term "professional chemist," the restriction to become effective on September 1, 1926. This act will not prevent others from practicing the profession of chemistry, so long as they do not endeavor to use the title "professional chemist." An amendment to the original bill provides that nothing in the new legislation shall be interpreted as affecting the rights and privileges granted to the members of the corporation of professional engineers of Quebec, those who hold diplomas issued by the Montreal Polytechnic School or by the faculty of applied science of McGill University, those who have a diploma of pharmacy or medicine, or members of the two latter professions who shall be allowed as in the past to practice chemistry under whatever name they wish, provided they do not take the title "professional chemist."

ACCORDING to the *Electrical World* the Swiss national committee of the World Power Conference, with the permission of the international executive conference, will hold a sectional meeting in Basle, Switzerland, this year from August 31 to September 12. European countries have been asked to participate in an organized way. Other countries have been invited to have representatives in attendance, and papers submitted through their national committees will be incorporated in the proceedings. O. C. Merrill, the chairman of the American national committee, has not determined as yet whether it will be possible to submit a national paper to this conference. The main subjects to be considered embrace railway electrification, electricity in agriculture, exchange of electrical energy between countries, utilization of water power and inland navigation, and the economic relation between electrical energy produced hydraulically and that produced thermally.

UNIVERSITY AND EDUCATIONAL NOTES

IT is announced that a chemistry building costing $1,200,000 will be erected with a portion of the $20,000,000 fund now being raised by Princeton University. The building will be in the collegiate Gothic style to harmonize with other buildings recently constructed.

CONSTRUCTION of the new chemistry building to be erected at the University of Maryland will begin almost immediately. The entire sum appropriated by the state legislature ($210,000) will be employed in constructing the building itself. Sums necessary to equip the various laboratories have been donated by Dr. and Mrs. M. L. Turner, of Berwyn, Maryland; Dr. H. A. B. Dunning, of Hynson, Westcott and Dunning; Dr. Samuel W. Wiley, of Wiley and Co. Inc., and the Alumni Association of the university. The new building will be ready for occupancy February 1, 1927.

A CAMPAIGN is in progress to raise an endowment fund for the Medical College of the State of South Carolina under the chairmanship of Dr. D. Lesesne Smith, Spartanburg. An organization is to be formed in every county in the state.

DR. WILLIAM LORENZO MOSS has been appointed acting dean for the first half of the year 1926–27 and assistant dean for the second half of the year in the school of public health at Harvard University.

DR. FREDERICK L. REICHERT, of the Johns Hopkins University Medical School, has been appointed associate professor of surgery in the Stanford University Medical School.

AT Yale University Dr. John Spangler Nicholas, assistant professor of anatomy at the University of Pittsburgh, has been appointed assistant professor of biology and Dr. Arthur Edward Ruark, of the U. S. Bureau of Standards, assistant professor of physics.

ROBERT F. FIELD, instructor in physics at Harvard University, has been appointed assistant professor of applied physics.

DR. C. R. MEGEE has been appointed acting professor of agronomy in the college of agriculture of Rutgers University.

PROFESSOR JOHN A. FERGUSON, head of the department of forestry at Pennsylvania State College, has been named visiting professor of forestry at Yale University for 1926–27. Professor Ferguson will take over the work in forest management while Professor Herman H. Chapman is on leave to participate in a government investigation of forest taxation which is being conducted by Professor Fred R. Fairchild, of Yale.

DISCUSSION AND CORRESPONDENCE

WHY THE TEMPERATURE OF THE AIR DECREASES WITH INCREASE OF HEIGHT

THE decrease of atmospheric temperature with increase of height is a phenomenon of unusual philosophic fascination, if one may so infer from the frequent explanations he sees of it, and from the further fact that nearly always these "explanations" are either utterly erroneous, or, at best, wholly inadequate. And the pity of it is that some of the worst of these come from high authorities, through hasty or heedless writing, for surely they know better.

One eminent scientist, in a great treatise now appearing, explains this decrease of temperature with

increase of height as being due to the accompanying decrease of density—the lighter or upper air not being able to hold so much heat as the lower and heavier air. Presumably heat capacity per unit volume is meant, but it is not so stated; neither is any attempt made to tell why this decrease of heat capacity should lead to a decrease of temperature. This is unfortunate, for such an attempt would have ended in complete failure, and shown at once how utterly erroneous the given explanation really is. For instance, it implies that the rarer the atmosphere the lower its temperature, indefinitely, a conclusion flatly contradicted by numerous aerological observations begun more than a quarter of a century ago and continued every year since then.

Another eminent scientist in a delightful book just published says that this paradox is the easiest sort of thing to explain—that it is all because the air is very transparent. This is nice enough so far as it goes, but it leaves the reader to supply nine tenths of the reasoning, and to find, if he can, why the atmosphere instead of always growing colder and colder with increase of transparency, that is, in general, with increase in height and rarefaction, as this theory indicates it must, cools only to a limited extent.

Obviously, then, the correct explanation of this phenomenon, although well known, is not widely known, and therefore needs to be published in a conspicuous place, and restated in some form every now and then until eventually it becomes securely fixed in scientific literature.

The essentials of this explanation are as follows—tediously numerous and detailed for any one who really knows the subject, but because of such detail all the more helpful to some who may not yet fully understand it:

(1) A considerable portion, actually between one fourth and one third, of the solar radiation incident on the outer atmosphere, gets through to, and is absorbed by, the surface of the earth.

(2) A roughly equal portion is directly taken up by the air, owing mainly to the presence of water vapor and carbon dioxide, and, when there are no intercepting clouds, generally in increasing amount per unit mass with decrease of height.

(3) Radiation from the surface of the earth also is strongly absorbed by water vapor and carbon dioxide, hence, as a rule, decreasingly absorbed per unit mass of air with increase of height.

(4) Clearly, then, through absorption of radiation and by conduction from the earth, the surface air is more heated and thereby raised to a higher temperature than that of any other level.

(5) Owing to its expansion with increase of temperature, and to the irregularities of surface heating, the lower air here and there becomes lighter than that immediately adjacent to it, by which it therefore is pushed up much as a cork is pushed up when let go under water, or a balloon when set free. It does not rise of its own accord, as it were, or by virtue of some strange levitation as it usually is said to do. It is forced up.

(6) With increase of height the pressure per unit area becomes less and less by the weight of the air left below in a vertical column of unit cross-section.

(7) As the pressure decreases the rising mass of air expands, but always against the then remaining pressure, and thereby does work.

(8) This work is at the expense of the energy of the expanding air—the heat it contains. That is, the rising air expands against the current pressure, thereby doing work at the expense of its own heat and, in consequence, growing colder with increase of height.

This in substance is the end to the most elaborate explanation one commonly sees of the cause of the decrease of temperature with increase of height. But according to it, no limit is set to the surface temperature nor to the height of convection except, inferentially, that which would be sufficient to cool the rising air down to the absolute zero. Yet we know that the temperature of the surface does not increase indefinitely, and that convection is limited to a comparatively low level, and cooling to a correspondingly moderate degree. All these limitations result from the fact that the air not only absorbs radiant energy but also emits it.

Now, the efficiency of an object as an absorber of radiation of a given kind, or wave-length, depends on its nature and not upon its temperature, while its rate of giving out radiation decreases very rapidly with decrease of temperature.

(9) Evidently, therefore, the normal limit to which warmer air at the surface or any other level can eventually cool by convection is that temperature at which it loses as much heat by radiation as it absorbs.

On the whole, then, the surface air is gaining heat, and the free air losing heat so long as its temperature is greater than that which gives the radiation equilibrium mentioned above. In short, all the atmosphere under this equilibrium ceiling (roughly seven to fifteen kilometers above sea level, according to latitude) is being heated below, especially at the surface, and cooled above. By this means mainly, and partly by the turbulence of the winds, vertical convection of this portion of the atmosphere and its consequent decrease of temperature with increase of height are perpetually maintained.

To sum up: The decrease of the temperature of the air with increase of height is owing to its dynamical

cooling incident to convection which, in turn, is maintained by warming below and cooling above, the warming by absorption and conduction, the cooling by radiation.

W. J. HUMPHREYS
U. S. WEATHER BUREAU

CONCERNING AUTHORITY AND THE SCIENTIFIC METHOD

I HAVE received the following letter from the dean of the University of Mississippi School of Medicine, dated March 2, 1926:

Dear Professor Linton:—

I notice in your address as retiring vice-president of section F—Zoology—American Association for the Advancement of Science, which is reported on p. 199 of SCIENCE for February 19, you make the following statement: "If the timorous defenders of authority at Baylor, Denison, Mercer Universities, and the Universities of Mississippi and Tennessee found the professors whom they recently dismissed guilty of showing Professor More, or any one else an amoeba with. . . . "

In so far as the University of Mississippi is concerned, I am glad to advise that no one has been dismissed in the last thirty-five years for any such reason as you give. I haven't investigated any farther back than this. I shall be glad if you will make this correction in SCIENCE.

Yours very truly,
J. O. CRIDER, Dean

Upon looking up the letter from which I had quoted from memory when writing the paragraph in question, later referring to it simply to see that I had the names of the institutions as they were named therein, I find that it reads thus (names of the professors being omitted in this copy):

Among those who are said to have been the victims of this anti-evolution movement, are Dr. ———, Professor of Zoology, University of Mississippi; Dr. ———, Professor of Sociology, Baylor University, Waco, Texas; Dr. ———, Professor of Zoology, Denison University, Granville, Ohio; Professor ———, University of Tennessee.

The letter was dated October 21, 1924. The name of Mercer University was my own contribution to the list. My habitual inclination, when fully awake to the possible importance of the occasion, is to pluck feathers from the wings of passing rumor, rather than to assist her on her devastating flight. It is therefore with a chastened spirit that I note in this instance the unpleasant fact that I have apparently, but I can assure Dean Crider, quite unintentionally, added a feather to her pinions, seeing that my words are "the professors whom they recently dismissed"; whereas my authority, for all except the Mercer case, uses the phrase: "Among those who are said to have been the victims, etc."

If I had had it in mind to discuss that disagreeable topic, the dismissal of college and university professors, I should, of course, have been careful to verify my data. Since my object was a quite different one, I trust that I have made the proper amend.

I am glad to be able to add a further good word for the University of Mississippi. I have a letter, dated March 18, inst., from my friend who was named as the one who was reported to have been dismissed from the University of Mississippi as a result of the anti-evolution movement, from which I quote:

You can make the following statement: During my stay at the University of Mississippi I taught evolution to my classes and as a consequence became aware of considerable criticism of myself for so doing. These criticisms originated outside of university circles. The attitude of the people of Mississippi with whom I came in contact, however, was never hostile and unfriendly in a personal way. I was treated with great courtesy. No official at any time threatened to have me discharged for my teaching. . . . I should add that this popular criticism of me in Mississippi became so strong that it occasioned considerable *concern* on the part of one of my superiors, though this man never threatened action against me.

If there exists in any minds the belief that demonstrated truths concerning the operations of nature have been withheld from the students at the University of Mississippi, I am glad to aid in dispelling that misapprehension.

But back of every silver lining there lowers the inevitable cloud. Thus it has come about that while the correspondence was in progress which supplies the subject-matter of this communication, there appeared the following note in SCIENCE, March 5, inst., (p. 253):

The bill to prohibit teaching in tax-supported schools the theory that man "ascended or descended from lower animals" was passed by the Mississippi Senate February 24, 29 to 16, after three hours debate. The bill was passed by the House of Representatives on February 8, by a vote of 76 to 32.

This bill has been signed by the governor of Mississippi and is now a law of the state.

The following extract from an editorial in *Nature,* February 13, ult., is commended to the consideration of those twenty-nine Senators and seventy-six members of the House of Representatives of Mississippi who appear to be of those who "would mould the