

inevitable result is a dismal failure. It is not quite clear for what class of reader the work is really intended, for in the preface we read that it "is intended to be a source of information and ready reference for the textile chemist," while on the title-page it would appear from the continuation of the main title, "being the syllabus of a lecture course adapted for use in textile laboratories," that it might be intended for some other purpose, possibly for teaching. In either case it has missed its mark.

These "knowledge in a nutshell" publications on technical chemistry, of which there appears to have been an increasing supply of late years, may be just the sort of thing that please people who like that sort of thing, but although there are a few exceptions, it is doubtful whether they do much good, while, on the other hand, they may do distinct harm through creating, under pretentious titles, a totally misleading impression of the subject as it presents itself in actual practice.

*Naturwissenschaftliches Unterrichtswerk für höhere Mädchenschulen.* By Prof. Dr. K. Smalian. Auf Grund der Bestimmungen vom 19 December, 1908, über die Neuordnung der höheren Mädchenschulwesens in Preussen bearbeitet von K. Bernau. II Teil: Lehrstoff der VI Klasse. Pp. 80. Preis 1.80 marks. III Teil: Lehrstoff der V Klasse. Pp. 127. Preis 2.25 marks. (Leipzig: G. Freytag; Vienna: E. Tempsky, 1909-10.)

IN the early part of last year a notice appeared in NATURE of Dr. Smalian's "Leitfaden der Tierkunde für höhere Lehranstalten," a work comprising a zoological text-book in separate fasciculi intended for the use of the various classes in German high schools. The fasciculi now before us form part of another work designed on somewhat similar lines for the use of girls' schools, but including botany as well as zoology. The general commendation bestowed on the "Leitfaden" may be extended to the present text-book, with the addition that we have little fault to find with the coloured plates of animals, while those of plants are excellent examples of German colour-printing, and worthy of all praise. Each of the two fasciculi now before us is divided into a botanical and a zoological portion; and it may be presumed that the same holds good for the other portion of the series. The zoological section of the second fasciculus is devoted to vertebrates, and that of the third to arthropods. A number of well-known species of mammals are, however, described in the first fasciculus.

The general plan of the work is similar to that of the "Leitfaden," the various orders being treated in systematic order, and a certain number of typical species being selected for comparatively full notice, while other groups are treated more briefly. In the case of the species selected as types, leading features in the external form and structure and noticeable traits in the matter of habits are touched upon; and throughout the work technicalities are, so far as possible, avoided. The only scientific names introduced are those of species, ordinal and family groups being referred to by vernacular designations. In the main the species represented in the illustrations seem to be correctly named; but in one of the coloured plates the monkey designated *Cercopithecus sabaeus* is clearly *C. aethiops* or one of the allied forms, as it has the distinct white brow-band of the latter, which is absent in the former. So far as we can see, the book appears admirably suited for its purpose, although it by no means follows that it would be equally well adapted to the needs of English schools.

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## LETTERS TO THE EDITOR.

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### The Meaning of "Ionisation"

IN asking for precision of language (p. 487), Prof. Armstrong shows how much he has fallen behind his time. If he had kept abreast of the recent developments of the principles of science, he would know that to be precise means running the risk of being wrong, which is to be avoided at all costs. Prof. Armstrong evidently belongs to an antiquated school which believed that scientific discoveries are made by forming definite ideas of things, even though these cannot be seen and handled. That is a standpoint which is abandoned, and we have entered on a new era. Science now aims purely at obtaining an equation which, without committing itself to any definite views, gives the required relationship between the brain impressions taking place in that particular dimension of a many-dimensional complex, which we identify with time. I am sorry if in this statement I have committed myself to the existence of a brain—it was lapse due to a weak concession to the prejudices of my youth, and would have been impossible in a thorough-going adherer to the new faith.

But to come to the point. If Prof. Armstrong will bring the theory of entropy to bear on the principle of least resistance to a cheap appearance of sagacity, he will discover, not what Arrhenius meant by ionisation—that is unimportant—but what he ought to have meant and would have meant if he were a chemical physicist such as we make them now. A. S.

### The Fertilising Influence of Sunlight.

THE letter on the above subject by Mr. and Mrs. Howard in NATURE for February 17 raises a question of much scientific interest and of considerable importance in tropical agriculture. In some of the text-books it is stated that the hot sunshine of tropical or subtropical climates must injure the productiveness of the soil, since it kills bacteria. On the other hand, experiments on the partial sterilisation of soil by other means—such as heat or volatile antiseptics—shows that the killing of bacteria (as distinct from spores) leads to an increased, and not a diminished, productiveness. The apparent discrepancy is now cleared away, and we have Mr. and Mrs. Howard's authoritative statement that strong sunlight has beyond question a beneficial effect on productiveness.

There is a close resemblance between the effects they describe and those that have been obtained with partially sterilised soils by myself in conjunction with Dr. Darbishire and with Dr. Hutchinson; in all cases the effect is that of a dressing of nitrogenous manure. Dr. Hutchinson and I have traced this to an increased rate of decomposition of organic matter after partial sterilisation, and have shown that the increased activity is due to the destruction of some agent, probably large organisms, which had previously interfered with bacterial development. The question is, Could sunlight partially sterilise a soil and kill the large destructive and competing organisms that we suppose limit productiveness?

There are at least three factors involved: sunshine dries the soil, heats it to a certain temperature, and may have a direct chemical action fatal to the cell. We are at present studying the effect of dryness and of temperatures lower than 100° (at which we have previously worked), but the direct effect of sunshine is not easily investigated here. Some preliminary experiments I made at Wye during the summer of 1906 indicated that soil exposed to bright sunshine for a period of ten days subsequently absorbed oxygen more rapidly, i.e. showed a higher rate of bacterial activity, than another lot kept shielded from the light. The effect was comparable with that produced by volatile antiseptics, and, so far as the experiment goes, it shows that sunlight could, equally with these, remove the factor limiting productiveness in ordinary soils. I have several times attempted to extend the experiment, but