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INTRODUCTORY REMARKS AND WELCOME*

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Ladies and gentlemen!

To begin with, I wish to express my pleasure that you have so willingly accepted my invitation to discuss here together the methods to be employed for characterising and classifying the streptomycetes. This proves not only that I feel strongly the lack of a usable system for determining these organisms, but that also you who, in most cases, have been dealing with these problems much longer and more in detail, are not satisfied with the schedules existing and described in the literature. What is the reason? Every author has tested with much assiduity and with good observation in most cases thousands of strains and has then tried to establish a system of classification and a key for determination. The situation now is that several keys for determination of the different kinds (species) are available for the genus Streptomyces. Each of these studies in itself is good, and there can be no objection to any of them. However, this perforce results in anybody who deals with streptomycetes—and due to the intensive investigation and research of antibiotica this number is very great nowadays—determining his new isolations by employment of different methods. This procedure is only too conducive to a nomenclature which is the constant source of errors and misunderstandings. At present it is necessary to state in the precise naming of a species what method has been used for testing the particular strain, for often another author classifying a different group may have given the same name to another species. On the other hand, one may conclude

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that a new isolate should be named as a new species; however, this isolate when tested according to another method is found to be one that had been described long ago. This procedure has resulted in a legion of new species which certainly can be substantially reduced in numbers by use of the respective comparative tests. Two items could help to overcome these difficulties:

1. Establishment of one system of classification to be used for future work.

2. Creation of Culture Collection for the genus Streptomyces.

For some time the systematic publications referring to streptomyces have been growing. They show, it is true, how much interest is evidenced in the classification and systematics of these organisms, but on the other hand these publications have also increased confusion in this field. You will justly object to my plea for a standardized procedure for testing: Patience, please! The good or the best respectively will make its way alone! This is surely true. But cannot we try to shorten this time of waiting a little by limiting ourselves and by agreeing on the employment of quite definite methods of investigation which we deem necessary and suitable for the description of the streptomycetes?

Permit me for the purpose of comparison, to show you in 2 tables once more the essential points which different authors have taken as bases for their methods of determination, particularly in their more recent studies. Table 1 shows the order of succession in which the different characteristics are used for classification. Krassilnikov, for example, places first the morphology of aerial mycelium, next the shape of the spores when examined under a light microscope, and third the colour of the pigment.

Table 2 is a summary of the statements in Table 1. It shows that the colour and morphology of the aerial mycelium are made use of as the most important characteristics for the primary classification of the streptomycetes. When comparing the different working methods of the authors as given in Table 1, one is struck by the fact that while the three authors Kutzner, Misiek, and Gause (to whom Burkholder with his working proposal may be added as a fourth) proceed by the same path in their determinations; nevertheless the groups, subgroups, and species can be compared only provisionally. The reason is that in all three cases

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Table 1. Order of succession of criteria used by different authors for classification of the Streptomyces

Author and year	No. of unit determinations	Color of		Morphology				Physiology		Ecology etc.
		Aerial mycelium	Substrate mycelium pigment	Aerial mycelium	Light micro-scope	Electron micro-scope	Chromo-genesis	Antibiosis etc.		
Krassilnikov 1949	53 species	4	3	1	2				5	
Waksman and Lechevalier 1953	147 species						3	4	1,2	
Baldacci <u>et al.</u> 1954	21 series	2	1					3		
Hesseltine <u>et al.</u> 1954	7 major groups	2		1						
Burkholder <u>et al.</u> 1954		1	2	3				4		
Kutzner 1954, 1956	10 major groups	1	2							
Misiek 1955	382 subgroups									
	9 major groups	1	2				3	5		
	31 subgroups			4						
	195 color pattern varieties									
Gause <u>et al.</u> 1957	15 series	1	2	3						
Pridham <u>et al.</u> 1958	108 species									
	7 sections	2		1						
Ettlinger <u>et al.</u> 1958	42 series									
	34 species	2		3	1		4			

Literature:

Misiek, M.: Comparative studies of Streptomyces populations in soils, Thesis Syracuse Univ. 1955
Gause, G.F. et al.: Problems of the classification of the antagonistic Actinomyces species, Moskau 1957
Ettlinger, L. et al.: Personal Communication 1958
The remaining literature is given by Baldacci (See pp. 86, 87, This BULLETIN)

Table 2. Frequency of the appearance of the most important criteria in the key for identification arranged in the order of their use (Summary of the numbers from Table 1)

Order	Color of the		Morphology				Physiology		Ecology
	Aerial Substrate		Aerial mycelium	Spore form		Chromo- genesis	Antibiosis, etc.		
	mycelium	pigment		Light micro-	Electron micro-				
								scope	
1	4	1	3		1				1
2	4	4		1					1
3			1	3		2	1		
4	1			1		1	2		
5							1		1

For example: The colour of the aerial mycelium was given first place by 4 authors, by 4 authors second place, and by 1 author fourth place.

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different culture media are used in judging the colour of the aerial mycelia, the primary basis of classification. The question whether it is preferable to employ that medium which is optimum for the formation of aerial mycelium in determining its colour, or whether it is better always to use the same culture medium for this reaction, has not yet been decided and will be one objective of our discussion. This illustration indeed broaches the whole question of standardization of the different reactions and culture media. The problem of standardizing the culture substrata, in my opinion, is of decisive importance in order to obtain index numbers and observations which can satisfactorily be compared.

The second item which, by supplementing the first may bring us closer to the ideal, is the establishment of a special Type Culture Collection for Streptomycetes. As to the need for such a standard collection we are agreed—if I understand the letters I have received from you. The manner, and place, and the possibility of financing it must be an important item for consideration.