If the Harvard Medical School does not adopt some such policy it will not be able to hold a leading position in this country like the other departments of the university, but will remain a local institution, and we shall continue to hear, as often in the past, the fatal excuse of expediency instead of commanding ability urged in behalf of a clinical man's appointment.

F. B. Mallory.

Harvard Medical School.

## SCIENTIFIC BOOKS.

*A Text-book of Sanitary and Applied Chemistry: or The Chemistry of Water, Air and Food.* By E. H. S. Bailey, professor of chemistry, University of Kansas. New York, The Macmillan Company. Pp. xx + 345. $1.40.

The purpose of this text-book on applied chemistry is best stated in the author's own words:

> A knowledge of the relations of health to pure air, unpolluted water, and wholesome food will have much to do with improvement of sanitary conditions, not only of students themselves, but, through them, of the people at large. The air is usually said to be free, but pure air and sunshine cost money, as the crowded tenements show. The best lighted and ventilated rooms are worth the most. * * *
>
> It is certainly time that the people should have some practical knowledge of food and medicine. Without this knowledge they will continually be imposed upon by those who have something to sell which may be worthless as a food, or dangerous as a medicine. * * *
>
> Schools and colleges are beginning to see their opportunity to impart a kind of knowledge that is practical and sane. * * *
>
> A thorough understanding of the facts of applied chemistry will not make the skilled workman, nor will the theories of chemistry make the accomplished cook, but a broad and thorough knowledge of the underlying principles will go very far toward developing common sense in hygiene and in the selection and preparation of food.

In fulfilling his purpose, the author in Part I. (one third of the book) discusses air and fuels in their relation to heating and ventilation, lighting by the various agents now in use, water supply and purification, disposal of household waste; he devotes a chapter to cleaning, soaps and bluing, and another to disinfectants.

In view of the fact that physicians are agreed that fresh air is the first requisite to maintaining or regaining health, it is fitting that the longest chapter in this part of the book should be given to the atmosphere. A partial analysis will serve to indicate the exhaustiveness with which the subject is treated: History of Atmospheric Theories, Composition of the Air, Methods for Analysis of Air, Carbon Dioxide in Free Air and in Closed Rooms, Effect of Impure Air on the System, Nitric Acid and Other Impurities, Ozone and its Properties, Effect of Carbon Monoxide on the system, Methods of Studying the Dust of the Atmosphere, Bacteria in City Air, Arsenic in the Air, Injurious Trades, Composition of Ground Air, Effects of Ground Air on the System, Offensive Gases.

Part II. deals with food, food materials, food accessories, preservatives, beverages and dietaries.

The method of treatment is substantially as follows: history, statistics of production and consumption, classification of various forms of a given food material, chemical composition, physical properties, methods of preparation in edible form, food value.

The lists of adulterants to be looked for and the tests to discover them constitute a timely feature.

The book contains valuable tables of composition, numerous well-chosen experiments for the student, and an extremely good, though not exhaustive, bibliography.

The style of the book and the directions for experiments, while terse, are always clear.

The plan is admirably adapted to the use of students in the higher schools, academies, agricultural colleges and technical schools. The progressive college may for once waive its fear of applied science, and welcome a book so suggestive of lines of research. It is much to be desired that every college will at least have the book in its reference case.

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.