tions for collecting and preserving material; (3) lists of apparatus and reagents; (4) lists of reference books, and (5) outline of classification.

Some new uses of old terms are introduced here and there. Thus we have 'ovary' used for oogone, carpogone and archegone, and 'ovulary' for the structure hitherto called the ovary in the flowering plants. 'Sperm' and 'spermary' replace antherozoid and antherid. 'Egg' is consistently used throughout for the female gamete. We do not quite like the use of 'megaspore' as synonymous with 'embryo sac' in angiosperms, and feel sure that it will lead to the confusion of the beginner. It is doubtless impossible to make a clear statement of all the homologies of the gametophyte of angiosperms in an elementary work, but it is certainly not necessary to simplify the statement by running together two structures so distinct as the uninucleate megaspore and the multinucleate embryo sac.

We trust that the author's wish may be realized, namely, "it is greatly to be desired that the too common thought of plants as *things to be classified* may be replaced by the conception of them as *beings at work, to be studied alive*," and we believe that his book will help to bring it to pass.

CHARLES E. BESSEY.

Grundprobleme der Naturwissenschaft. Briefe eines unmodernen Naturforschers. By DR. ADOLF WAGNER. Berlin, Gebrueder Borntraeger. 1897. Pp. vi + 255.

The sub-title of this sharp little polemic might well have been *Schopenhauer versus Büchner*. There is much else in the book, but that about it which is most vital is the application of the philosophy of *Welt als Wille und Vorstellung* to such views of nature as characterize *Kraft und Stoff*. But the actual sub-title does very well. 'Unmodern' the author certainly is. *Kraft und Stoff*, his arch-enemy, long ago had its day; and even the aftermath of discussion over Ostwald's Lübeck address, the most modern scientific matter of which he seems conscious, has been garnered in. This is the most obvious fact about the book; it is belated. The ultra materialistic views of nature and the hard and fast notions of matter, atom, molecule, ether, etc., which the author ascribes to naturalists, are no longer held by them, or are held with a genial flexibility which make the Doctor's savage onslaught seem whimsical.

Then, the book is arrogant in tone. Rarely in these days does the venerable speculative philosophy so lord it over youthful science. Although the book takes the form of letters (in reality a single letter) addressed by a humanist to an old university friend in the other camp, yet the 'lieber Freund,' in spite of the constant 'Du' and 'Dir,' everywhere gets hard blows and short shrift. His views are 'nonsense,' 'absurd,' 'impossible to one who has had a single semester of philosophy,' etc.

And yet it would not be easy to find a better *résumé* of the idealist position with regard to the fundamental problems of nature and science. The book is very readable. It is full of matter. The style is picturesque, lively and popular; the argument clear and mercifully brief. It is a strong book of its kind.

The first half of the book is a coherent argument for a certain view of the world; the second part seems to be occupied (I have not read it completely) with an elaborate *a priori* discussion of the nature of human, animal and plant life. With regard to this part it is only necessary to remark how the philosopher, after belaboring the eternal *is* (the assumption of existence and reality) of science, allows his own equally gratuitous *must be* to run riot. How should it be so difficult to see that we cannot any more get outside and beyond ourselves in philosophy than in science. We project ourselves into our science. Granted. But so, too, we project ourselves into our philosophy, which is, out and out, as truly as science, a creature of taste, mood, temperament, race, age and environment.

What, then, are the 'Grundprobleme?' They are questions concerning the nature of things; concerning criteria of reality; concerning the relation of experience to knowledge. You scientists build upon experience. First find how far experience is valid. You talk of realities. What do you mean by reality? What are your tests of reality?

The author, though everywhere affirming the idealist position, very sensibly refrains from any

close classification of his philosophy. In general he might be spoken of as a spiritualistic monist, since he finds nothing in the world but the human will and the human will anthropomorphically projected into space, which projection he follows Schopenhauer in calling force (Kraft), and its localized manifestations energy. But this lightly held monism easily lapses into pluralism, and when he gets all his contestants on the arena together a pretty contest they put up. For example, first appears *reality as it is in itself*—a ghostly presence. To him enters the burly and self-confident *common notion of reality*, easily holding all eyes upon himself. Then comes in that keen-witted fellow, *interpretation of reality*, striving to put *notion of reality* in a hole and get on good terms with *reality itself*. And this is only a beginning. Even space and time appear to be distinct entities. For, speaking of the production of like effects by like causes, he says very truly that there are no two like causes. At least they must differ in-place and time; which is very interesting if one thinks of it.

Then is the author wise in insisting, to the extent we find in the earlier chapters, upon the opposition of experimental science to speculative philosophy? He first gives standing to speculative philosophy by showing how all thinking, even scientific, is speculative, and then adroitly attributes to speculation its old meaning of inquiry into causes, essences and realities. Science is now the servant of speculation, or, to use his favorite figure, the hod-carrier bringing bricks and mortar to the philosopher-architect. But how if the hod-carrier chooses to be his own architect, finding that the man of speculation does not feel the properties of the material which he has not encountered at first hand, and that so his construction is not sound. And when reminded that the bricks and mortar of experience are man-made, can he not retort; but so is the temple? And may not this suggestion of inferiority sting him into asking whether any one of this endless succession of temples, falling into ruin almost as soon as built, is really a more noble object than the almost eternal elements of which each one in turn is made?

And is not the Doctor wrong in insisting that men of science decry speculative philosophy? They only object to that which is not sober and fruitful. Speculation, indeed! They all love it as the apple of the eye! Who does not know that they live on bread and water and wear the hair shirt of inexorable verification to moderate this tendency. Dr. Wagner is right in thinking that all people have a deep interest in the nature of things, in cause, and necessity, and reality. Who among us is so much a positivist as to say, not only that we have not yet penetrated the soul of things, but that we never can; that it would be of no use if we could; that we ought not even to desire to. The experimental philosopher (if Dr. Wagner will permit this hated expression this once) does not travel the noble road of speculative philosophy simply because he has found that *for him* it is hedged up or leads no-whither. What does Dr. Wagner himself bring back from his search? Has he found an answer to his questions? Who has accepted this answer? While experimental science has been building up a body of knowledge which it is a liberal education to know, what sure and well accredited doctrine has speculation to offer? Where does it impinge upon science? How help, or illuminate, or direct? This is no objection to philosophy, but to its arrogance.

The chapters upon causality, or rather the law of causality, are suggestive, though not new. If there is some juggling with words here, where is there not in any full discussion of the subject? Every event is both cause and effect; the emphasis upon every. So the universe is all of a piece; all events in one series. This implies necessity and excludes accident. But cause in itself is one thing, cause for us another. Two events may belong to two, or many, quite different (for us) causal series. The motion of necessity does not exclude the motion of accident. Still there is no absolute accident. Causality has reference to becoming —development—and not to existence; *e.g.*, to heating, and not to heat; to vital changes, and not to life. He properly objects to divorcing form from content. If one rubs a glass rod with fur one does not bring about two results—create electricity and electrify the rod—but only one, the latter.

He follows Liebmann, *Analysis of Reality*, in asserting that force is not true cause. For example, force cannot produce motion. But he has in mind Schopenhauer's idea of force, a sort of synthesis of the powers of nature—may one say, the total potential energy of the universe—the thing-in-itself of the metaphysician. True force—always something akin to the human will—is that which releases this fundamental power, producing the various manifestations of energy. The true cause of the falling of a stone, for example, is not gravity, but the removal of an obstacle; and so in all motion. This view, sufficiently common in one form or another, may have little significance for physics, which concerns itself with the how and how much rather than the what and why, but is intrinsically important and deserves greater elaboration than it has hitherto received.

This view leaves no place for matter as something upon which force can act or in which it may 'reside.' The universe is to be explained dynamically. So all talk of atoms and molecules, except as for a time they may pictorially assist the learner, is aside from the purpose. They may be handy to have about, as they make no trouble and deny nothing, but they also explain nothing. Ostwald's concept is the true one, simply putting will for force and acts of will for energy.

For it is the world of will—of longing, of striving, of action—of which we are conscious. Here is the real world. But the will encounters opposition from without on the part of something which we feel to be akin to the human will—the powers of the external world. The nature of the world is will.

E. A. STRONG.

YPSILANTI, MICH.

International Catalogue of Scientific Literature. Report of the Committee of the Royal Society of London, with Schedules of Classification. March, 1898. Schedule Q, Anthropology.

It will be remembered that at the International Conference for a Catalogue of Scientific Literature, held at London, July, 1896, the classification of the sciences to be catalogued was referred to the Committee of the Royal Society for organization. The report of this Committee is now published, and it is to its classification of the Science of Anthropology (known as 'Schedule Q') that the present review is confined.

The Committee states that these schedules 'are not put forward as final or authoritative' (p. 9); therefore, an examination of them should be carefully carried out by special workers in science, to see how far a catalogue based upon them will reach the highest degree of usefulness.

Obviously, the schedule should include all the prominent branches of a science, and should reduce repetition of titles to a minimum.

With regard to Anthropology the Committee excludes from it the branches of experimental and comparative psychology, grouping these under the general schedule of 'Psychology' (Schedule P). While the anthropologist may regret this, it is in accordance with the precedents of the American Association and other similar bodies.

The general science of anthropology is divided into eleven primary branches, as follows: (1) Museums and Collections; (2) Archæology (prehistoric); (3) Anthropometry; (4) Races; (5) Industrial Occupations and Appliances; (6) Arts of Pleasure; (7) Communication of Ideas; (8) Science ('chiefly of primitive races'); (9) Superstition, Religion, Customs; (10) Administration; (11) Sociology ('chiefly of primitive races'). The total number of sub-headings is seventy.

What will first impress the anthropological student in this classification of the subjects of his science are its omissions. Nothing is said of that most prominent branch sometimes called 'developmental somatology,' which investigates the influences of heredity and environment and the physical transformations of man (evolution, monogenism, polygenism, etc.)

The whole science of ethnography, as such, is overlooked, as under the unfortunate heading 'races' the only sub-titles are 'General Works,' 'Classification by Name and Language,' 'Racial Peculiarities.' Another ill-chosen term is 'arts of pleasure' as a synonym for the fine, or æsthetic arts. Many of the most noteworthy developments of these are in no sense ministers to