more refreshing to find no less a churchman than the Very Reverend W. R. Inge, Dean of St. Paul's, London, proclaiming his belief that "in science has come the chief revelation of the will and purposes of God that has been made to our generation." The following brief quotations will serve to indicate Dean Inge's position. They are taken from his article "The Social Message of the Modern Church" in the January *Yale Review*, in which article interested scientists will find much for reflection and inspiration.

I believe that in science has come the chief revelation of the will and purposes of God that has been made to our generation. I believe that it is more important for the Christian preacher to understand this new revelation, and to apply it to his ethical teaching, than to cultivate a sympathy with social revolution and the "demands" of manual labor. Perhaps the great struggle of the future will be between science and sentimentalism, and it is by no means certain that the right side will win. . . . There are many temptations to the churches to side with the anti-scientific forces. There has been and still is a conflict between traditional theology and natural science. . . . Science and philosophy (even religion) are willing to learn from each other, and a *rapprochement* is in sight. But the so-called fundamentalists, or traditionalists, still dream of routing the enemy, and are willing to use the most dubious allies for the purpose. It is, of course, they who are the real materialists, since they can not conceive of a religion which is not buttressed by miracle and special interventions. The more that our clergy can study the philosophy of religion, the better it will be for them and their hearers. We have to come to terms with the scientific view of the world. There is no reason why this old feud should be perpetual. Christ never wished to oblige us to outrage our scientific conscience as a condition of being His disciples. Our traditionalists bind heavy burdens, grievous to be borne, and lay them on men's shoulders, burdens which are no part of the burden of the Cross, no part of the light and easy yoke which Christ told us to take upon us, but which on the contrary are a terrible impediment to thousands who wish to be Christ's followers, but can not swear black to be white to please the authorities.

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I am afraid it is not so much any particular results as the whole scientific way of approaching questions, which is hateful to traditionalism. For this reason, I beg those of my readers who are religious teachers to try to keep an open mind, and at least to recognize that men of science are sincerely anxious to make their contribution to the problems of civilizations, that they have a strong case, and that their motives are as pure as your own.

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I believe therefore that in so far as we connect the kingdom of God with the progress of the human race, we who are Christian ministers ought to give much more attention than we have hitherto done to the discoveries of modern science, and to the scientific way of looking at things. . . . I also hold very strongly that a reconciliation between religion, science and humanism is overdue.

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SCIENTIFIC BOOKS

Climatic Laws: a summary of climate. By STEPHEN SARGENT VISHER, Ph.D., associate professor of geography, Indiana University. John Wiley & Sons, Inc., New York.

IT is a thankless, perhaps even an ungracious, task to discuss adversely a book upon which the author has, as the reviewer knows, labored long and painstakingly. The intention was to provide a series of concisely worded generalizations, each followed by brief amplifying comments, the whole to constitute a body of fact which would "make it somewhat less difficult for students of climate to obtain an understanding of this important subject."

We are introduced first to twenty-five meteorological laws grouped under temperature, winds and moisture. The climatic laws, ninety in number, then follow in four chapters: on heating and cooling of the earth (laws 1–26), winds (27–50), moisture (51–80), and miscellaneous (81–90)—truly a large structure to try to erect in eighty-one pages. To say that in building it the need above all else is for severely logical thinking as the only means to clearness and accuracy is to utter a truism.

One reads but a few of the meteorological laws, however, before beginning to wonder if such thinking laid the foundation stones of the structure under review. On page 9:

3. The lower atmosphere is warmed chiefly by the absorption of terrestrial radiation and to a minor degree by the absorption of solar radiation.

4. The lower air is cooled chiefly by convection, *i.e.*, the rising of warm air, and subsequent radiation to cooler air and into space. It is sometimes [!] cooled by radiation to cooler land or water.

There are no comments to amplify the meteorological laws; hence the difficulty obviously is that it is impossible to express in any such simple terms as these the complicated interrelations of the processes by which the lower atmosphere is warmed and cooled. The result is a statement of half-truth, imparting, however, to the uninitiated the delightful sensation as of a "fact" acquired.

In summarizing (p. 10) the "laws of heating," a cycle of daily changes is presented, ending with: "Then gravity pulls it [the air] down to the earth's

surface where it awaits another warming the following day." The picture thus offered to the unsuspecting student is so simple—but, as meteorologists have long since recognized, so untrue.

On page 11: "Surface winds are influenced by topography and surface temperature. Winds tend to descend slopes, to follow valleys . . ." The implication of the words as printed surely is that winds do not tend to ascend slopes—an astonishing comment, for example, on the often violent effects of daytime up-slope winds among mountains. The reviewer feels certain that the writer never intended that implication, but clear thinking would have kept such a statement out of print. And one wonders why a publisher should so far fail in the matter of self-protection as not to catch the vacuity of the following (law 81): "Air pressure decreases with increased elevation because the atmosphere envelops the rest of the earth."

"82. There are seasonal and diurnal variations in air pressure related to changes in temperature *but with the opposite sign, falling as the temperature rises.*" (Reviewer's italics.) Now the average elementary student, unwitting victim of mass production in "education," dearly loves to regard his textbook as infallible. At any rate, acting on that assumption helps him to "pass" courses. Therefore it is too much to expect him to wonder whether the spectre of vagueness and half-truth lurks in a statement like the above. The fact is that the diurnal temperature and pressure changes do normally show approximately opposite trends for stations at and near sea level, but that quite the reverse is true for high-altitude stations. It is precisely in this fashion that the spectre bobs up constantly through large sections of the book.

The purpose of the author being to discuss *laws,* it seems unfortunate that he should occasionally (*e.g.,* pp. 25–26) indulge in speculation based too often upon the hypothesis that if such-and-such were the case, the results would be so-and-so. It may be seriously questioned whether it is wise, in a book of this nature, to enter into highly debatable ground—a procedure which can only confound the student for whom evidently the volume is intended.

The bibliographic notes are abundant, and, if used with discretion, will serve a purpose. One becomes skeptical of the author's judgment, however, upon finding that some of the notes refer to text-books (at best second-hand "sources") that are more or less seriously out of date meteorologically. Moreover, one fails occasionally to find references in critical places to the leaders in the particular fields. Thus under "sensible temperature" there is no mention of Leonard Hill, under "cyclones of mid-latitudes" no mention of Bjerknes. Indeed, nothing indicates that the author considers the great conceptions relative to surfaces of discontinuity, warm and cold fronts, etc., to be of any importance to the student of climate who would attempt to keep pace with the development of modern thought in these matters.

Lest the above comments seem too pessimistic, it should be made clear that although the reviewer believes the book *as it stands* could only prove to be an educational pitfall, not alone to the elementary student but to an unwary teacher, nevertheless he also believes that those possessing a sound background of training in meteorology and climatology could find use for the volume. Thus, there is in it abundant statistical and bibliographic material which the teacher of, let us say, geography, could, *if so trained,* use to advantage. But he should, in order to decide whether he is thus trained, first inquire if his knowledge is based upon something more than the outworn conceptions of meteorological processes to be found in the average American "college" text. Then, if he can qualify, and has both time and inclination for the task, let him proceed to select and rearrange from "Climatic Laws" such materials as meet his particular needs.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

APPLICATION OF THE MICROSCOPE TO GALVANOMETRY

THE intention of this note is to draw attention to the possibilities of the microscope as an aid in galvanometer observation. When a galvanometer is used as a null indicator in potentiometer or Wheatstone bridge work the sensitivity of the instrument should be high enough to give an unmistakable change in the galvanometer reading when the slide wire contact is altered by the smallest readable amount. In operations with galvanometers of the portable pointer type it sometimes happens that this condition does not obtain, and it then becomes necessary to turn to the reflection galvanometer, with its more troublesome technique, or to find means of extending the divisions-per-volt sensitivity of the pointer instrument. The latter recourse is to be preferred and is easily affected by bringing a microscope with a power of perhaps a hundred diameters to focus on the tip of the pointer. The eyepiece should be furnished with a scale. It is easy by these means to obtain an increase in apparent sensitivity of sixty to one hundred fold.

The quickness, steadiness and convenience of this