

DEVELOPMENT OF FLAGELLA ON GERMINATING SPORES¹

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The only observation on the development of flagella on germinating spores which has come to my attention is that of Klein (1889). Klein used an organism he called *B. leptosporus* n.sp. (Klein). He made hanging drop preparations of the spores and observed them continuously at a temperature of about 35°C. The germination was generally complete in five and three-quarters hours. No motion of the organisms during germination was observed. Not until six hours and fifty minutes did characteristic motion begin to appear. At this time many four-membered chains of cells could be seen. From this observation it is impossible to tell exactly when and how flagella develop on the newly formed cell.





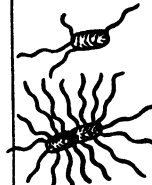

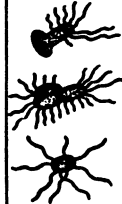

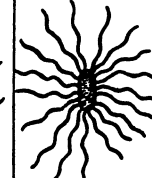


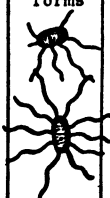

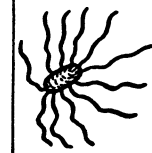
Working with a number of motile spore-forming bacteria including *B. vulgatus*, *B. cereus*, and *B. flavus* the author set about making flagella stains of the germinating spores. The stain used was that described by Leifson (1930). The method was essentially as follows: Week-old agar slant cultures, containing practically no vegetative cells, were suspended in distilled water and the suspension heated to 70°C. for ten minutes to kill any vegetative cells. A number of bouillon tubes were then heavily inoculated by means of a pipette with the heated suspension. At different intervals of time a tube was removed from the incu-

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bator, a hanging drop made to determine motility and the organisms washed in distilled water. Flagella stains were made of

Table 1
Time and Manner of Development of Flagella
on Newly Formed Vegetative Cells.

Motility and Morphology after Indicated Hours of Incubation

Organisms used	1¼ Hrs.	1½ Hrs.	1¾ Hrs.	2 Hrs.	2½ Hrs.
<u>B. vulgatus</u>	Motility no motile forms	Motility no motile forms	Motility no motile forms	Motility some motile forms	Motility many motile forms
	Morphology 	Morphology 	Morphology 	Morphology 	Morphology 
<u>B. cereus</u>	Motility no motile forms	Motility some motile forms	Motility -	Motility sluggish motility	Motility active motility
	Morphology 	Morphology 	Morphology 	Morphology 	Morphology 
<u>B. flavus</u>	Motility no motile forms	Motility some motile forms	Motility many motile forms	Motility good motility	Motility good motility
	Morphology 	Morphology 	Morphology 	Morphology 	Morphology 

these washed organisms. The results with three of the organisms are given in table 1.

It is evident from table 1 that flagella begin to grow out of the organisms while they are still in the process of germination. The flagella do not grow out all at once but one by one. They evidently grow very rapidly; perhaps as much as 1 micron every two to three minutes. The organisms evidently become motile with only 2 or 3 short flagella present.

REFERENCES

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LEIFSON, EINAR 1930 *Jour. Bakt.*, 20, 203.