work on the bodily accompaniments of feeling and emotion.

The idea of "moral pathology" is very much in evidence at present, underlying as it does the work of Lombroso and his school. Dr. Giles' book is of a very different kind. It is an unpretentious sketch of moral defects from the point of view of the physician, considered under such headings as causation, diagnosis, prognosis and treatment. The work cannot be regarded as an important contribution to ethical science, but it is written brightly and with common sense. The principles which regulate diagnosis and treatment in medical practice are applied with considerable ingenuity to moral disease. There is an interesting chapter in which the idea of morbid diathesis is applied, and several types of character which predispose to moral disease are sketched.

PROTOTYPES OF THE FUNGI.

Protobasidiomyceten. Untersuchungen aus Brasilien.
Von Alfred Möller. Pp. xiv + 179. (Jena : Fischer, 1895.)

THE present work forms the eighth part of Dr. Schimper's "Botanischen Mittheilungen aus den Tropen." The author is well known for his mycological researches, having previously contributed two parts to the above-named communications—"The Fungus-Gardens of some South American Ants," and "Brazilian Fungus-Flowers." To Elias Fries is due the credit of having first reduced the previous chaotic condition of mycology to an intelligent and scientific standpoint; even much beyond what could have been expected, considering that naked eye characters, or at most when aided by a pocket lens, were only available. Berkeley and Tulasne followed, and, aided by the microscope, added greatly to our knowledge of the minute structure and affinities of the various groups of fungi, a knowledge which has been in some instances more readily utilised than acknowledged by their successors. Later, De Bary's classical work indicated clearly what could be done, by means of pure cultures, towards the elucidation of the life-history of species, and a knowledge of true affinities; a method which is being developed at the present day by Brefeld, to the extent that the last-named author has presented us with his idea of the gradual evolution of the fungi, from their algal ancestors to the highly differentiated, asexual condition, represented by the members of the Basidiomycetes. As usual in classifications based on progressive morphological development, connecting links between groups that the evidence at hand suggest as forming a natural sequence, are not always forthcoming. The purport of the work under consideration is to make known a series of such connecting links or primitive types of the great group of fungi known as the Basidiomycetes; and if the author's conclusions prove to be well founded, the neighbourhood of Blumenau, in the province of Santa Catharina, Brazil, where the material was collected, must be looked upon as a veritable garden of prototypes of the higher fungi.

Brefeld's conception of the Basidiomycetes, character-

ised by a single feature, the basidium or spore-bearing organ, which must be a terminal, clavate, or sub-cylindrical cell, bearing at its apex four—less frequently two—slender prolongations, or sterigmata, each of which bears a spore at its tip, is accepted, and the evolution of this group from the Ustilagineæ is bridged over by six families, collectively constituting the transition group called Protobasidiomycetes. Four of the transition families agree in having the basidium furnished with transverse septa, hence formed of two or more superposed cells, and bearing the spores laterally. In the remaining two families the basidia are vertically divided into four lobes, each of which runs out into a sterigma bearing a spore at its apex. The sub-families and genera of these families are considered as furnishing transitions to the Basidiomycetes proper. The following illustrate the value of these transition stages, being new sub-families and genera included in the Tremellaceæ, one of the families described above as having vertically divided basidia :—

Protopolyporeæ : Tremellaceæ with the aspect of the hymenium like that of the Polyporeæ.

Protohydneæ : Tremellaceæ with the hymenium resembling that of the Hydneæ.

Genera are as follows :—

Protomerulius : Macroscopic appearance that of the genus *Merulius*, but with basidia of the Tremella.

It is doubtful as to whether the author's view of transition groups, as illustrated above, will be accepted by mycologists. The genus *Merulius* is a typical Basidiomycete, so far as its basidia are concerned, but that something looking superficially like *Merulius*, but having basidia of a lower type, is the prototype of *Merulius*, appears to be more a matter of faith than of conviction. The same argument is applied everywhere; the general appearance is that of some well-known family or genus of the Basidiomycetes, but the structure of the basidia is that of the Protobasidiomycetes.

A wider knowledge of living species, or even a careful study of the material in any large herbarium, will in all probability convince the author that the lower forms of the Basidiomycetes are very plastic, nearly all the simpler genera being superficially mimicked by the unstable species of *Tremella* and its allies. On the other hand, it is not unusual to find specimens belonging to the simpler genera of the true Basidiomycetes presenting a superficial resemblance to species of *Tremella*, &c. As examples may be mentioned *Corticium arachnoideum*, Berk., which is sometimes a typical *Corticium* with a dense, waxy hymenium; at others the substance is very loose, dry, and the basidia scattered, when it mimicks *Hypochnus*; or again, *Coniophora puteana*, Cke., *Forma cerebella*, Sacc., on account of the *Merulius*-like hymenium. The author has considered structures worthy of sub-family and generic rank, what others would not consider as entitled to rank as a variety of a species.

Nevertheless, if all the author's deductions cannot be accepted, we are at the same time greatly indebted for the large amount of additional knowledge, the result of careful and conscientious investigations, carried out under most favourable conditions, pertaining to those primitive forms of the Basidiomycetes, which hitherto had received but scant attention.

GEO. MASSEE.