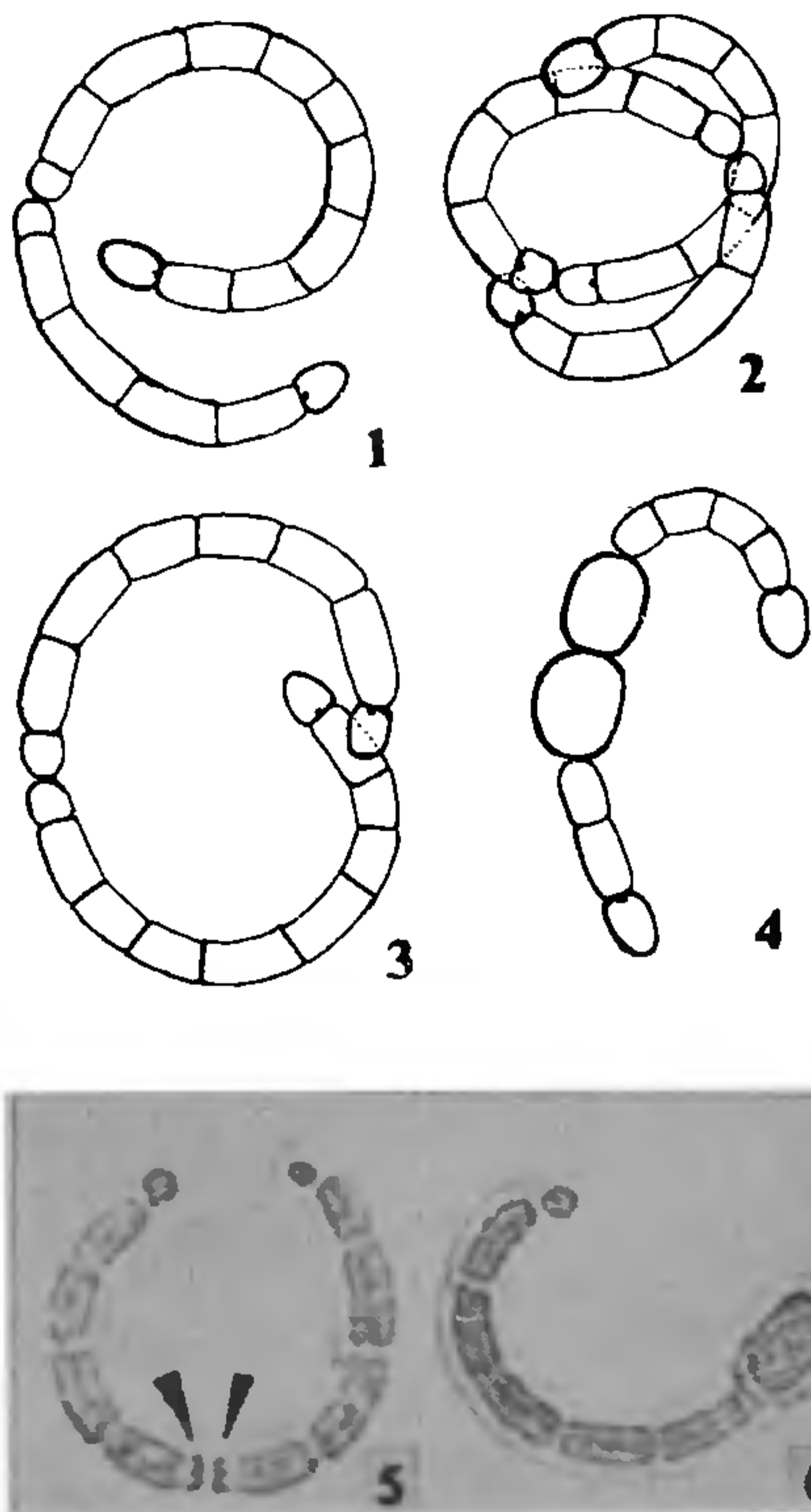


are oblong or ellipsoidal, formed singly or in a series of two, always away from the heterocyst and  $6-8\mu$  in breadth and  $8-13\mu$  in length (Figs. 1-6).



FIGS. 1-6. *Anabaenopsis tanganyikae* (G. S. West) Wolosz & Miller. Figs 1-3. Filaments showing formation of paired heterocysts in intercalary position,  $\times 750$ . Fig. 4. Filament showing occurrence of two akinetes away from the heterocysts,  $\times 750$ . Fig. 5. Filament showing unequal divisions in two cells in the median position,  $\times 800$ . Fig. 6. A part of a filament showing a terminal heterocyst and an akinete,  $\times 800$ .

Thus our observations confirm that the paired heterocysts arise in an intercalary position in this species as well which is an important diagnostic character of the genus, *Anabaenopsis*. Further, there also existed some doubt about the number of akinetes produced in this species. Geitler (1932, p. 808) reports it to be single (?). However, the present specimen has shown that the akinetes do occur and they may be borne singly or in series of two.

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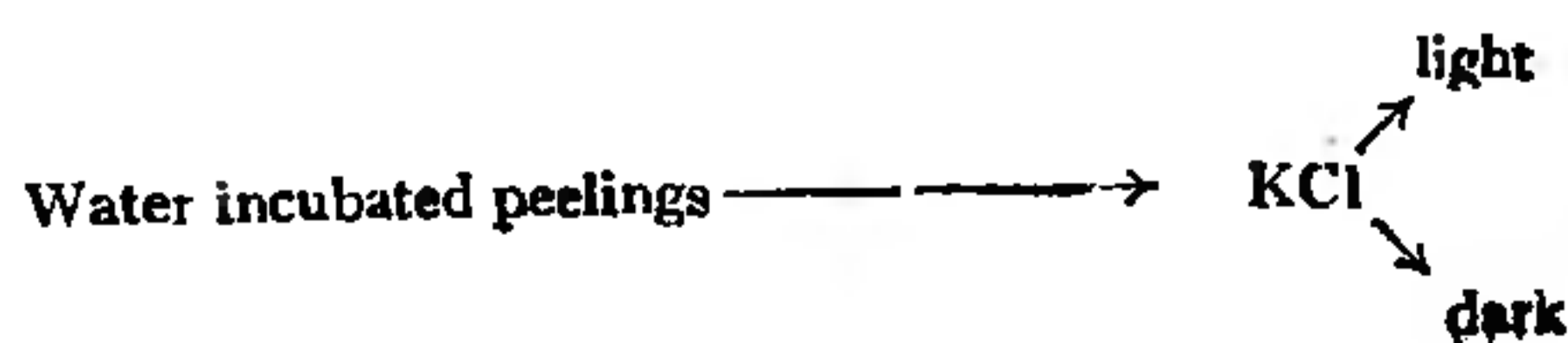
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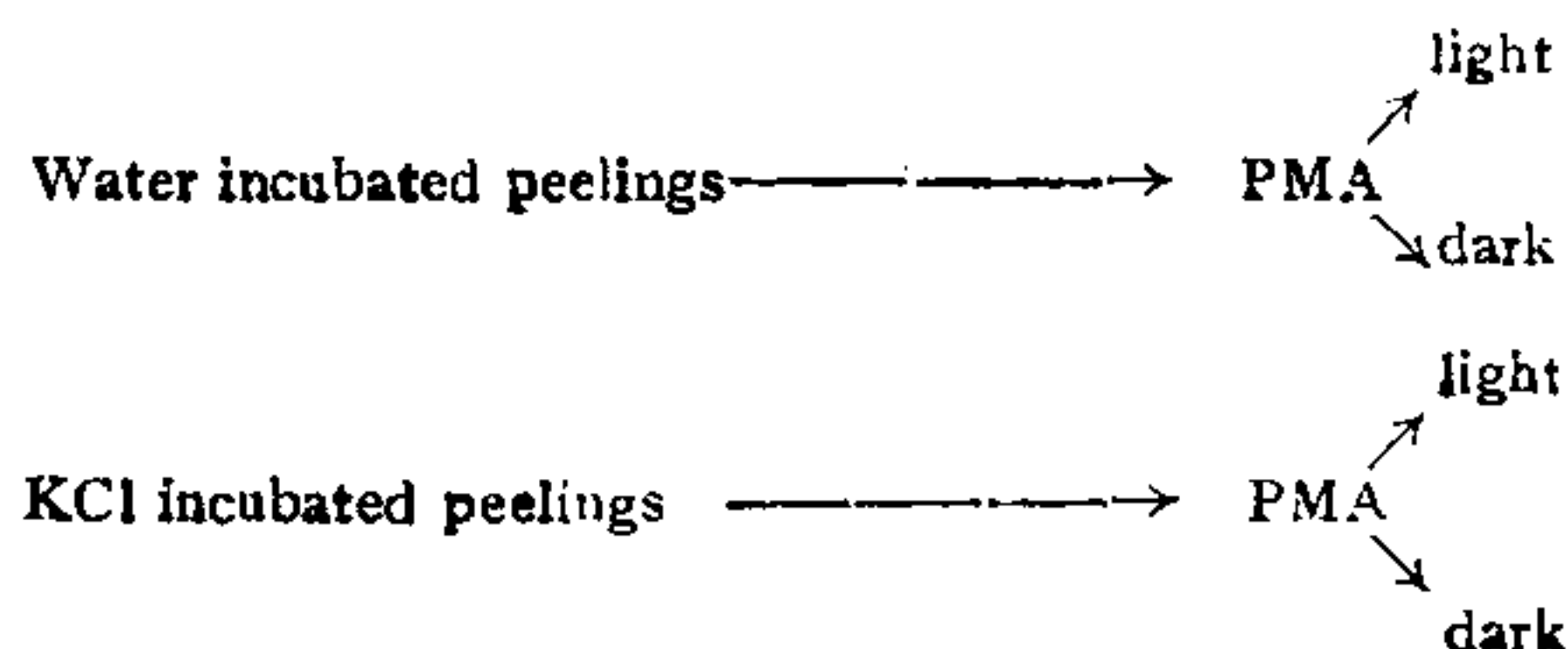
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#### ROLE OF POTASSIUM CHLORIDE AND PHENYLMERCURIC ACETATE ON STOMATAL APERTURES IN ISOLATED EPIDERMAL PEELINGS OF *CALOTROPIS PROCERA* R. BR.

THE stomatal opening has been shown to be controlled by osmotically regulated swelling of guard cells<sup>7</sup>. Recent experimental work has stressed the specific role of potassium in light stimulated opening of stomata<sup>4,5,10,11</sup>. It has been indicated that absorption of  $K^+$  and the associated increase in anions may account for increase in solute concentration in guard cells associated with opening<sup>5</sup>. This was supported recently in tobacco guard cells<sup>14</sup>. It has been demonstrated that floating leaf discs on a dilute solution of phenylmercuric acetate (PMA) prevented complete opening of the stomata<sup>15</sup>. Experiments have been reviewed in which PMA used as a stomata closing antitranspirant, caused reactions in transpiration and photosynthesis<sup>14</sup>. In the present study, further observations on the role of  $K^+$  in the opening of stomata, the effect of PMA in causing the closure of stomata and the interaction of KCl and PMA in opening and closing of stomata have been recorded.

Epidermal peelings removed from the leaves of *C. procera* were incubated in distilled water for 30 minutes and then transferred to respective molar solution of KCl (0.5) and PMA ( $10^{-3}$ ). These concentrations were tested as optimum for maximum opening and closing of stomata both in light and darkness. The procedure for the incubation in the two chemicals was as follows:





The observations as regards opening and closing of stomata and  $K^+$  influx were done after an incubation period of three hours in respective chemicals. The histochemical detection of  $K^+$  was done by employing cobalt sodium nitrite<sup>13</sup>.

The measurements recorded on the opening and closing of the apertures are shown in Fig. 1. Figure 1 shows that the stomata which

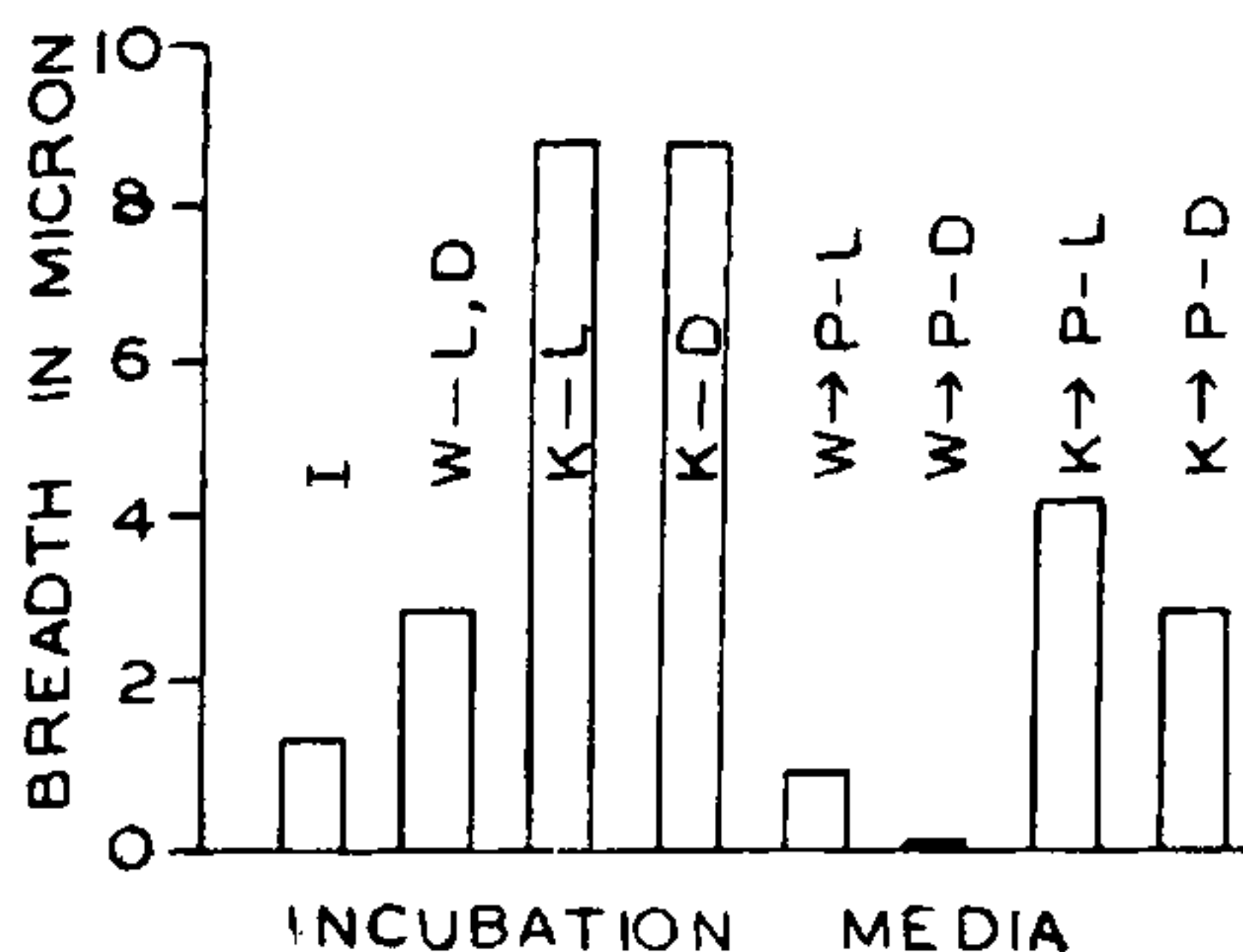


FIG. 1. Effect of different incubation media (W=water; K=KCl; P=PMA) on the width of stomatal aperture in isolated epidermal peelings from leaf of *C. procera*. (I=initial; L=light; D=dark condition).

were initially 1.5 microns in nature, opened upto 3 microns when the peelings were incubated in water in light or dark. This suggested that water induced the opening of stomata to a certain extent. They opened to a maximum by KCl in both light and dark, consequently breadth of the stomatal apertures became the actual length and *vice versa*. Both the light and KCl incubated peelings showed the positive test for potassium ions in the guard cells. This indicated that potassium ions influxed into the guard cells. It was inferred that influx of  $K^+$  into the guard cells was independent of light.

When water-induced open stomata were transferred to PMA in light and darkness, stomatal apertures were reduced in the

former but forced to close down in the latter. Thus PMA was found to be more effective to close the stomatal apertures in dark as compared to light.

When peelings with KCl-induced open stomata were transferred to PMA in light and darkness, stomatal apertures were reduced more in the latter as compared to the former condition. Thus in presence of  $K^+$  in guard cells, PMA could not have full effect so that it could not be replaced or released by PMA.

Guard cells of several species contain large concentrations of potassium when they are open in light and relatively small quantities when they are close in dark<sup>6</sup>. KCl-incubated peelings of *C. procera* showed equal stomatal openings in light as well as in darkness. Opening in light in  $CO_2$  free air was accompanied by a decrease in solute potential (increase in solute concentration) and maximal stomatal opening in dark required a tenfold higher potassium concentration in the medium<sup>4</sup>. In the present study *C. procera* required the same concentration of KCl in light and dark for a maximum stomatal opening. The potential between the guard cells and the external medium in epidermal strips of tobacco in the light in open stomata has been measured<sup>9</sup>. When KCl was in the medium, the greatest change in the electrochemical potential was observed indicating that potassium ions were accumulated in guard cells. The accumulation of  $K^+$  took place in guard cells of *C. procera* which resulted in maximum opening independent of light condition.

Phenylmercuric acetate when sprayed on maize leaves caused the closure of stomata and more adversely effected transpiration<sup>12</sup>. In the present study PMA was found to be more effective in light as compared to dark both for water and KCl-induced stomata. It has been reported that PMA retarded stomatal closure in *Nerium oleander* but retarded closing as well as opening in *Phaseolus vulgaris*<sup>2</sup>. In the present work, water-induced open stomata were completely closed down in PMA but KCl-induced open stomata were partially closed. It is reported that initially closed stomata in epidermal peelings of *Tephrosia purpurea* opened when floated on water in light but not in darkness, whereas KCl induced the opening of stomata apertures to a maximum

in light but not in darkness<sup>8</sup>. In *C. procera* opening of stomata were independent of light conditions.

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