

identification of the material, I am grateful to Dr. J. R. Norman of the British Museum and to Dr. S. L. Hora of the Department of Fisheries, Bengal, for the supply of literature.

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January 1, 1943.

1. Norman, J. R., "The John Murray Expedition, 1933-34" *Scientific Reports*, 1939, 7, No. 1. 2. Gunther, A., *Cat. Fish. Brit. Mus.*, 1862, 4, 373.

A NOTE ON *BORASSUS FLABELLIFER* LINN.

Borassus flabellifer Linn. is described as a tall dioecious palm in systematic accounts.¹ Blatter² describes it as a "very tall dioecious palm" and does not refer to any exceptions. But monoecious trees of *Borassus* seem to be common. The monoecious inflorescences are observed to be produced by some trees regularly year by year. The photograph published is that of



Monoecious spadix of *Borassus flabellifer* Linn.

such an inflorescence, observed by the writer, where one branch of the spadix (right) bears only female flowers and the other (left) bears female flowers at the base and male flowers towards the tip, where the branch shows a deflection.

The unisexual condition in this genus seems to be derived by reduction from hermaphrodite flowers, the female flowers containing 6-9 staminodes and the male flowers containing a pistillode represented by three bristles.

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January 14, 1943.

1. Hooker, J. D. Sir, *The Flora of British India*, 1894, 6. 2. E. Blatter, S.J., "The Palms of British India and Ceylon, Indigenous and Introduced, Part VII," *The Journal of the Bombay Natural History Society*, 1912, 21, No. 3.

EXCITATION AND ACCOMMODATION IN UNSTRIATED MUSCLE

WHEN unstriated muscle is stimulated with alternating current (A.C.), the tension soon subsides owing to accommodation (Singh, 1938).

This phenomenon is analogous to that described by Hill (1936) in nerve. Using his terminology the tension subsides when "U" rises above "V", their rise being visualised as in Fig. 1. When the muscle is stimulated with A.C., two factors produce their effects, one that retards relaxation, and the other that produces tension. These two factors are not the same, as shown by the fact that the muscle accommodates to the two at different times; the two factors are antagonistic. Using 8 volts, A.C., the relaxation is retarded if the duration of the contraction is approximately less than 3-4 seconds; accommodation to tension takes longer, about 5-7 seconds. The primary tension is probably produced by ions inside, and retardation of relaxation by ions outside (Singh, 1938,^{3,4,5,6,7,8} Singh, 1939,^{9,10} Singh

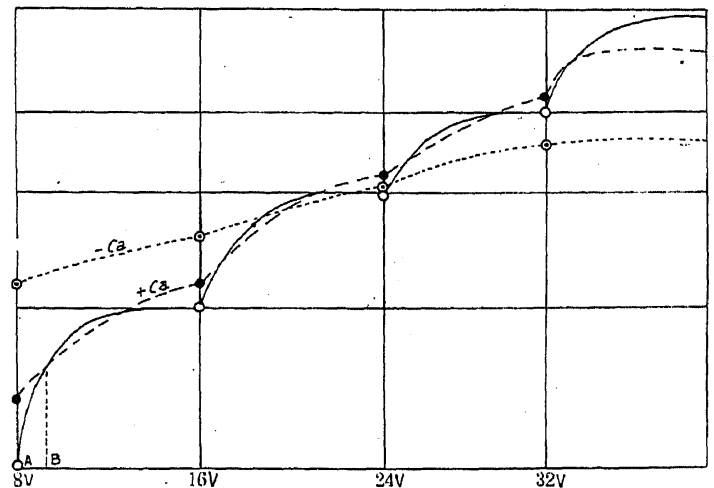


FIG. 1. Unstriated muscle. Rise of "V" (continuous line) and rise of "U" (discontinuous lines) In the absence of calcium the initial threshold rises but the rate of rise is less (Singh, 1938d). Ultimately "U" may begin to fall, owing to "adaptation to adaptation" or "accommodation to accommodation".

1940,^{12,13} Singh, 1942, 1943,^{14,5} Rao and Singh, 1940). The above results show that "U" rises more slowly than "V".

When the stimulus is over, fatigue persists to A.C., and potassium for sometime, and tone also is neutralised for 3-4 secs. This shows that the fall of "U" is slower than that of "V"; the primary tension is probably produced by ions inside and tone and the potassium contraction by ions outside.

The interval from A to B, that is, the latent period, is the time required by "V" to catch "U" as suggested by the fact that potassium and magnesium which increase accommodation in nerve, increase the latent period of certain contractions in *Mytilus* muscle.

Ultimately "V" rises higher than "U" as shown by the fact that with higher voltages continuous tension is produced, and the rate

of relaxation is decreased. Ultimately, however, "U" may fall cwing to "accommodation to accommodation" or "adaptation to adaptation".

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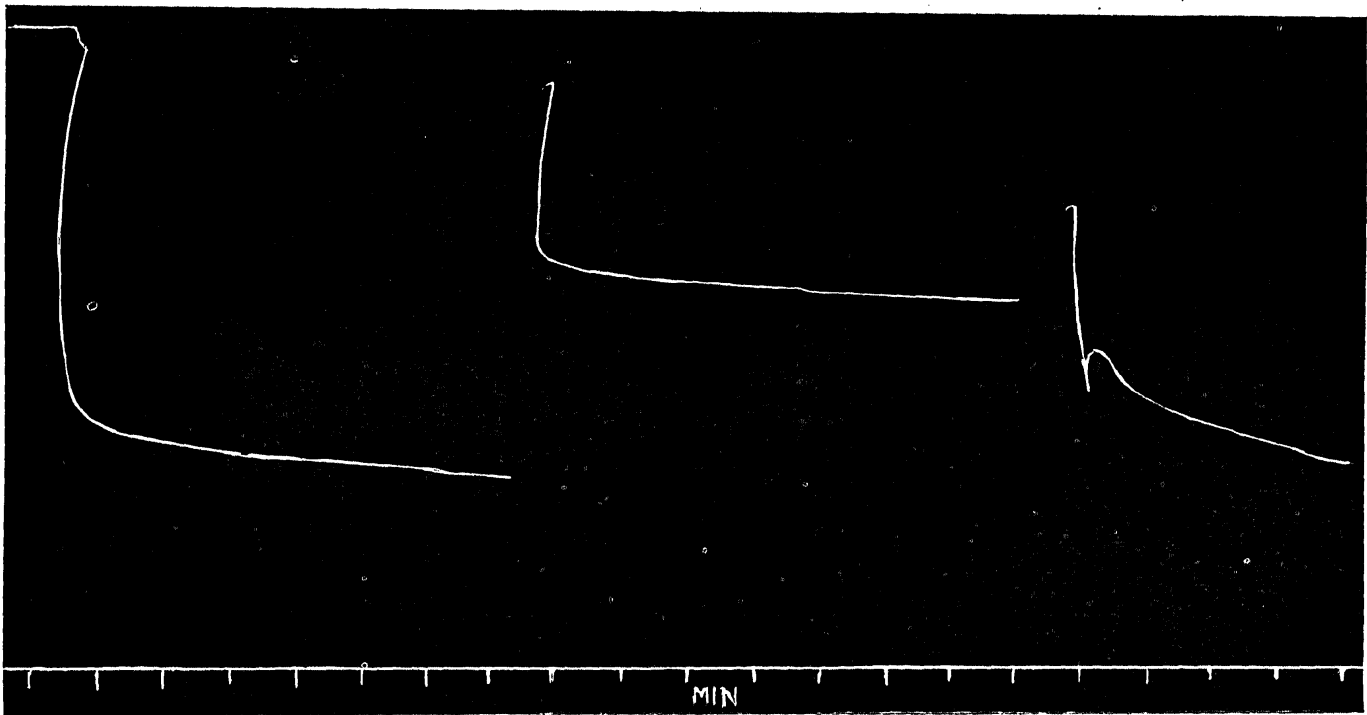
1. Hill, A. V., *Proc. R. Soc.* 2. Rao, M. S., and Singh, I., *J. Physiol.*, 1940, **98**, 12. 3. Singh, I., *Ibid.*, 1938, **91**, 398. 4. *Ibid.*, 1938, **92**, 62. 5. *Ibid.*, 1938, **92**, 235. 6. *Ibid.*, 1938, **94**, 241. 7. *Ibid.*, 1938, **94**, 1. 8. *Ibid.*, 1938, **96**, 367. 9. *Ibid.*, 1939, **96**, 1. 10. *Ibid.*, 1939, **96**, 367. 11. *Ibid.*, 1940, **98**, 155. 12. *Ind. J. Med. Res.*, 1942, **30**, 449. 13. *Ibid.*, In the Press. 14. *Proc. Ind. Acad. Sci.*, 1943, In the Press. 15. *Ibid.*, In the Press.

THE CONTRACTION OF UNSTRIATED MUSCLE PRODUCED BY CHANGE OF TENSION

UNSTRIATED muscle is known to contract on sudden increase of length (Straub, 1900;

agencies that paralyse nerves, such as, chloral hydrate, ether, curare, novocaine, nicotine. Fig. 1 shows stretch contraction produced in the presence of 0.1 per cent. nicotine. When I first noticed the stretch response in *Mytilus* muscle, I thought it was due to nervous activity, so I used chloral hydrate to abolish it, but I found that the latter augmented the response.

The absence of the stretch response in nerve-free smooth muscle is no indication that it is produced by nerves. It is not always found in *Mytilus* muscle, and I have not found it in frog stomach which contains nerves. Its presence depends on the action of ions outside, and also on the rate of stretching. Calcium increases this accommodation in *Mytilus* muscle. The fact that contraction is produced both by stretch and release suggests that it is due to a certain configuration of the myosin molecule through which the muscle passes as its length is changed either way, this configuration being distorted by accommodation. Changing the length of the molecule probably produces orientation of the bonds, so that the molecule



The effect of nicotine (0.1 p.c.) on the stretch response

Curve I in *Mytilus* saline

Curve II in Acetylcholine (1 in 10^5)

Curve III in Acetylcholine + nicotine. Note the stretch response.

Winkler, 1898; Singh, 1938). Singh (1938) has shown that unstriated muscle not only responds to increase but also decrease of tension or length, so that like other stimuli, it is the change of state that excites the muscle. Further this contraction has properties of the potassium contraction.

The contraction produced on stretch has been ascribed to nervous activity (Ferguson, 1942). I am not inclined to agree to this, as the potassium contraction is increased by

becomes polarised, and difference in potential is produced between parts of the molecule.

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January 18, 1943.

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1. Ferguson, J., *Amer. J. Physiol.*, 1942, **131**, 524.
2. Singh, I., *J. Physiol.*, 1938, **92**, 62. 3. Straub, W., *P. Fluger's Arch.*, 1900, **79**, 379. 4. Winkler, H., *P. Fluger's Arch.*, 1898, **71**, 357.