MORPHOMETRIC CHANGES IN THE FIELD CRAB ON ADAPTATION TO HIGHER SALINITY

SALINITY adaptation modifies the structure, function and behaviour of many euryhaline species[1]. The freshwater field crab, *Oziotelphusa senex senex* is a euryhaline species[2] and it alters its geotactic responses on adaptation to higher salinity[3]. Recent studies on osmotic stress, revealed that a medium of about 50% sea-water seems to be iso-osmotic for this crab[3]. But the crab performs its life functions well in sea water too[3,4]. This paper describes some morphometric changes with reference to the gill areas and body weight of crabs adapted to higher salinity.

The crabs, were adapted to full strength artificial sea-water[5] for 3 months as described earlier[2]. Carapace length and width measurements of different sized crabs in freshwater as well as in sea water were made with a vernier calipers. The antero-thoracic carapace width, which is the widest part of the carapace, was usually measured. The crabs were blotted on a dry cloth to remove all water in their branchial chambers and weighed. The proximate surface areas of the gills were measured according to Babula *et al.*[6],

The results are presented in Figs. 1 and 2. The log-log plots of carapace width or length *versus* gill area of crabs showed linear relationships (Fig. 1). Salinity adaptation decreased the gill area significantly. As the slopes of the regression lines differ with sex, it could be understood that the salinity stress manifests in the morphometric changes differently.

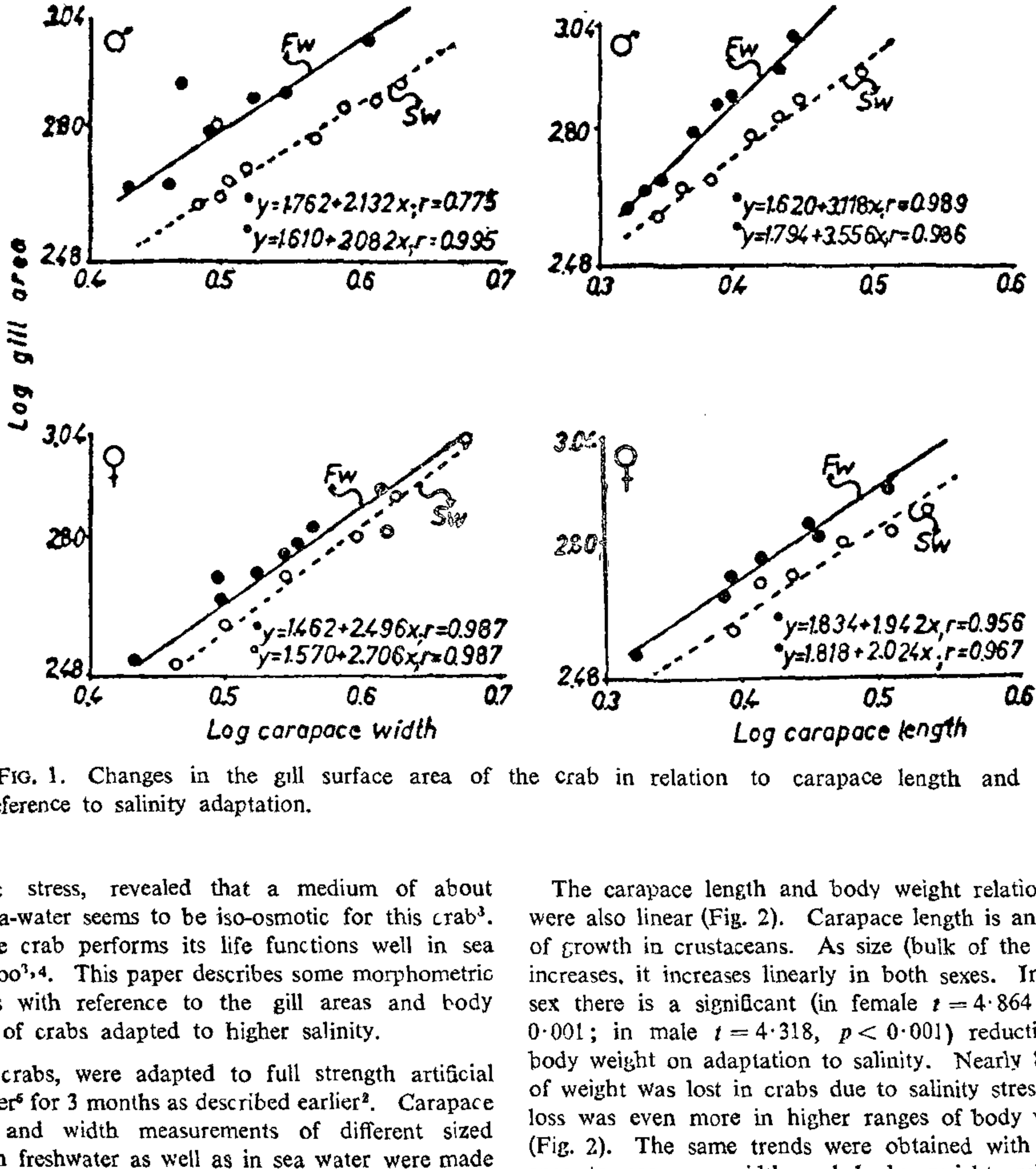

FIG. 1. Changes in the gill surface area of the crab in relation to carapace length and width with reference to salinity adaptation.

The carapace length and body weight relationship were also linear (Fig. 2). Carapace length is an index of growth in crustaceans. As size (bulk of the body) increases, it increases linearly in both sexes. In each sex there is a significant (in female $t = 4{\cdot}864$ $p < 0{\cdot}001$; in male $t = 4{\cdot}318$, $p < 0{\cdot}001$) reduction in body weight on adaptation to salinity. Nearly 8–10% of weight was lost in crabs due to salinity stress; the loss was even more in higher ranges of body weight (Fig. 2). The same trends were obtained with reference to carapace width and body weight relationship (Fig. 2).

The results show that the salinity effects manifest in reduction in body weight and atrophy of gill areas. The reduction in body weight could be due to reduced levels of feeding and food intake, as already

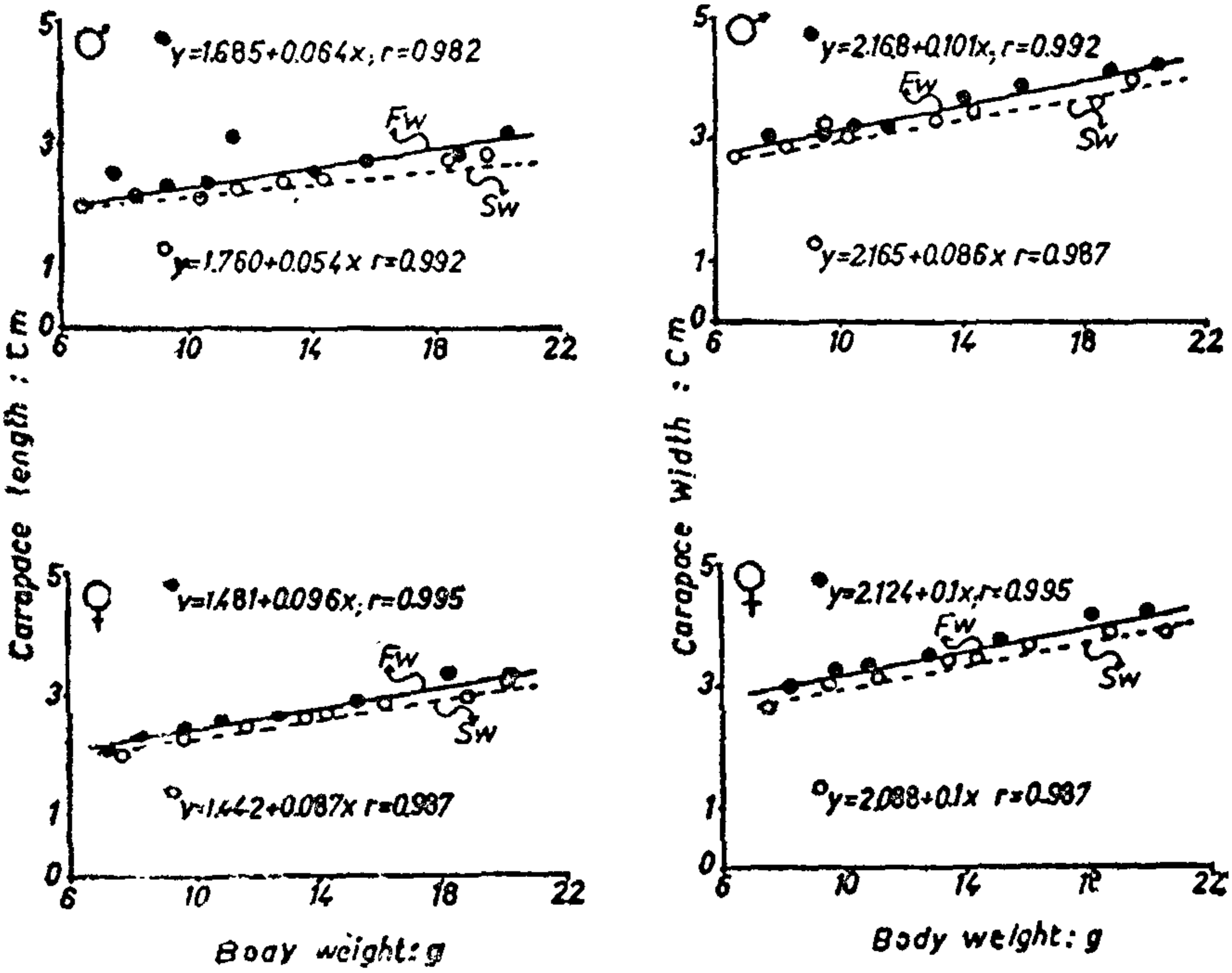

FIG. 2. Changes in the body weight of the carb in relation to carapace length and width with reference to salinity adaptation.

demonstrated earlier[7]. However, loss of weight due to dehydration on higher osmotic stress has been overruled as the tissue water content remained constant in salinity adapted crabs. Reduced gill surface areas obviously reduce the ventilation, but certainly would cope with the lowered oxygen uptake and metabolism reported earlier[7]. Nevertheless, the reduction in body weight and gill surface areas are noteworthy morphometric compensatory changes operating at salinity stress.

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Department of Zoology, University of Agricultural Sciences, GKVK Campus, Bangalore 560 065,
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M. V. V. SUBRAHMANYAM.
R. V. KRISHNAMOORTHY.

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