The student of sociology, the settlement worker and every seeker after truth must, in order to know his subject, get an acquaintance with its ancillary factors. He must have his science on a positive basis. A scientific knowledge is as necessary in questions of education, reformation and the improvement of social physical conditions as it is in the treatment of a diseased individual. In this book of Professor Bailey's the student will find much that is helpful to his understanding of the causes of the conditions of daily living. Unless he has such knowledge, he is in no position to make suggestions for betterment.

The following paragraph serves to show the value of the book in this direction:

> It is estimated that at least 10 per cent. of the income is squandered not only by the well-to-do, but frequently also by those who have a very small income and so can ill afford it, in expensive food material which affords little nutrition, in unsatisfactory methods of preparation, in selecting foods out of season, by throwing away much valuable food material, and by using badly constructed cooking appliances. Much careful investigation is needed along these lines, and painstaking instruction will ultimately improve these conditions which are at present so much deplored.

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ANIMAL MECHANICS.[1]

THE author's previous contributions to animal mechanics, to some extent in company with the late Professor W. Braune, are well known to anatomists; though it is to be feared that they are held in more respect than in intelligent appreciation. The anatomist who is not a trained mathematician can very well understand that most if not all of the models and diagrams used to illustrate the simpler problems show at most the central principle, if we may so express it, and show it in a painfully diagrammatic way. It is much as if an artist were to give us a man's face drawn in straight lines. We may say, and truly, that the essential idea is given, but that much is left out; and we are not very clear as to the precise importance of the omissions. As the mathematician adopts a more thorough system we feel an increasing difficulty in following it. We can see that the method is an improvement; we can appreciate even without full understanding (if this be not a paradox) that the work is honestly done; but a clear idea does not come to us. One of the causes of the want of sympathy between mathematicians, in so far as they are mathematicians, and the rest of the world is that the former with all their learning can not do justice to the full stupidity of the non-mathematician when the question is one of mathematics. It is impossible for him to grasp how sincere the outsider is in his ignorance, or rather in his incapacity.

This book is devoted to an analysis of the movements of joints in their mutual relations. It is clear that the simplest system is one of two rigid bars playing one on the other. If we restrict the motions to one plane a child can understand it; but if we go beyond that the ordinary man is at once out of his depth. Add one more bar still keeping to one plane, and the difficulty increases. Make the number of the bars and the planes indefinite and where are we? The mathematician would tell us to go one step at a time; but somehow we lose our heads as we should did we receive the same instruction relative to walking on the tight rope.

The author writes as follows in his preface:

> As the whole animal organism has for its first object the movement of the living body through joints, I have devoted this book in the first place to physicians, especially to physiologists and anatomists as well as to zoologists. I have therefore attempted to make the mathematical deductions so elementary and to present them in so clear a manner that they will be easily intelligible even to those who are not mathematicians.

[1] 'Theoretische Grundlagen für eine Mechanik der lebenden Körper, mit speziale Anwendungen auf den Menschen sowie auf einige Bewegungsvorgänge an Maschinen in möglichst elementar Weise dargestellt.' Von Otto Fischer. Mit 67 in den Text gedruckten Figuren und 4 Tafeln. Leipzig und Berlin, Druck und Vorlag von B. G. Teubner, 1906.

Frankly it seems to us that the work is beyond these outsiders, but we are sure that those who are competent will find it a work of much value. T. D.

Kurzes Lehrbuch der organischen Chemie. Von Professor Dr. A. Bernthsen. Neunte Auflage, bearbeitet in gemeinschaft mit Dr. Ernst Mohr. Braunschweig, Fr. Vieweg und Sohn. 1906. Pp. xxii + 638.

The approval with which this book has been received is indicated by the fact that it has reached its ninth edition and has been translated into English, Russian and French. This success is well deserved. Within a comparatively small compass it gives a remarkably comprehensive oversight of the fundamental principles and of the important compounds of organic chemistry. The most important change in this edition is the addition of a third division called 'Heterocyclic Compounds,' though a considerable portion of the material in this division was formerly given under the division called 'Benzene Derivatives,' but in this edition named 'Isocyclic Compounds.' The aliphatic compounds are still called 'Methane Derivatives,' as in former editions.

On p. 70 Schorlemmer's classification of paraffins as normal, iso-, meso-, and neo-paraffins is still given, although the last two classes are never mentioned in current literature and have been practically forgotten by most organic chemists. It is a pity we have no means of eliminating unnecessary and little used terms of this sort.

The most characteristic and valuable features of the book are the clear, concise statements given at the introduction of each new class of compounds, presenting the most important methods of preparation for the class and the facts on which our knowledge of the structure of the characteristic group of the class is based. The fault of the book, if it has one, lies in the brief description of an excessive number of compounds, far beyond the possibility of memory for any one. The effect must be bewildering and discouraging to the beginner. W. A. Noyes.

DISCUSSION AND CORRESPONDENCE.

AN UNUSUAL METEOR.

To the Editor of Science: On page 151 of your issue for August 3, Mr. E. E. Davis, of Norwich, N. Y., describes a very interesting meteor train observed by him about 5:30 or 6 P.M., when traveling between Cortland and Elmira, N. Y. The changes in his own location during the fifteen minutes must have had an appreciable influence on the appearance of this trail, but will scarcely alter our general conclusion that it was a typical case illustrating and settling a matter that has caused a little speculation among students of the subject. If a meteor leaves a visible train behind it we are apt to think that this is a series of luminous particles, lying in a straight or gently curved line, and that they will, by reason of unequal gravity, resistance of the air and possibly winds in the upper atmosphere, drift along unequally, so that the straight trail may gradually become irregular. This may be true in some cases, but it is incredible that any plausible movement in the thin upper air should affect the course of the scattered luminous particles. They must be considered as moving, with rapidly diminishing velocity, under the influence of three forces—namely, their initial momentum, the attraction of gravitation and a very gentle resistance from the atmosphere. In most cases the initial momentum is mainly that due to the straight-line motion of the original meteor; but in some cases this meteor may be revolving on its axis in a manner quite analogous to the less rapid rotation of a comet's nucleus, and just as the comet of 1875 sent out a series of tails from its revolving nucleus, so with the streams of material issuing from these rapidly revolving meteors. The diagrams submitted by Mr. Davis would indicate that five rotations were made in that portion of its track represented by his third curve; the motions of the particles outward from the meteor's track were so slow that it made a barely appreciable sine curve, or a broadening of the track, in his first and second curves, but a very large jagged sine curve in his sixth, or last, curve. This latter broadening re-