

however, are not sufficiently described. Cases are known where shavings from a $2\frac{1}{2}$ -inch drill working on cast steel have been obtained many feet in length, the material, of course, being of very excellent quality.

The illustrations of drilling machines are good, but all appear to have the ordinary power feed; in many cases it is found advantageous to have, besides the power feed, a quick hand feed in addition, in conjunction with a power attachment, the quick hand gear being used to withdraw the tool in all cases. These motions are very handy in boiler shops, where the same machine may have to drill rivet-holes out of the solid, rhymer or enlarge punched holes, and finally countersink holes, all requiring different feeds.

The continuation of the steam engine in this volume includes boiler fittings and details, efficiency of the engine and engine and boiler trials, concluding with a chapter on compound engines. The latter parts of these chapters are well written and interesting. The classical work of the late Mr. Willans is largely drawn upon, as well as the trials carried out by the Institution of Mechanical Engineers, besides careful descriptions of other steam-engine trials. The combination of indicator diagrams of compound or triple expansion engines is well explained.

A series of articles on engineering workshop practice is commenced, and they are very good so far as they go, but it may be suggested that engineers' shop appliances as generally used should be described, and not the "elegant amateur tools," such as are illustrated in Figs. 29 and 77. N. J. L.

Index Kewensis Plantarum Phanerogamarum. Sump-tibus Beati Caroli Roberti Darwin ductu et consilio Josephi D. Hooker, confecti B. Daydon Jackson. Fasciculus iii. (Oxoni: E prelo Clarendoniano, 1894.)

THE third fasciculus of the Kew Index, which the Clarendon Press has just issued, brings us within sight of the completion of this monumental work. This part brings the Index down to near the end of the letter P, and we may look forward then to seeing in course of the coming year the concluding fasciculus. Since we noticed the earlier fasciculi there has been no new development in the nomenclature controversy, upon which, we believe, the Kew Index will exercise an important influence; the effect of this will likely be only apparent after the whole is published. Meanwhile the sterling value of the Index is increasingly evident, and every botanist will congratulate the preparers and the publishers upon the appearance of this third fasciculus, in which the same careful and conscientious workmanship is noticeable as characterised the portions of the work previously issued.

Alpine Climates for Consumption. By H. J. Hardwicke, M.D. Pp. 65. (London: J. and A. Churchill, 1894.)

THE high-altitude cure for acquired and hereditary consumption has gained ground in the medical world during recent years, with the result that numerous winter health stations have sprung into existence in Switzerland. Dr. Hardwicke's little brochure has been written for the purpose of providing trustworthy and unbiassed information with regard to some of these resorts. It is pointed out that the principal requirements of an Alpine winter climate in the treatment of phthisis are (1) high altitude, (2) low temperature, (3) dry atmosphere, (4) large amount of sunshine and ozone, (5) low atmospheric pressure, (6) freedom from wind, (7) freedom from organic and inorganic particles in the air, (8) absence of fogs, (9) good water-supply, (10) good drainage. The author believes that stations possessing all these properties are extremely beneficial to consumptive patients. His book will help sufferers from lung disease to the selection of a suitable winter residence.

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LETTERS TO THE EDITOR.

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"Acquired Characters."

IT may be at once conceded that persons who discuss whether "acquired characters" are inherited or not, ought to know and to be able to state clearly what is meant by the term "acquired characters."

I am surprised that Sir Edward Fry should find any difficulty in ascertaining what should be meant by this term when used in the case to which he refers, viz. the theories of Lamarck and of Darwin with regard to the origin of the species of plants and animals. Sir Edward Fry seems to assume that the matter under discussion is contained in certain writings by Prof. Weismann as though those writings were a sort of "affidavit," binding and limiting the discussion. The fact is that Prof. Weismann is a witness—and an advocate too—in a case which is of more ancient date than his connection with it.

Sir Edward Fry has found some satisfaction, as have many other writers, in pointing out inconsistencies and ambiguities in Prof. Weismann's statements; but it is to me somewhat astonishing that one should be invited to a textual criticism of Weismann's words in order to ascertain the significance of the term "acquired characters." The term and the discussion about the inheritance or non-inheritance of acquired characters were not invented by Weismann! They have been familiar ever since the discussion of Mr. Darwin's book on the "Origin of Species," commenced thirty-five years ago. The term has been explained and amplified over and over again. It really dates back to Lamarck; and I should propose, when anxious to know the meaning of a term associated with Lamarck's doctrine, to investigate Lamarck's writings rather than Weismann's.

Lamarck's "Philosophie Zoologique" was published in 1809. On p. 235 of vol. i. of the reprint of this work, issued in 1873 under the direction of Prof. Charles Martin, Lamarck states his two "laws" of organic development. They run:—

Première Loi.—"Dans tout animal qui n'a point dépassé le terme de ses développements, l'emploi plus fréquent et soutenu d'un organe quelconque fortifie peu à peu cet organe, le développe, l'agrandit, et lui donne une puissance proportionnée à la durée de cet emploi; tandis que le défaut constant d'usage de tel organe l'affaiblit insensiblement, le détériore, diminue progressivement ses facultés, et finit par le faire disparaître."

Deuxième Loi.—"Tout ce que la nature a fait acquérir ou perdre aux individus par l'influence des circonstances où leur race se trouve depuis longtemps exposée, et par conséquent, par l'influence de l'emploi prédominant de tel organe, ou par celle d'un défaut constant d'usage de telle partie: elle le conserve par la génération aux nouveaux individus qui en proviennent, pourvu que les changements acquis soient communs aux deux sexes, ou à ceux qui ont produit ces nouveaux individus."

I have italicised two words in this quotation. It is to this doctrine of Lamarck that the short term "doctrine of acquired characters" has been and is applied.

In the report of a lecture given by me, at the London Institution, in February 1889 (published in NATURE of that date), on "Darwin versus Lamarck," the two laws of Lamarck were quoted in full. In lectures given some three years earlier I had pointed out that there is no satisfactory evidence that animals or plants transmit by generation the characters acquired by the individual in the way supposed by Lamarck.

It is, I admit, a very difficult matter to determine whether a particular character which makes its appearance in the course of the life of an organism has been "inherited" (i.e. is congenital) or "acquired." But that has nothing to do with the question as to what we should mean when we say "acquired characters." The answer to that seems to be certain and simple. It is given by Lamarck, and the term directly refers to Lamarck's doctrine.

On the other hand, it is the fact, as Sir Edward Fry points out, that Weismann and others have employed the term "acquired characters" in an extended and modified sense. To this extension I will refer in another letter.

E. RAY LANKESTER.