quence as compared with No. 2, the strawberry mildew. The now famous American gooseberry disease is illustrated. To prevent its spread, the use of one ounce of potassium sulphide dissolved in three gallons of water is recommended. With this solution the bushes should be sprayed just before the leaves expand, and the spraying should be repeated at intervals as necessary. It is unfortunate, we think, that the destruction of affected bushes by fire is not also recommended. A descriptive pamphlet, for which one penny is asked, is supplied with the diagrams.

La Mécanique des Phénomènes fondée sur les Analogies. By M. M. Petrovitch (Belgrade). "Scientia" Phys.-Math. Series, No. 27. Pp. 96. (Paris: Gauthier-Villars, 1906.) Price 2 francs.

DR. J. W. MELLOR, in his "Chemical Statics and Dynamics," p. 19, gives the following as the four stages of a physical theory:—hypothesis, differential equation, integration, observation. While this sequence is well illustrated in the study of dynamical phenomena, these, after all, constitute but a small proportion of the large number of effects in which changes are brought about by the action of definite causes. This book, while not containing any very novel and striking features, puts matters in a somewhat fresh light by giving prominence to the more philosophical aspect of the equations of mathematical physics and allied branches of science. Thus the motions determined by a constant force, a positive, and a negative force varying as the distance, are all characterised by different known forms of the integrals of the equations of motion. If in any phenomenon the changes which occur can be represented by equations of the form of one of these integrals, then conversely the relation between cause and effect may be of the same form as the corresponding law of force. The mathematical portion of the book is comparatively simple, and about the hardest problem considered is that of forced oscillations in a resisting medium. The book appears suitable for placing in the hands of such science students as have not the time to pursue an extended course in mathematics, as they would doubtless get many hints from its perusal. It may be doubted whether much is gained by the inclusion of physiological problems, such as the action of bacteria, in the present discussion, or whether such problems can indeed be adequately treated without introducing statistical considerations. But there are many cases where, even if the analogy be not exact, it is more easy to picture the progress of phenomena by associating them with dynamical or other analogues, and the book will be useful if it teaches students to think in this way.

The Steam-table. A Table of the Thermal and Physical Properties of Saturated Steam Vapor and of the Specific Heat of Water. Compiled from various sources by Prof. Sidney A. Reeve. Pp. ii+42. (New York: The Macmillan Company; (London: Macmillan and Co., Ltd.) Price 1s. 6d. net.

THIS is a very elaborate table from 400 lb. per sq. inch and 445° F. down to 0.18 lb. per sq. inch and 32° F. Usually we know a pressure in round numbers or a temperature in round numbers, and two separate tables are needed; Mr. Reeve's table contains both, and there is an ingenious arrangement for making interpolation easy. There are entries for every degree, and also for every pound per sq. inch. The usual error of such tables, using Regnault's heats with a value of Joule's equivalent which does not agree with Regnault's unit of heat, seems to be avoided by Mr. Reeve, and this steam-table seems to us likely to prove of very great value to steam engineers.

LETTERS TO THE EDITOR.

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Ionisation by Spraying.

IN a paper published in the *Philosophical Magazine* (February) I noted that positive and negative ions could be observed in large quantities by an Ebert apparatus if fine spray from water were produced profusely in its neighbourhood. Whilst much work has been done in connection with electrification caused by the bubbling of air through water and the splashing of drops, the effects due to spray do not appear to have received much attention.

A description of a simple method of studying the ionisation by spraying, with a preliminary note of some of the results obtained, may therefore be of some interest. A strong current of air, filtered through cotton wool, is passed for a definite time, usually half a minute, through a small glass sprayer, as supplied by Beckmann for introducing salts into a flame for spectroscopic work; but in the present case the air and spray pass together into the large lower chamber of an electroscope containing an insulated cylinder connected with a gold-leaf system in a small upper chamber. The leaf remains steady when air alone is driven into the lower chamber, except for a slight natural leak, which remains constant in spite of much spraying.

When spray has been introduced into the electroscope for half a minute the fall of potential is observed for that time, and from minute to minute until the leaf steadies to the natural leak. The effect terminates in two or three minutes in the case of water, but in the case of acetic acid, chloroform, ether, and the alcohols the ionisation effects do not disappear for ten to fifteen minutes, so that there are large inert ions, both positive and negative, present, some with a velocity of the order 10^{-5} cm./sec. in a field of 1 volt/cm. Similar results have been found by Aselmann for salt solution.

In most cases the positive and negative ions are generated in nearly equal quantities, but with water the negative ions are about 1·5 times as numerous as the positive. The same ratio holds for ether, of which the negative ions are more quickly removed than the positive. The most important point, however, is that small quantities of liquids can be examined by the help of these small sprayers, and definite results obtained for the substances, if care is taken to avoid impurities.

The following is a preliminary statement of the results obtained:—

Substances	Negative	Positive
Mercury	0	0
Toluene	0·02	0·02
Sea-salt and water	0·01	0·015
Hydrochloric acid and water	0·04	0·04
Pentane	0·07	0·03
Phenetol	0·08	0·08
Benzine	0·14	0·08
Ammonia water	0·45	0·30
Tap water	0·65	0·50
Distilled water	1·7	1·0
Ether	3·7	2·5
Chloroform, pure	2·3	2·3
Chloroform, impure	4·5	4·5
Acetic acid	3·2	3·2
Methyl iodide	3·0	3·0
Methyl alcohol	3·0	3·0
Ethyl alcohol	3·5	3·5
Amyl alcohol	4·5	4·5

The figures are taken to an arbitrary standard and are expressed in terms of the positive ionisation due to distilled water. It may be better ultimately to select ethyl alcohol as a standard of comparison, because the ionisation due to water varies sharply when any impurity is introduced.

It is remarkable that volatile substances like benzine, pentane, phenetol, and toluene should give rise to little or no ionisation when sprayed, whilst ether, chloroform, alcohol, and aldehyde should so profusely form both positive and negative ions.

A. S. EVE.

McGill University, March 22.