton plus an electron and implies that the Curie-Joliot measures of 1.010 for the neutron mass may be in error.

Science News Letter, July 7, 1934

PHYSICS

Atomic "Bullets" Travel At 174,840 Miles A Second

NEGATIVE particles of electricity—the electrons—are being "kicked" down evacuated glass tubes at the University of Virginia with speed reaching 94 per cent. that of light, the fastest thing in the universe. Light travels 186,000 miles a second or 667,600,000 miles an hour. Electrons speeded up in the apparatus of Prof. J. W. Beams and H. Trotter, Jr., have reached velocities of 174,840 miles a second.

Reporting their experiments in *The Physical Review,* the Virginia scientists describe their method for obtaining very high speed particles for use in research on bombarding atoms where large energies of impact are required.

Electrons having kinetic energy comparable with that achieved if a million volts of storage batteries were connected in series, are obtained by the use of only 300,000 volts alternating current from power lines. Or, if a small Van de Graaff type electric generator is employed, electrons having energies well over a million volts are obtained with only 30,000 volts. The apparatus for this last case boosts up the energy by a factor of over 40.

The scientific trick in the method, which makes the high energy gain possible, is to apply the small voltages at just the right times as electrons fly down the tube. Each electron passes by a series of electrodes and is speeded up step-by-step on its journey to the far end of the apparatus.

Science News Letter, July 7, 1934