stations covering periods of 6 to 9 hours' duration nightly. In this way there are large changes in the lunar hour angle for each night's observation, while solar activity remains practically constant during this interval. Furthermore, the results of measurements here presented were made during the last sun-spot minimum when the sun-spot numbers were near the zero value. It is thus believed that the effect of solar rotation in the present results has been for the most part eliminated.

A curve plotted with radio intensities in microvolts against lunar hour angle indicates that for the transmission between WBBM Chicago and Delaware, Ohio, there is a marked increase in field intensity strengths with the hour angle 95°. Similar reductions of measurements between KFI Los Angeles and Delaware, Ohio, reveal a pronounced maximum of field intensities at hour angle of the moon 150°. The amplitude of the intensity range is surprisingly large. Since these measurements are based on a period of low solar activity and include observations extending over large ranges of hour angle of the moon, it would appear that we have confirming evidence for some sort of a lunar tide in the ionosphere for which no adequate explanation can yet be given.

Through the courtesy of Professor H. R. Mimno data gathered at the Cruft Laboratory during 1933–1934 have become available for testing any lunar effects on the percentage of E-layer reflections based on a frequency of 3492.5 kc. About 10,000 hours of observations were included in the material. During this time there were reflections from the E-layer on approximately 250 days during the period. There was an increase in the percentage of time of reflection from the E-layer of from 12 per cent., when the moon and the sun were in close proximity, to about 22 per cent., when the differences in hour angle between the sun and the moon was 15 hours. Assuming that part of this effect may be seasonal, the difference in the observed percentages from the expected percentages based on Professor Mimno's trend curve reveals a nearly 8 per cent. increase in reflections from the E-layer as the difference between the hour angle of the sun and moon increases from 0 hours to 14 hours. Corresponding decrease in the percentage of reflections accompanies the change in hour angle difference from 14 hours to 24 hours. These results may, therefore, be interpreted as indicating that when the moon is opposite the sun there is a tendency for an increase in the ionic density on the night half of the earth's atmosphere, thus favoring increased numbers of reflections from the E-layer. When the moon is in proximity to the sun such a slight effect as it may have is probably lost in the solar effect on the day half of the earth's atmosphere.

The apparent and very appreciable change in the percentage of reflections of the E-layer with the changing position of the moon appears to add corroborating evidence for electronic tides in the atmosphere which are in agreement with deductions based on the measurements of field intensities already mentioned.

There has long been known a change in the magnetic characteristics of the earth's field which correlates with the lunar hour angle and declination. Since variations in the induced magnetism within the earth would follow changes in the electron density of the upper atmosphere, the lunar period in magnetic variation appears to give independent evidence for the existence of tides in the ionosphere.

Acknowledgment is again made of aid received from the Rumford Fund of the American Academy of Arts and Science used in acquiring the recording equipment, and also to grants from the American Association for the Advancement of Science and the American Philosophical Society for aid in pursuit of investigation of cosmic-terrestrial relationships of which the present investigation forms a part. A more complete publication and discussion of these results will appear elsewhere at a later date.

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THE "BROWN" SNOWFALL IN NEW HAMPSHIRE AND VERMONT

THE Bureau of Chemistry and Soils received several samples of dust in the recent fall of "brown" snow (February 24, 1936) from observers in New Hampshire and Vermont. A sample from Wells River, Vermont, was large enough to permit a mechanical analysis and chemical analysis of the dust of colloidal dimensions. This sample was largely silt and much coarser than the smaller samples obtained from Keene and Peterboro, New Hampshire. The colloidal matter from the Wells River sample yielded the following analysis:

SiO_2	48.9 per cent.
Al_2O_3	20.4 " "
Fe_2O_3	6.1 " "
CaO	5.4 " "
MgO	3.2 " "
Ignition loss	16.0 " "

It has been repeatedly shown that the ratio of silica to alumina plus iron oxide is a characteristic feature of the composition of the soil colloids of the great groups. This ratio varies from somewhat above 4 in the western soil colloids to less than 1 in the lateritic soils of the south. It is therefore useful in determining the origin of the material in dust storms. The analysis shows a ratio of 3.3 and also a relatively high content of lime and magnesia. All the samples showed the

presence of calcium carbonate and silicified organic remains, both characteristic of soils from the general region west of the Missouri. These characteristics taken together make it probable that this dust could not have originated east of the Mississippi River.

The fall at St. Johnsbury, Vermont, was estimated by observers at ten tons to the square mile. At Keene and Peterboro, New Hampshire, it was considerably less and the dust particles were much finer. The Peterboro sample showed an ignition loss of 15 per cent., which probably means that it is largely colloidal. This deduction is also indicated by microscopic examination. It would appear that there was considerable air elutriation or mechanical separation by air currents during the passage of the dust cloud toward the northeast.

The silt of the Wells River sample apparently contained as much or more lime than the colloidal matter. A fall of ten tons to the square mile amounts to 1,080 pounds of lime for that area. It can thus be seen that the quantity of plant food elements transferred long distances by dust storms may be considerable.

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OCEAN SUNFISH IN HABANA WATERS

DURING the night of March 24, 1936, a large pointed-tailed sunfish (*Masturus lanceolatus*) was captured in Habana. It had entered the Almendares River a distance of 200 yards and was in a deep pool from which it could not escape when discovered. It was harpooned and gaffed and after a struggle of three hours was finally landed. The carcass was placed on exhibition, where it remained four days. Before being removed and disposed of it was opened and dismembered. There were no ossified bones in the skeleton. The substance of the skull and the spinal column resembled a hard stiff jelly or the meat of a ripe coconut. The rib, fin and tail bones were cartilaginous. The intestines were empty, except for a single fragment of seaweed and a small amount of dark fluid resembling thin mud. Both the intestines and the surface of the liver were infested with parasites. The same observation was recorded by Howell. A sucker-fish was found in the rear part of the buccal cavity. The fishermen are familiar with the sucker-fish that attach themselves to the surface of other fish, and they stated that the one found in the sunfish was different from any they knew.

The animal was 8 feet 6 inches long, 4 feet 3 inches deep in front of the dorsal fin and 8 feet 3 inches high through the dorsal and ventral fins. The dorsal fin was 2 feet 10 inches long and the ventral fin 2 feet 4 inches. The weight was estimated to be 1,200 pounds.

This is the second reported occurrence of the pointed-tailed sunfish in Habana waters. The other was reported by Howell[1] in 1934.

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SPONGE CONSERVATION

ON a recent visit to Tarpon Springs, Florida, I had an opportunity to see the sponging industry in that place, which is the largest of its kind in the world. Here is a sponge exchange to which are brought the catches for auctioning to the sponge buyers. I listened to the owner of the exchange addressing our group on sponging methods and was particularly impressed with his statements about the age of the industry, which he claimed had prospered in his native land, Greece, for more than two thousand years. I was still more impressed with the little change that had taken place in the sponging industry through these centuries. The only improvement that seems to have been made is in the use of gear to enable one to obtain from the deeper reaches of the sea the harvest that he seeks.

The wastefulness of the methods used to-day is the same as that in the ages gone by, and in this time of conservation it has occurred to me that scientific methods should be employed in the gathering of sponges.

Sponge culture, such as was carried on on Chase's Key in Florida prior to the war, showed that cuttings of sheepswool sponges an inch in size would grow to marketable size in from two to four years, depending on the species in question, and that method was there employed for cultivating or, let us say, growing sponges under controlled conditions.

To-day spongers merely rip the animals from their moorings, then haul them out on the beach to die, returning them to the sea long enough to macerate them and until the minute marine organisms clear away the flesh, leaving the spongy fiber, which is then carried to the so-called market or sponge factory, where the base with its attached bit of hard bottom is trimmed away and cast out, and the rest packed for further treatment. In other words, every time a sponge is ripped up the entire colony is destroyed.

The suggestion that I wish to offer is that the laws of the governments interested in sponge industry should be modified to require the spongers to cut the sponge from its mooring, leaving a small portion of the animal intact, or, if hauled aboard, to cut off the base and cast this back into the sea. By so doing, the animal will be able to regenerate the lost parts in due time. The gathering of the sheepswool sponge would then be comparable to the shearing of a sheep instead of killing and fleecing it, as is done at present. By this method a continued crop would be assured.

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[1] Howell, *Mem. Soc. Cub. Hist. Nat.*, Vol. 8, p. 338, 1934.