The Classification of Actinomycetes at the 3rd International Congress of Microbiology

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by

ELIO BALDACCI.
(*Dal Laboratorio crittogamico di Pavia*)

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In the abstracts of Communications of the third Congress of Microbiology in New York, the summaries of six works (1) regarding the classifications of Actinomycetes and a work regarding the etiology of Actinomycosis from bacteriological viewpoint have been published (2). A short analysis of these works seems useful to us to recapitulate the purposes and the results of these researches to which we have contributed for a time(3)

A common feature of all these works is that the generic nomenclature for these microrganisms is entirely abandoned. The discussion is therefore resolved about the opportunity of grouping or not these microrganisms into one or more genera, and it is ascertained that their morphologic, cultural and pathogenic characteristics are such as to make the subdivision into many genera justified and necessary. As a corollary of this an almost complete agreement follows on the diagnoses of *G. Actinomyces*. In it are included the species producing spores (conidia) in an aerial mycelium distinct from vegetative mycelium. BALDACCI proved the logical necessity of such a diagnosis arising from the critical exam. Only NAESLUND insists, though only incidentally, for the *Nocardia* generic nomenclature, which, on the contrary, is to be considered a synonym „pro parte" of *Actinomyces*. Also the genus *Proactinomyces* Jensen (1931) for the non-forming spores, aerobic filamentous species in cultures, in which a fragmentation of mycelium is found in bacteria-like segments, is almost generally accepted.

The problem of anaerobic Actinomycetes, under which term various species are included of difficult culture, effected only in conditions of anaerobiosis, is less discussed. But, as PUNTONI points out, the anaerobiotic characteristic is not the only peculiarity and perhaps it is the least important, though the most apparent. Almost all the AA. acknowledge the morphologic and cultural individuality that differentiates them clearly from the others but their classification into one or more genera is still discussed. NEGRONI gives some experimental results to this purpose, but, as far as we know, he has not yet dealt with the matter of nomenclature. As we have stated (BALDACCI) there are three generic names: *Actinobacterium* Haass, *Cohnistreptothrix* Pinoy and *Brevistreptothrix* Lignières suggested for such microrganisms, two of which, at least, are synonyms (*Actinobacterium* = *Brevistreptothrix*). As to *Cohnistreptothrix*, it has been successively used with a different meaning from that formerly suggested by PINOY. The identity of anaerobiotic Actinomycetes with *Corynebacterium* has met no approval; nor does it seem maintainable to us, at present. In our opinion it is necessary, on the contrary, to fix one's attention on the species of *Leptothrichia* (= *Leptothrix*) described in pathologic cases, for a careful revision, which we are doing at present.

Finally no A. has expressed his opinion about the *Actinobacillus*, *Fusiformis*, *Pfeifferella*, *Erysipelothrix*, *Leptothrichia*, species which however are necessarily included in the Actinomycetales.

Also the problem of species, which, in our opinion has a very great importance for the study of these microrganisms, was equally undiscussed. In fact in some species, no morphologic and cultural characteristics were found for the only fact that they were named only after pathologic findings (*A. bovis*; *A. hominis*; *Streptothrix Foersteri*) and are to be abandoned. The known characteristics of other species are too summarized short to permit a reliable diagnosis, so that no further isolation appears besides the original one (*A. luteo-roseus*; *Nocardia Rivieri*). These species too are to be abandoned by right, as they are by fact. Finally of other species among those above described, a careful revision is necessary in order to fix the characteristics and to draw a list of the synonym species. This work was a special object of our researches.

Only two arrangements of classification of ray-fungi have been presented at the Congress. KRASSILNIKOV divides them into two families, but the Actinomycetaceae family does not seem to us to be omogenous from the union of four genera as: *Actinomyces, Proactinomyces, Mycobacterium, Mycococcus*. We do not see why we have to create a Micromonosporaceae family for the only genus *Micromonospora*, which includes four species in all and that WAKSMAN would like to divide into three groups. The spores-formation approaches these species to the g. *Actinomyces* in a very apparent manner. WAKSMAN forms four families, besides the Micromonosporaceae family which he accepts from KRASSILNIKOV. But the Proactinomycetaceae family is to be considered invalid, because by the same name LEHMANN and NEUMANN created, since 1927, a family including the g. *Mycobacterium* and *Corynebacterium*.

A new arrangement of Actinomycetales has been dealt with by us in a work published on this review shortly before the meeting of the Congress, nor are we acquainted at present with elements that allow us to modify it. In this work we also stated our opinions for a further complete revision of the ray-fungi to which we have been giving our contribution for years.

(1) Naeslund C., On What Grounds Can a Classification of Actinomyces and Allied Organisms be Made?; Krassilnikov N., The Structure, Development and Classification of Actinomycetales; Waksman S. A., On the Classification of Actinomycetes; Erikson D., On the Nomenclature of the Anaerobic Actinomycetes; Negroni P., Estudio sobre los Actinomyces micro-aerofilos; Puntoni V., La Classificazione degli attinomiceti; Abstracts of Communications of Third International Congress for Microbiology, New York, september 2—9, 1939, pp. 26—31. — (2) Naeslund C., Etiology of Actinomycosis among Cattle and Swine from Bacteriological Viewpoint; Abstracts of Communications, ecc. pp. 270—271. — (3) Baldacci E., Introduzione allo studio degli Attinomiceti. Mycopathologia, II, 84—106, (1939); Baldacci E., La conception d'espèces chez les Actinomycetes par rapport a leur classification et a leur determination. Boll. Sez. Italiana Soc. Inter. Microbiologia, V, 3—11, (1937); Baldacci E., Contributo alla sistematica degli Attinomiceti. I. Sull'*Actinomyces bovis* Harz e sull'*A. sulphureus* Gasperini. II. *Actinomyces Bostroemi* Bald. n.sp. III. Rapporti fra l'*Act. carneus* (Rossi Doria) emend. Bald. e il *Proactinomyces asteroides* (Epping.) Bald. con descrizione di due varietà di quest'ultima specie. IV. Sull'*Act. melanosporeus* Krainsky. V-VIII. *Actinomyces albus*, *A. chromogenus*, *A. odorifer*, *A. thermophylus*, *A. viridis*, *A. viridochromogenus*, *A. hominis*, *A. innominatus*. Atti Ist. Botan. Pavia. **9**, 244—271, 299—314. (1937) **10** 125—160, 321—329 (1938), **11**, 192—231 (1939); and Mycopathologia I, 68—76, (1938); **2** (1939).