The Specific Fungi of Chromoblastomycosis*

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THE CLASSIFICATION of the fungi of chromoblastomycosis is a rather confusing subject about which there has been much difference of opinion. In addition to the complicated and variable morphology of these fungi, there are other reasons to account for the existing confusion. Certain species, which were originally described as different, have been found to be identical when actually compared under the same conditions in the laboratory. Moreover, recent attempts to change the nomenclature of these organisms have promoted further complication by introducing a long list of superfluous synonyms which render it very difficult to identify some of the strains of this group. This paper is presented hoping to simplify, as far as possible, the classification of the species that are actually valid.

Since the discovery of chromoblastomycosis in Puerto Rico, in 1931[1], a considerable part of our time has been devoted to a general study of this disease, giving particular attention to its mycologic aspects. During that period we have been able to gather 28 fungous isolates from patients who contracted the infection in various parts of the world. Since the etiologic agent of the disease has been isolated in, probably, not more than 75 instances,‡ our collection may be considered as generally representative of this group of pathogens. We have cultured these fungi repeatedly on several laboratory media, the morphology being carefully noted each time. While studying the strains more recently acquired, a revision of the old series was carried out for comparison. In order to avoid repetition no attempt will be made here to discuss in full the characteristics of this group of organisms. We will only endeavor to point out certain features concerning the methods of sporulation that are considered essential for the purpose of classification.

In the course of our observations we have encountered three different methods of sporulation. Two of these are fundamentally consistent with the genera Phialophora[2] (Figure 1a) and Hormodendrum[3] (Figure 2a). The other method is one to which we have often referred as the pseudo-

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‡ It is estimated that the total number of cases of chromoblastomycosis so far recognized must be approximately 100, but, unfortunately, the fungus has not been isolated in all of them.

Acrotheca method, for lack of a better name. The pseudo-Acrotheca method of sporulation, as noted in the fungi of chromoblastomycosis, is often indistinguishable from that of the genus Acrotheca[4] (Figures 2c and 3b), but it differs from the latter in the tendency of the conidia to becomes catenate as in Hormodendrum (Figures 2d and 3d), a feature which excludes it from Acrotheca.

According to their sporulating habits, our fungi can be naturally and conveniently divided into three specific groups.

1. *Phialophora verrucosa* Medlar, 1915.—Here are included five specimens, the morphology of which is essentially consistent with the species *P. verrucosa* Medlar, 1915[2] (Figures 1a, b, c and d). These fungi were isolated from cases of chromoblastomycosis occurring in the United States—Boston,[5] Texas,[6] St. Louis,[7] Uruguay[8] and Brazil.[9]

The fungus of the Brazilian case has been described by Moore and Almeida as a new species, namely, *Phialophora macrospora*.[10] This species would be characterized chiefly by the different dimensions of the conidia which, according to these authors, are generally longer by 2 microns and wider by 1 micron than those of *P. verrucosa*. Our measurements have confirmed, to a certain extent, those of Moore and Almeida. However, considering the extreme variability of these fungi, as to the size of the spores, and considering, further, that the range of this variability is not closely equal in all of the strains, it is doubtful if the small differences pointed out by Moore and Almeida justify the creation of an independent species on that character alone. We believe that the so-called *P. macrospora** should be considered as a variety of *P. verrucosa*. Medlar's original definition of *Phialophora verrucosa* refers to the spores as "somewhat variable in form and size usually about 4-5 x 2-3 μ. . . ."[2] This definition is considered sufficiently elastic to include varieties such as that observed by Moore and Almeida.

Conant, of Duke University, who has carried out an intensive study of the genus Phialophora and who has made accurate measurements of hundreds of conidia produced on different culture media, has found that the Texas isolate is constantly different from the others in the rate of growth and in the size of the conidiophores and conidia on all the culture media. On this basis, he considers the fungus of the Texas case as another variety of *P. verrucosa*. We are informed that Conant will discuss this subject in a future publication.

* Certain cultures of this isolate (*P. macrospora*) made after this paper was written have revealed the presence of occasional conidiophores of the pseudo-acrotheca type. This observation would seem to link more closely *P. verrucosa* with *F. Pedrosoi*. Further investigations in this connection are in progress.

PLATE I

FIGURE 1: *Phialophora verrucosa* (Uruguayan isolate), illustrating characteristic conidiophores and, in *a* and *c*, agglutinated conidia at the mouth of the Phialophora "cups." (Magnification: × 1000.)

FIGURE 2: *Fonsecaea Pedrosoi* Var. *Cladosporioides* (Dominican isolate), illustrating the Hormodendrum type of sporulation in *a* and *b;* spore clusters of pseudo-Acrotheca type in *c* and *d*, and Phialophora "cups" with conidia at *e* and *f*.) (Magnification: × 1000.)

FIGURE 3: *Fonsecaea Pedrosoi* Var. *communis* (Puerto Rican isolate), illustrating the Hormodendrum type of sporulation at *a;* pseudo-Acrotheca clusters at *b*, *c* and *d*, and Phialophora "cups" at *e* and *f*. (Magnification: × 1000.)

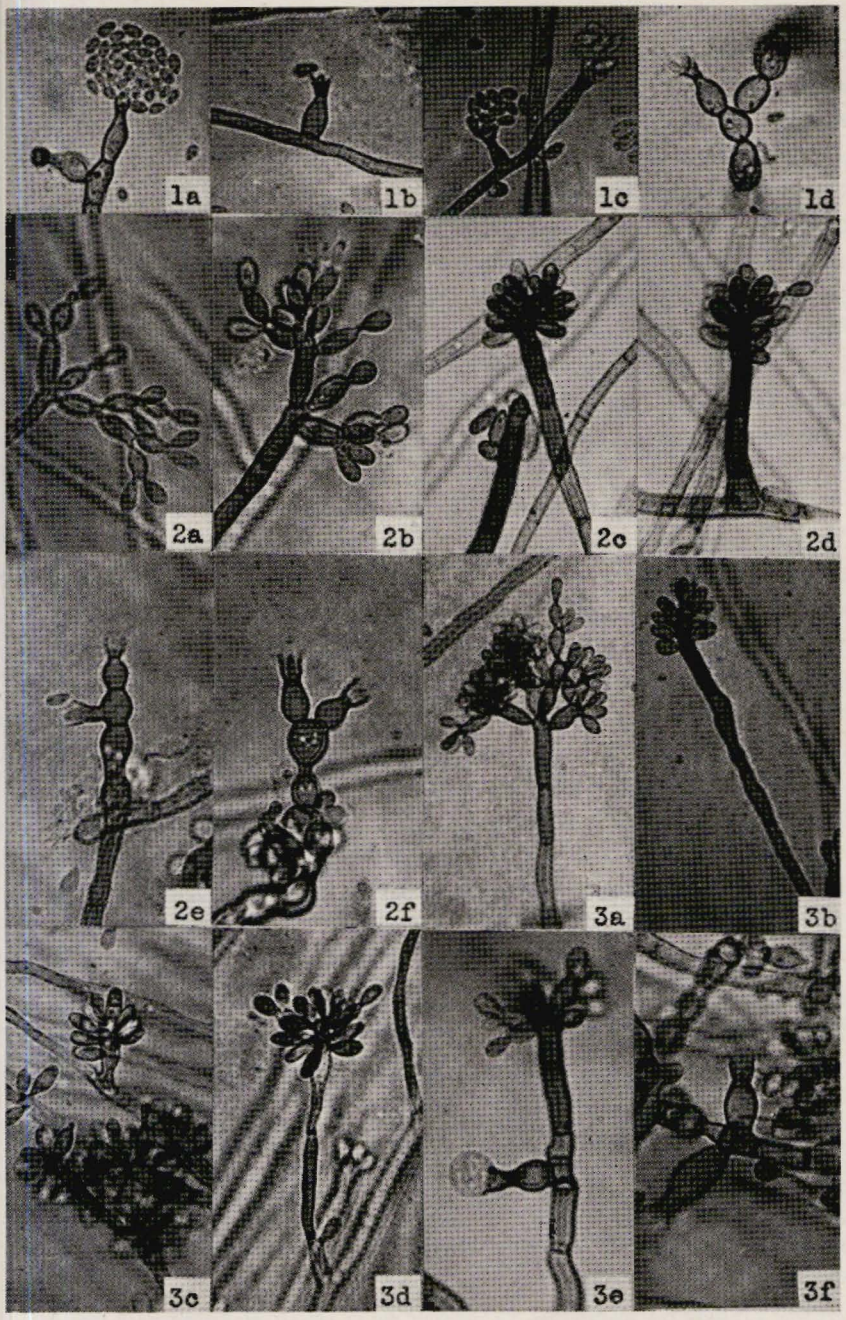

PLATE I

2. *Fonsecaea Pedrosoi* (Brumpt) Negroni, 1936, emend.—*Fonsecaea Pedrosoi* is the most common etiologic agent of chromoblastomycosis. This species was originally described by Brumpt in 1922 under the name *Hormodendrum Pedrosoi.*[11] In March 1936 it was transferred to the new genus Fonsecaea by Negroni,[12] who has laid emphasis on the acropleurogenous spore clusters (pseudo-Acrotheca) constantly observed in this fungus in addition to the Hormodendrum heads. Later in the same year Emmons and we ourselves published a more elaborate and well-illustrated description[13] of *Fonsecaea Pedrosoi** in which this species was actually emended to allow for the occurrence of the Phialophora sporulation which was apparently overlooked by Negroni.

Among the 28 fungi studied, there are 22, or 77 per cent, which may be classed as *Fonsecaea Pedrosoi.* These 22 fungi were obtained from cases occurring in Brazil,** Venezuela,[16] Argentina,[17] Puerto Rico,[14] the Dominican Republic,[18] Guatemala,[19] the United States—North Carolina[20] and Georgia—,† Algeria (Africa)[21] and Java (East Indies).‡

In *F. Pedrosoi,* the Hormodendrum type of sporulation varies in abundance according to the individual strain and with the composition of the culture medium. As a rule, it is more exuberant on Czapek's agar. Morphologically, it is usually represented by groups of conidia produced acrogenously in comparatively short, branching chains (Figure 2a), fundamentally similar to those developed in the saprophytic species of Hormodendrum (Cladosporium) found in nature. A distinguishing feature of the Hormodendrum type of sporulation in *F. Pedrosoi* is the tendency shown by some of the spores to produce numerous secondary spores in characteristic terminal clusters (Figures 2b and 3a). The so-called disjunctors are conspicuous in some strains and very poorly developed in others.

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* In this description, as well as others of the same fungus published prior to 1939 (14, 15, 18, 22, 23, 29 and 30), we used the generic name Hormodendrum, instead of Fonsecaea, for the fungus under discussion. The reasons for this are given under the heading "Nomenclature" (see below).

** Of the Brazilian strains, three were obtained through the courtesy of Prof. O. da Fonseca, who classified them as *Acrotheca Pedrosoi;* two were given to us by Dr. F. Weidman, of the University of Pennsylvania (U.S.A.); three others, labeled *Phialoconidiophora Guggenheimia, Hormodendroides Pedrosoi* and *Botrytoides monophora,* were kindly sent by Dr. M. Moore, of the Missouri Botanical Garden (U.S.A.); and the remaining strain, labeled *Phialophora macrospora,* was obtained through the kindness of Prof. F. P. de Almeida of Brazil. We suspect that the strain named *Hormodendrum Pedrosoi* (Brumpt) Langeron, which was received from the C.B.S., at Baarn, Holland, is also Brazilian in origin.

† This case, yet unpublished, was observed by Dr. Hailey, of Atlanta, Georgia. We were able to study the fungus through the courtesy of Dr. C. W. Emmons, of the National Institute of Health at Washington, D.C.

‡ The two strains from the Java case were obtained through the courtesy of Dr. C. W. Emmons, of the National Institute of Health at Washington, D.C.

The pseudo-Acrotheca type of sporulation has been observed constantly in all the specimens of *F. Pedrosoi.* The frequency of its occurrence is also variable with the particular organism and with the composition of the culture medium. Corn meal agar would seem to stimulate its development. In the isolate originally described as *H. algeriensis*[21] and in a few others in which the pseudo-Acrotheca clusters are not produced in great abundance, the presence of this type of sporulation might be overlooked if not carefully searched for. However, its occurrence in these strains is unquestionable and its characters are as typical as in any of the remaining members of this group (Figures 4c, d, e and f).

The existence of conidiophores of the Phialophora type in *Fonsecaea Pedrosoi* was originally announced in Puerto Rico in September 1935.[15] Since then, practically all the strains studied in our laboratory have revealed this method of sporulation, although its occurrence is usually very scanty.* It was only in a few instances that conidiophores of Phialophora were present in numbers large enough to be discernible without difficulty; in most cases it would take hours of careful search to discover them; and, in some strains—like one proceeding from Java, for example—, it was necessary to culture the fungus repeatedly on different media, and to extend the observation over a period of several weeks before it was possible to encounter a few conidiophores of this type (Figure 7c).

It is quite evident that, in most specimens of *Fonsecaea Pedrosoi,* the Phialophora type of sporulation represents a more or less suppressed morphologic character. Its occurrence is significant because it indicates a close morphologic relationship with other etiologic species of chromoblastomycosis.[22, 23] However, as a practical diagnostic feature of the species, it is considered of secondary importance, not only because of its scant occurrence, but also because *Fonsecaea Pedrosoi* possesses two other characteristic methods of sporulation which will always warrant the identification of the fungus.

According to the comparative proportion of the Hormodendrum and pseudo-Acrotheca types of sporulation, *Fonsecaea Pedrosoi* may be subdivided into three varieties.

a) *Fonsecaea Pedrosoi typicus.*—This variety includes several specimens resembling Brumpt's original strain, in which the pseudo-Acrotheca sporulation is the outstanding character. Indeed, this method

* In two strains recently received the Phialophora sporulation has not been found as yet. We have not observed the cultures long enough to be sure that the "cups" are not produced.

PLATE II

FIGURE 4: *Fonsecaea Pedrosoi* Var. *Cladosporioides* (African isolate—the so-called *Hormodendrum algeriensis*), illustrating the Hormodendrum type of sporulation at *a* and *b;* pseudo-Acrotheca clusters at *c* and *d,* and verrucous conidiophores of the type described by Negroni at *e* and *f.* (Magnification: × 1000.)

FIGURE 5: *Fonsecaea Pedrosoi typicus* (Brazilian isolate—the so-called *Hormodendroides Pedrosoi*), illustrating the Hormodendrum type of sporulation at *a, b* and *c,* and the pseudo-Acrotheca type at *c, d, e, f* and *g.* (Magnification: × 1000.)

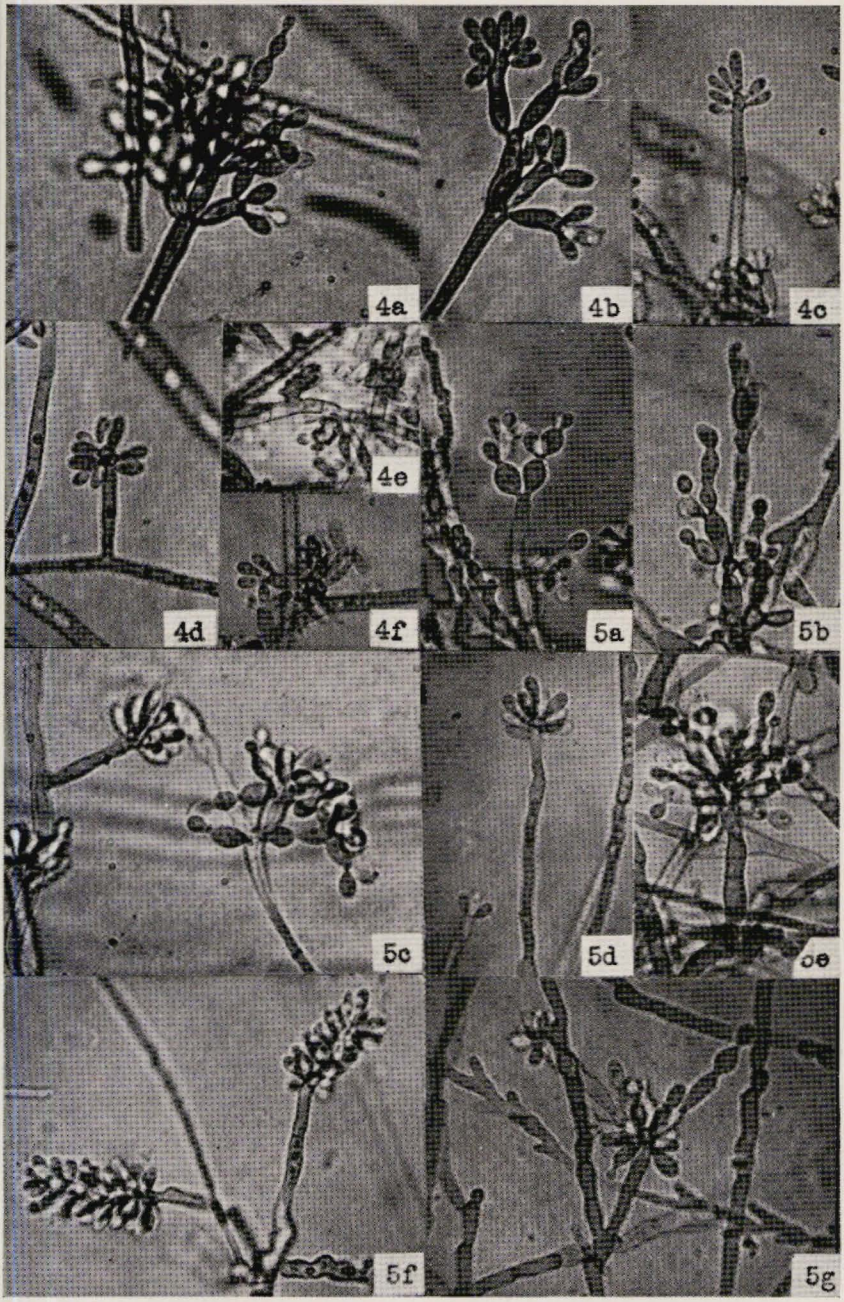

PLATE II

PLATE III

FIGURE 6: *Fonsecaea Pedrosoi* Var. *communis* (Venezuelan isolate), illustrating Hormodendrum sporulation at *a* and *b;* pseudo-Acrotheca sporulation at *c* and *d* and Phialophora sporulation at *e*. (Magnification: × 1000.)

FIGURE 7: *Fonsecaea Pedrosoi* Var. *communis* (isolate from Java), illustrating the Hormodendrum sporulation at *a*, the pseudo-Acrotheca sporulation at *b*, and a Phialophora "cup" with conidia at *c*. (Magnification: × 1000.)

FIGURE 8: *Fonsecaea Pedrosoi typicus* (Brazilian isolate—the so-called *Botrytoides monophora*), illustrating spore heads of Hormodendrum type at *a* and *b;* pseudo-Acrotheca clusters at *c* and *d*, and Phialophora "cups" at *e* and *f*. (Magnification: × 1000.)

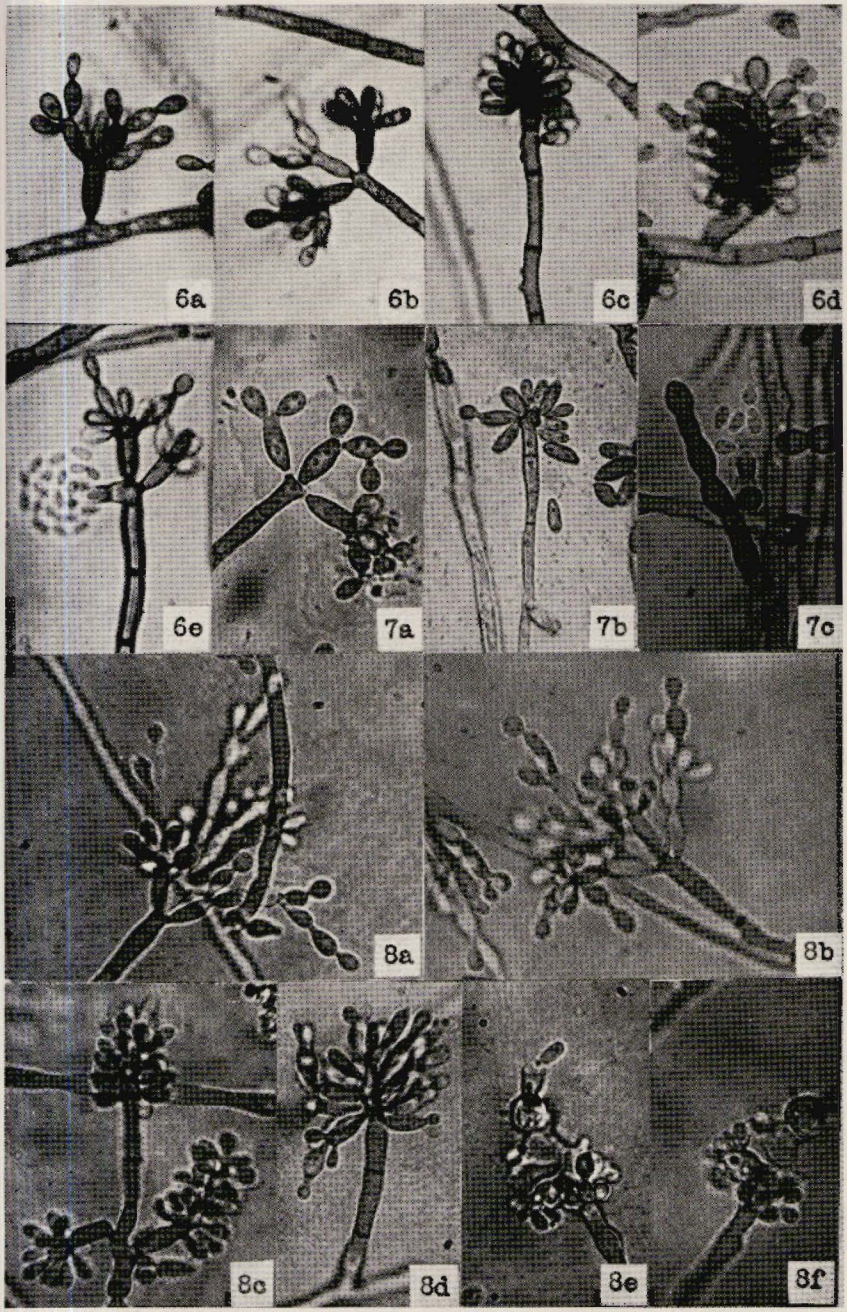

PLATE III

of sporulation may be said to have reached its highest degree of development in this variety, most of the conidia being borne acropleurogenously, either singly (Figure 8c) or catenate (Figure 8d). On the other hand, the sporulation of pure Hormodendrum type, which is characteristically acrogenous, is observed only sparsely (Figures 8a and 8b), the morphology of the chains being sometimes atypical or degenerate (Figures 5b and 5c). Finally, conidiophores and conidia like those of *P. verrucosa* are apparently rare in this variety (Figures 8e and 8f).

Certain specimens of *Fonsecaea Pedrosoi typicus* have been described as independent species under the names *Acrotheca Pedrosoi,*[25] *Trichosporium Pedrosianum*[26]*—Trichosporium Pedrosoi*[27]*—, Gomphinaria Pedrosoi,*[31] *Botrytoides monophora*[10] and *Hormodendroides Pedrosoi.*[10] According to our observations and those of others, the fungi described with the above terminology are all essentially identical with *Fonsecaea Pedrosoi* and their names should be considered synonymous with the latter. It may be added, further, that the genera Acrotheca (Gomphinaria),[4] Trichosporium[28] and Botrytoides[10] do not admit, by definition, catenate sporulation, which is one of the distinguishing features of *Fonsecaea Pedrosoi.* Finally, the proposed new genus, Hormodendroides, would be consistent with chained sporulation,[10] but that name is illegitimate according to the International Rules of Botanical Nomenclature.[24]

b) *Fonsecaea Pedrosoi* Var. *Cladosporioides.*—Variety *Cladosporioides* includes certain isolates in which the sporulation is mostly of the Hormodendrum (Cladosporium) type. The fungus known as *Hormodendrum algeriensis*[21] is a typical example. Although the original publication of this fungus mentions only the Hormodendrum chains (Figure 4a), our cultures have revealed the pseudo-Acrotheca type of sporulation as described by Brumpt[11] and Negroni[12] (Figures 4c, d, e and f) and, in addition, occasional conidiophores of Phialophora type. The organism described by Moore and Almeida as *Phialoconidiophora Guggenheimia*[10] also belongs to this variety (Figures 10a, b, c and d). In the latter isolate the Phialophora sporulation is rather conspicuous (Figures 10b and d). The two species *algeriensis* and *Guggenheimia* are illegitimate according to Art. 60 of the International Rules of Botanical Nomenclature.[24]

c) *Fonsecaea Pedrosoi* Var. *communis.*—Variety *communis* comprises a large number of intergrading forms (Figures 3, 6, 7, 9 and 11), in which both the Hormodendrum and the pseudo-Acrotheca sporula-

tions take place abundantly. There is usually some predominance of one or the other according to the individual isolate and to the culture medium used, but this predominance never reaches the extreme degrees noted in the varieties *Pedrosoi typicus* and *Cladosporioides*. Some specimens of the variety *communis* have been found to produce conidiophores of Phialophora type in conspicuous numbers, but, in most instances, this type of sporulation occurs very scantily.

Nomenclature.—In previous communications we have consistently used the name *Hormodendrum Pedrosoi* to designate the specific group just described. We used this binominal because: (a) it was the first name given to the species; (b) the Hormodendrum (Cladosporium) type of sporulation was an outstanding morphologic character in a large number of specimens examined, and (c) other alternative names proposed for the fungus were unsuitable. However, a careful observation of several isolates recently acquired has revealed that the pseudo-Acrotheca sporulation, rather than the Hormodendrum, may occur as the predominant character in some members of this group. It was further found that, in many instances, the semi-endogenous Phialophora sporulation may be produced in sufficient abundance to become an important morphologic feature. The conspicuous development of these two methods of sporulation in certain strains of *Fonsecaea Pedrosoi* has been, undoubtedly, the most important factor leading to the erroneous classification of this species by many investigators. We feel that this source of confusion should be eliminated in order to avoid further complications in the nomenclature and, on this basis, we are inclined to accept the transfer of the species *Pedrosoi* to the genus Fonsecaea Negroni, 1936. Finally, removal from Hormodendrum would be also indicated by the doubtful validity of the latter name, which is apparently a synonym of Cladosporium.

Strictly speaking, the present definition of the genus Hormodendrum, or Cladosporium, could hardly cover the organisms under discussion, which are capable of sporulating simultaneously by three distant methods, specially when we consider the reduced and depauperate character of the Hormodendrum sporulation in certain specimens of this group. Notwithstanding this, if any of the saprophytic species of Hormodendrum found in nature could be shown to produce, by microbic variation, the sporulating characters of Acrotheca and Phialophora, we would not hesitate in proposing a revision of the genus Hormodendrum (Cladosporium) to include in it the fungi of chromoblastomycosis. Similarly, if *Phialophora verrucosa (Cadophora americana)*, as

PLATE IV

FIGURE 9: *Fonsecaea Pedrosoi* Var. *communis* (Puerto Rican isolate), illustrating Hormodendrum sporulation at *a;* pseudo-Acrotheca sporulation at *b,* and Phialophora sporulation at *c.* (Magnification: × 1000.)

FIGURE 10: *Fonsecaea Pedrosoi* Var. *Cladosporioides* (Brazilian isolate—the so-called *Phialoconidiophora Guggenheimia*), illustrating the Hormodendrum sporulation at *a, b,* and *c;* the pseudo-Acrotheca sporulation at *c,* and "cups" and conidia of Phialophora type at *b* and *d.* (Magnification at *a:* × 600; at *b, c* and *d:* × 1000.)

FIGURE 11: *Fonsecaea Pedrosoi* Var. *communis* (Brazilian isolate). This particular specimen shows a remarkable tendency to sporulate almost exclusively by the Hormodendrum method, as shown in *a,* on Czapek's agar; while on corn meal agar, the spore clusters are mostly of the pseudo-Acrotheca type, as shown in *b.*

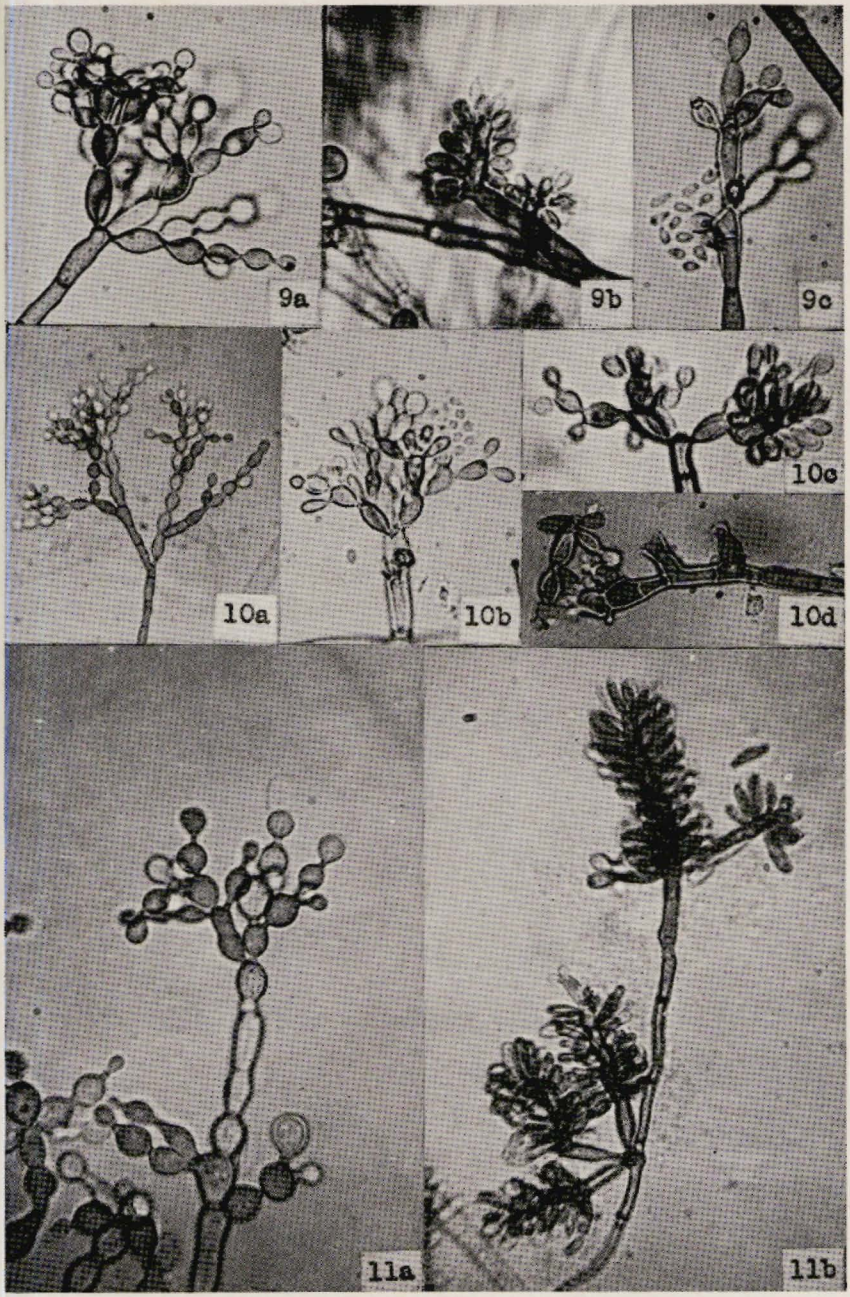

PLATE IV

PLATE V

FIGURE 12: *Fonsecaea compactum* (Puerto Rican isolate), illustrating branching chains of conidia resembling Hormodendrum at *a* and *b;* at *c,* acropleurogenous sporulation resembling the pseudo-Acrotheca type noted in *Pedrosoi;* conidiophores and conidia of Phialophora type, at *d* and *e;* Phialophora "cups" arising from a sclerotic cell at *f;* and a combination of the Phialophora and the Hormodendrum-like sporulations in the same spore heads at *g* and *h*. (Magnification: × 1000.)

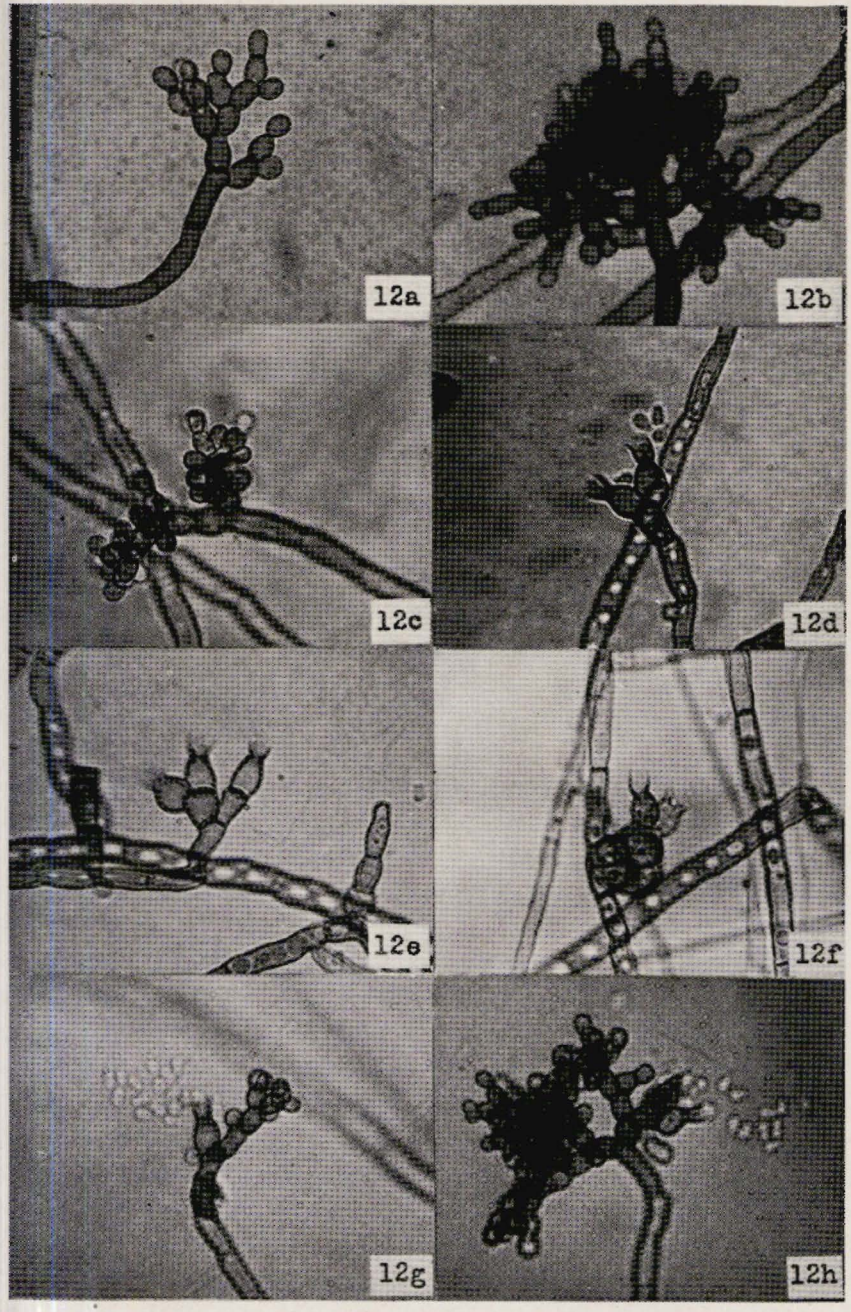

PLATE V

isolated from chromoblastomycosis, or as found in nature, could be shown, also by variation, to produce the other sporulating types characteristic of *Pedrosoi,* we would be willing to accept Phialophora as a good generic name for all the fungi in our collection. However, since none of the above possibilities have yet been demonstrated to be true and, *in view of the increasing accumulation of confusing synonyms,* the name *Fonsecaea Pedrosoi* has been accepted, as a reasonable compromise, for this group of fungi. *Fonsecaea Pedrosoi* (Brumpt) Negroni, 1936, emend. is a legitimate and comprehensive specific name which will cover, without strain, all organisms showing the three methods of sporulation here discussed; it is sufficiently elastic to allow for the wide range of variability of the fungi concerned; it is neither confusing nor misleading; and, finally, it represents a mycologic group possessing distinct pathogenic properties.

It should again be emphasized, however, that the name *Fonsecaea Pedrosoi* is hereby accepted only as a convenient and practical compromise which, it is hoped, will help to avoid the present confusion and to promote good understanding among medical mycologists. As already stated in a previous paper,[14] the botanical position of this species, as well as others involved in chromoblastomycosis, will not become definitely established until the perfect form of these fungi is discovered, and we have good reasons to believe that this will be possible in the future.

3. *Fonsecaea compactum* Carrión 1935, comb. nov.—*Fonsecaea compactum* has been isolated in a single case of chromoblastomycosis occurring in Puerto Rico. It was described under the name *Hormodendrum compactum,* Nov. Sp., in June 1935[29] and later, and more in detail, in the following year.[30] This fungus reveals the three methods of sporulation noted in Fonsecaea and, on this basis, has been transferred to that genus. In *Fonsecaea compactum,* the branching conidial chains of Hormodendrum type are overwhelmingly predominant (Figures 12a and 12b). The conidia which make up the chains are spherical or subspherical, usually shorter and wider than those of *F. Pedrosoi;* they appear more closely packed in the spore heads; they are much harder to dissociate one from the other and have no disjunctors, each element being compactly linked to its immediate neighbors in the chain by broad articular facets. Conidiophores of the pseudo-Acrotheca type are not developed in conspicuous abundance, but may be constantly observed in culture, chiefly on corn meal agar* (Figure 12c). In these

* The pseudo-Acrotheca method of sporulation had not been described in previous reports of this species.

conidiophores, the conidia are borne acropleurogenously, they are either single or catenate, and their morphology is the same as that already given for the Hormodendrum chains. The Phialophora sporulation occurs only sparsely and is fundamentally similar to that encountered in *F. Pedrosoi* (Figures 12d, e, f, g and h).

SUMMARY AND COMMENT

Chromoblastomycosis may be caused by several distinct fungi possessing a complicated and variable morphology. The classification of these fungi requires a thorough knowledge of the general morphology of the group as a whole and a careful observation of the individual isolates in different culture media, especially corn meal and Czapek's agars.

In this communication we have submitted a comparative study of 28 fungi from cases of chromoblastomycosis occurring in ten different countries throughout the world. This mycologic collection constitutes over 37 per cent of the total number of organisms so far isolated from that disease and may be considered as generally representative of the whole group.

According to their methods of sporulation, these fungi have been classed among three distinct species of the genera Phialophora and Fonsecaea. There are five specimens which are essentially consistent with *Phialophora verrucosa* Medlar, 1915; twenty-two others belong to the species *Fonsecaea Pedrosoi* (Brumpt) Negroni, 1936, emend., and a single one which is classed as *Fonsecaea compactum* Carrión, 1935, comb. nov. The two species of Fonsecaea were found to sporulate by three different methods: the Hormodendrum, the acropleurogenous (pseudo-Acrotheca) and the Phialophora. The extremely variable proportions in which these methods of sporulation may occur in different strains of *Fonsecaea Pedrosoi,* might lead to the false impression that we are dealing here with more than one specific group. It is thus that the so-called *Hormodendrum algeriensis* and *Botrytoides monophora,* for example, were described as independent species. In *algeriensis,* the Hormodendrum sporulation occurs in overwhelming predominance; whereas, in *monophora,* the sporulation is mostly of the pseudo-Acrotheca type. Yet, careful and repeated observations have firmly convinced us that the organisms described under the above names are identical with *Fonsecaea Pedrosoi.* It has been definitely demonstrated that the existing differences among these fungi lie only in the proportion, not in the nature, of the sporulating types. Moreover, the occurrence of a large series of intergrading strains would make it impossible

to establish definite limits for the proposed new species. Under the present conception of microbic variation such strains as *algeriensis* and *monophora* should be considered as varieties of *Fonsecaea Pedrosoi* and not as independent species.

We do not question the possible existence, in chromoblastomycosis, of other etiologic species different from those included here; but, according to the law of probability, it could be predicted with a fair degree of certainty that most of the organisms to be isolated, in the future, from cases of that disease will fall among the three specific groups discussed in this communication. Moreover, certain fungi already described as new species, for example, *"Hormodendron rossicum"* Meriin[32] and *"Hormodendron japonicum"* Takahashi,[33] which are not included in our collection, would seem to belong in one or another of these groups, according to the descriptions published.

The classification proposed by us represents what is considered to be a judicious interpretation of the outstanding morphologic characters of the fungi studied, it does not introduce new specific names and its comparative simplicity renders it practical. This work is submitted with the hope that it will promote a better understanding of the fungi of chromoblastomycosis among medical mycologists.

ADDENDUM

The following Latin diagnoses are given in compliance with the International Rules of Botanical Nomenclature:

1. *Fonsecaea Pedrosoi* (Brumpt) Negroni, 1936, emend., Var. *Cladosporioides.*

   Syn: *Hormodendrum algeriensis* Montpellier et Catanei 1927.[21]
   Phialoconidiophora Guggenheimia Moore and Almeida 1937.[10]

Morphologia essentialiter similis *Fonsecaea Pedrosoi typicus,* sed Hormodendrum (Cladosporium) sporulatio frequentissima et pseudo-Acrotheca sporulatio rara.

2. *Fonsecaea Pedrosoi* (Brumpt) Negroni, 1936, emend., Var. *communis.*

Morphologia essentialiter similis *Fonsecaea Pedrosoi typicus,* sed Hormodendrum et pseudo-Acrotheca sporulatio utraque forma abundans, una forma paulo prevalens secundum specimen individuale et medium culturale.

3. *Fonsecaea compactum* Carrión 1935, comb. nov.*
   Syn: *Hormodendrum compactum* Carrión 1935.[29, 30]
   Phialoconidiophora compactum (Carrión) Moore and Almeida, comb. nov.[10]

Hyphae 2.5-5.2 μ latae, arborescentes, interdum dichotomae, septatae, saepe conjunctae; sporulatio triplex: A) Hormodendrum (frequentissimum) conidiis 2.5-4.8 μ × 2.5-3.8 μ, globosis vel subglobosis, levibus, olivaceis, catenis brevibus ramosis conidiophori saepe dilatatis cellulis terminalibus; B) acropleurogenosa conidiis solitariis vel concatenatis, conidiophoris irregularibus terminalibus vel lateralibus 3-5 μ × 6-15 μ; C) Phialophora (rara) conidiophoris terminalibus vel lateralibus 7-12 μ × 3-4 μ, conidiis 1.5-2 μ × 2-3 μ.

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*The original description of this species did not include a Latin diagnosis. We are indebted to Dr. H. W. Rickett, of the New York Botanical Garden, for the Latin translation.

A translation of this work into Spanish will appear shortly in another issue of *The Puerto Rico Journal of Public Health and Tropical Medicine.*

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