

1-1931

## Editor and Advisory Board

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### Recommended Citation

(1931) "Editor and Advisory Board," *Science Bulletin*: Vol. 3: No. 5, Article 5.

Available at: [https://scholarworks.uni.edu/science\\_bulletin/vol3/iss5/5](https://scholarworks.uni.edu/science_bulletin/vol3/iss5/5)

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## SCIENCE BULLETIN

Editor-in-Chief: W. H. Kadesch. Advisory Board: Dr. L. Begeman, Head, Department of Physical Science; Dr. E. J. Cable, Head Department of Natural Science.

Issued Monthly. Entered as second class mail matter at the post-office, Cedar Falls, Iowa, under the act of August 24, 1912.

Five cents per copy, 35c per year, outside of Iowa.

### RADIO AND THE OUTER ATMOSPHERE

In investigating the possibilities of short-wave radio the surprising fact was discovered that although short waves may often be clearly received at distances of thousands of miles from stations with very little power, it is difficult or impossible to detect them at nearby points, 30 to 300 miles away. This can be understood if the upper atmosphere acts like a reflector. All points except those within a very few miles of the station will be in the shadow of the earth, and the waves will not be detected. Those sufficiently distant will receive them after one or more reflections.

These phenomena indicate that the upper atmosphere contains a great many ions and free electrons. This ionized condition gives the atmosphere the electrical conductivity necessary to make it a reflector. The ions are doubtless produced by the ultraviolet in the sun light. The stratum of greatest ionization, known as the Kennelly-Heaviside layer, is at an average height of about 100 miles.

### SMOKE MAKES CITY WARMER

Mr. Fred L. Disterdick, of the U. S. Weather Bureau at Des Moines, has observed surprisingly great differences in temperature between the smoke covered city and the nearby country. When the

air in the country is clear, and the city is covered with its usual blanket of smoke, the city is always at least five degrees, and most of the time ten degrees or more warmer than the country. Comparing minimum temperatures he found on one occasion that when the temperature in the country was 35 degrees, at his office in the city, only five miles away, it was 52.

Mr. Disterdick further says that the minimum temperatures tend to be lower on Sunday and Monday mornings than at other times. He ascribes this to the fact that there is less smoke in the city over week-ends, when industries close down.

### UNIVERSE MAY NOT BE RUNNING DOWN

The Sun by radiation is losing energy at a tremendous rate. The Earth receives about one two thousand millionth part of this, and other planets, satellites and asteroids their tiny share. The rest travels out into the depths of space, presumably to be lost forever so far as the solar system is concerned. In radiating heat and light the Sun is not only becoming cooler, but according to the views of modern Physics is also losing mass—the matter which is converted into the emitted radiant energy. With the myriads of other stars the situation is the same. The conclusion has seemed inevitable that the universe is running down—slowly but surely approaching a cold and lifeless end.

In his retiring presidential address before the American Association for the Advancement of Science at Cleveland recently Professor Millikan holds out a hope that this fate may not after all be in store. He believes that the cosmic rays may be taken as an indication that somewhere in the interstellar regions such elements as helium, oxygen, silicon, and iron are being continuously formed from the simplest element, hydrogen. He believes it possible that hydrogen