

*"There is no more
Fateful Force in man
than hostility."*

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by Walter Bromberg, M.D.

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RADIO

Ionized Clouds at Night

► CLOUDS of ionized atmosphere, invisible to the human eye, are all that remain at night of the "radio roof" that during the day enables us to hear distant broadcasts.

These clouds are about 55 to 65 miles above the earth's surface, R. A. Helliwell of Stanford University reported at the joint meeting of the International Scientific Radio Union, American Section, and Institute of Radio Engineers in Washington.

Whereas the highest radio-reflecting layers, extending from around 100 to 250 miles above the earth, are always present, the lower layers come in with sunlight. The electrons, knocked out of atoms by the sun's ultraviolet light, tend to recombine when sunlight is withdrawn.

These patchy clouds of ionization are

probably blown about by the high-velocity winds known to exist at ionospheric heights, Mr. Helliwell stated. At times the lowest of these clouds of ions remain substantially stable for as long as ten minutes, again within a few minutes they will be five miles lower or higher than before.

The ionized layers are assumed to be quite patchy in the lower fringe of the ionosphere. Echoes from radio signals, sent directly upward from a broadcasting station, are sometimes received from two clouds, one six to ten miles above the other. While some signals are reflected from low-level clouds of ionization, some penetrate between these patches and are reflected from clouds at a higher level.

Science News Letter, November 13, 1948

CHEMISTRY

Quartz Crystals Made

► SYNTHETIC quartz crystals, suitable for use in radio equipment, have now been produced in high-grade quality under the sponsorship of the Army Signal Corps.

During the month of September, the Brush Development Company of Cleveland delivered to the Signal Corps the largest synthetic quartz crystal, essentially free from defects, known to have been produced from any artificial source. The greatest dimensions of the sample are equal to the diameter of a silver dollar.

Quartz crystals are grown by deposition from a solution containing the raw material derived from quartz-sand or other silica materials, in a closed metallic container at a temperature of about 750 degrees Fahrenheit and at pressures as high as several thousand times that of the atmosphere. Individual molecules are deposited on a seed crystal in a regular manner to produce a larger model with the same shape as the seed.

It is believed that mass production of synthetic quartz crystals may be feasible, but considerable laboratory work must be done before they can be made economically. Their manufacture in this country would make the nation independent of natural quartz crystals which now come principally from Brazil. Relatively little satisfactory quartz for the purpose has ever been found in the United States.

The quartz crystals are used in radio transmitters, and in other applications, to regulate radio oscillation or radio wave frequency. A quartz crystal is what scientists call a piezoelectrical substance. It forms electrical charges on its surface when mechanically stressed, or exhibits mechanical strains when electrically charged. Other substances have the same properties, but

none have been found that are as satisfactory in use or as economical as quartz.

Science News Letter, November 13, 1948



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