

Dr. Meisinger spent the rest of the night asleep in the basket of his balloon three miles from town.

METEOROLOGISTS FAVOR REFORM OF THE CALENDAR

Reform of the calendar, with a year to consist of 13 months of four weeks each with one "extra" day, was advocated by a resolution passed by the American Meteorological Society in recent session here. The change was urged by Dr. C.F. Marvin, chief of the U.S. Weather Bureau, on the ground that it would simplify the collection and study of weather data.

Dr. Marvin said the whole question of the reform of the calendar was before a special committee of the League of Nations, and the resolution approved by the meeting directed the secretary of the society to notify the League committee of the society's action. Dr. Marvin added that January 1, 1928 had been tentatively chosen as the most favorable time for a number of years to come on which to start the new calendar, since that year begins on Sunday.

By the proposed calendar, every month would be just four weeks long, the same day of every month would always fall on the same day of the week, and religious and secular days such as Easter and Election Day would always come on the same day of the year. A committee on which all the great religions of the western world are represented is now conferring with the League of Nations committee on this subject.

PREDICTING THE MOVEMENTS OF ELECTRONS

By Dr. Edwin E. Slosson.

The essence of science is prophecy. Until a student of nature can tell what is going to happen beforehand his knowledge is of uncertain validity and little value.

The science of astronomy had its birth twenty-five hundred years ago when the Greek philosopher, Thales, predicted the coming of an eclipse of the sun.

Today a new science is being born, quite as marvellous as astronomy and much more important to the world. It may indeed be called "the astronomy of the atom", since it deals with the orbits of the electrons in their revolution about the central nucleus. This reminds us of the arrangement of the solar system with the positively charged nucleus standing for the sun in the center and the corpuscles of negative electricity revolving around it. But there is this important difference. The solar system is stable and the planets pursue almost exactly the same course, century after century, fortunately for us who are living on one of them. It would be decidedly disconcerting to us, of, for instance, Mars should be carried off by a comet, making the grand tour of the universe, and Saturn should suddenly drop into its place. Or if our earth should be detached from the sun and swept off through space and be drawn into the sphere of influence of some other star like Sirius, which we might not like so well as our own sun. Yet that sort of thing happens frequently with the electronic planets

inside the atoms. And it has now been found possible to predict what particular orbit a loosed electron will fall into. This is possible because when an electron shifts from an outer orbit to one nearer the nucleus it sends out a flash of light of a definite color, that is to say the waves of the emitted light are of a certain length and a corresponding frequency. The "frequency" means the number of waves passing a given point in a second. The longer the waves, of course, the less the frequency. The frequency and wave length of the light radiated by any star or incandescent gas can be determined by the location of the bright lines in its spectrum.

Prof. R.A. Millikan of the California Institute of Technology has recently discovered a way of stripping off one by one the outer electrons from an atom and he can tell in advance with amazing accuracy just what sort of light will be emitted by such a stripped atom. Last year Dr. Millikan was awarded the Nobel Prize in physics for the ingenious piece of apparatus that enabled him to catch and count the loose electrons and calculate their electric charge. He has this year penetrated still further into the mystery of atomic structure. His new discovery was to have been explained to the National Academy of Sciences on the afternoon of April 29, but on account of the tragic death of Dr. E.F. Nichols while addressing the Academy that morning no further papers were read during the day. But Professor Millikan has kindly consented to give Science Service a plain account of what he has done and what it means.

THE ASTRONOMY OF THE ATOM

By Dr. Robert A. Millikan,
California Institute of Technology.

The world is just entering upon a period of development of atomic mechanics, or of the astronomy of the atom, which has many points in common with the period of development of celestial mechanics which occupied the two or two and a half centuries following Galileo. Celestial mechanics was made possible through the invention of the telescope. The spectroscope bears precisely an analogous position with respect to atomic mechanics. The telescope made it possible to determine the exact orbits of heavenly bodies and to check by precise observation of such phenomena as the time of eclipses the theoretical results which are consequences of the Newtonian laws. Similarly, today the spectroscope has furnished the physicists with means for the quantitative testing of the recently developed laws of atomic mechanics, and it is today furnishing as exacting proof of the orbital theory of electronic motions as the telescope furnished a century earlier for the orbital theory of the motions of heavenly bodies.

The present paper shows not merely what kind of phenomena can be predicted with the aid of the orbital theory of electrons and atoms, but with what amazing precision these predictions are verified by the test of experiments. These results have been made possible because of the development of high vacuum "hot spark" spectrometry with the aid of which we were able first in 1920 to push three or four octaves farther into the ultra-violet than preceding investigators had gone. For the sake of simplicity, I shall at first confine attention to the radiations emitted by one particular atom, namely, the atom of boron, familiar to every household because of the abundant use of boracic acid for disinfecting purposes.

The atom of boron is the fifth in the order of increasing atomic weights,