resigned to take a professorship in chemistry in Washington State University, to which institution Dr. M. W. Harrington, late of the Weather Bureau, has been called as President, and Mr. Harry Landes, A. M., of Harvard University, to the professorship of Geology.

It has been incorrectly reported in several journals that the University of California will be moved from Berkeley to San Francisco. Mayor Sutro has given 13 acres of ground in San Francisco and the State Legislature has appropriated $250,000 for the erection of buildings, but these are for the professional schools of law, medicine, dentistry, pharmacy and art, which have always been located in San Francisco.

Mrs. Cornelia A. Atwill has given $6,000 to Columbia College for the foundation of two scholarships, to be known as the Stuart Scholarships in the school of arts, in memory of her grandsons, S. B. Stuart, Class of 1880, E. T. Stuart, Class of 1881, both of whom have since died. Mrs. Atwill reserves the privilege of nominating the scholars if so disposed, during her lifetime.

President Peter McVicar has resigned the Presidency of Washburn College, Topeka, Kans., which position he has held since 1871.

The British Treasury has offered to include in next year's estimates a grant of £20,000 to the University College of South Wales. Cardiff and the Drapers company have offered to subscribe £10,000, provided that similar amounts are collected locally.

Among recent foreign appointments we notice that Dr. Dogiel, professor of anatomy in the University of Tomsk, has been called to the University of St. Petersburg, and Dr. J. P. Kuenen has been called to the new Harris chair of physics in University College, Dundee. Dr. F. Marés has been promoted to the professorship of physiology at the Bohemian University of Prague and Dr. Schuchardt has been appointed to a newly established chair of psychiatry at Rostock.

The Williams Science Hall given to the University of Vermont by Dr. E. H. Williams, of Philadelphia, at a cost of $13,000 is now nearing completion. It contains laboratories and lecture rooms for the departments of chemistry, physics, biology and electrical engineering. The present Freshman Class, 78 in number, is the largest in the history of the University.

From the Oxford University Gazette of October 11th giving the courses for the Michelmas term, it appears that in mathematics, astronomy and mechanics lectures are given occupying together twelve hours per week; in physics four hours per week; in chemistry eleven hours; in comparative anatomy two hours or more; in physiology five hours; in botany six hours; in geology six hours; in rural economy two hours; in zoölogy two hours, and in anthropology one hour. Laboratory work is offered in connection with most of these courses, but the opportunities for scientific study at Oxford do not seem to be so favorable as at the leading German and American universities.

CORRESPONDENCE.

THE PROBLEM OF SOLAR MAGNETISM.

The work of Professor Bigelow (Science, p. 509, October 18, 1895) upon this subject has reached such dimensions as to command attention; at the same time the conclusions require the abandonment of so many ideas which experimental physicists have considered as representing experimental facts that I venture to call attention to some of the points which will render the new theory difficult of acceptance, by some at least. If Professor Bigelow has forseen and quantitatively explained away these difficulties we ought to have the explanations.

If meteorology has contented itself (p. 510) with only a consideration of combinations of 'earth's gravity, earth's rotation and equa-

torial insolation,' and has treated the whole question of insolation, it seems to me to have considered, in the last factor, the most important source of energy for disturbances of the atmosphere. We receive from the sun daily sufficient radiant energy to melt a sheet of ice six inches thick (180 ft. annually, Langley). Two-thirds of this is caught by the atmosphere. either on its way in or out. A rough calculation shows this energy sufficient to raise the temperature of the entire atmosphere a little over 3° C. daily. When we remember that this action is concentrated upon a portion of the atmosphere, which is changing daily and annually, and upon certain strata, depending upon their relative humidity, it seems almost superfluous to seek for other forms of energy to account for the activities of the air.

The keystone of the new theory seems to be the assumption that the sun is a magnet and its activity as such affects us to a marked extent. The ratio of the sun's diameter to its distance from the earth is about 1 to 100. It is almost inconceivable that the best steel ball magnet one foot in diameter would affect the most delicate instrument at a distance of 100 feet. Possibly an electromagnet might, but how shall we conceive the sun as an electromagnet, even with the assumption of a solid nucleus and distant envelope. No trace of permanent magnetism has ever been observed in a body that is within several thousand degrees of the sun's temperature; magnetic effects vanish at 800° to 1000° C., except those due to electric currents. Suppose the sun to be a magnet, any distribution of magnetism at all adapted to the new theory would give a field at our distance homogeneous in its distribution in solar longitude, and hence the axial rotation of the sun would not affect the earth's magnetic state; this would be done only by variations from time to time in the intensity or distribution of the sun's magnetism. In no case can the earth's total magnetization be due to the sun's field. It is far too weak to induce such intensity even in the most susceptible metal, much less in such non-magnetic material as the earth's crust. Furthermore, if such were the case the magnetic poles would pass round the earth daily, somewhere between latitudes 60° and 75°.

It would appear that Professor Bigelow attributes to magnetic lines of force entirely novel properties. Properly speaking, lines of force are directions only, and if electricians refer to them as containing energy they really mean tubes of force.

There can be no radiation along a line or tube of force. When the author speaks of the sun as a 'magnet in dynamic operation,' and 'live lines of magnetic force originating in the sun and propagated to the earth in wide sweeping curves,' he uses terms to which students of mechanics and physics have fixed definite meanings, but in a way quite unintelligible to them. Also when variations of terrestrial latitude are attributed 'to the action of stresses in the ether at the surface of the earth, due to the mechanical forces generated in the ether by the transmission of radiant energy.' If we are to admit a new form of radiant energy we must have good cause indeed. No doubt we receive from the sun radiant energy of wave-lengths varying from fractions of a micron to possibly many kilometers, and this varies in nature from actinic to electric, from light to Herz waves of gigantic size.

Again, with reference to the reversal of the curves, Professor Bigelow's magnetic theory seems incapable of explaining such a phenomenon. To doubt that a line of magnetic force is continuous from one pole to the other, in fact, is a closed curve, is to doubt the most fundamental principle of magnetism as at present experimentally established. Electrostatic tubes, or lines of force may be open curves, but the difference between the two cases must be evident. It is difficult to see the connection between these hypothetical magnetic phenomena and the temperature of our atmosphere. It is too permeable and too bad a conductor to catch much of the slow radiant energy, either magnetic or electric.

In view of these difficulties among others are we not warranted in asking a fuller justification of a hypothesis, seemingly based upon curves of small residuals, obtained by a delicate and apparently complicated system of selecting and plotting.

WM. HALLOCK.

COLUMBIA COLLEGE, October 24, 1895.