

TYPES OF FLOWERING BEHAVIOUR IN RICE '*ORYZA SATIVA* LINN.' AND THE DISTINCTIVENESS OF THE AMAN TYPE

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DATE OF EAR EMERGENCE, also called 'Flowering time', has been studied from the physiological as well as the genetic point of view in Japan, U.S.A., India and other countries. It was shown by a number of Japanese workers^{1,2} that flowering in rice is hastened by short photoperiods. Some varieties were shown to be definite short-day plants and others to be "less sensitive" in the U.S.A.³ In India, different types of rice are grown in different seasons. There are autumn-winter (*Aman*), spring (*Boro*) and summer (*Aus*) varieties. It is generally known that *Aman* varieties tend to flower about certain fixed dates in autumn or winter irrespective of the date of sowing while *Aus* varieties tend to flower after a fixed number of days following any date of sowing. Late sown *Aman* varieties flower in spring. It has been suggested that *Aman* varieties require a fixed daylength for flowering which occurs naturally both in autumn and spring.⁴ *Aus* varieties are generally considered to be indifferent and *Aman* varieties to be sensitive to photoperiods. Experiments conducted with *Aman* varieties have shown them to be short-day plants.⁵ A few *Aus* varieties examined showed that they were not short-day plants but

were possibly long-day ones.⁶ Genetic investigations have shown the presence of a number of genes (symbolised as Fl_1, Fl_2, \dots etc.⁷) including an inhibitory gene (lfl) causing monofactorial to multifactorial inheritance of this character. The Fl genes have also been found to be linked with other characters (height, etc.)^{8,9} in different chromosomes.

During 1951-53, the author grew 31 varieties of rice (10 *Aman*, 5 *Aus*, 2 *Boro*, 8 U.S.A., 5 Japanese, and 1 Javanese) in the open at the Calcutta Presidency College. There was one sowing of every variety every month. The dates of ear emergence were noted and Figs. 1 and 2 show some of the graphs obtained. A striking observation was the uniformity in the flowering behaviour of all the *Aman* varieties and its contrast with all other non-*Aman* (Indian *Aus* and *Boro* and all foreign) varieties. Twelve monthly sowings of 6 *Aman* varieties showed 54 flowerings during October-December, 18 during January-April and none during May-September. Flowering of *Aman* is fixed during autumn-winter. If that fails, there is a second flowering time in spring. In all the non-*Aman* varieties flowering is more or less distributed throughout

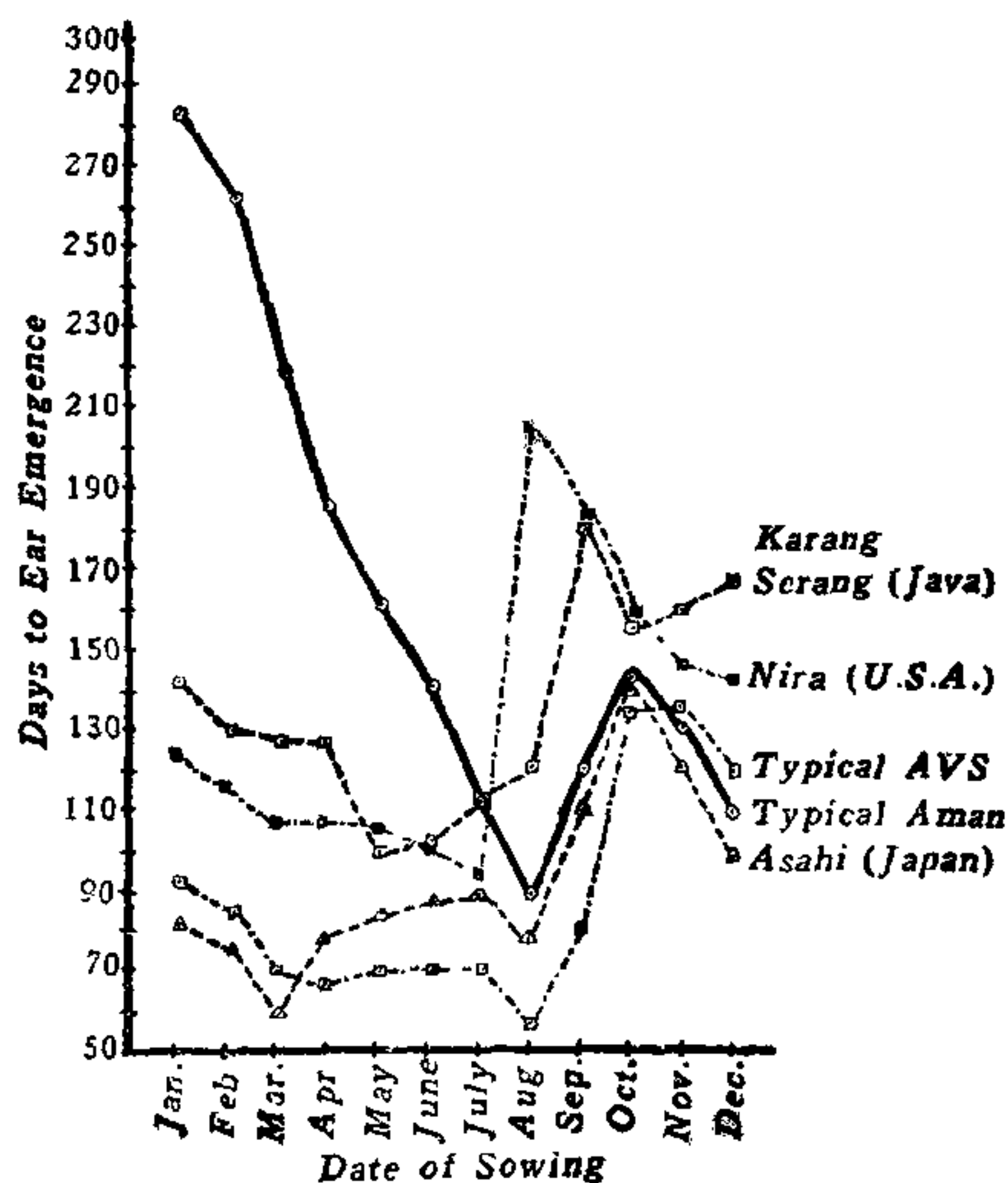


FIG. 1

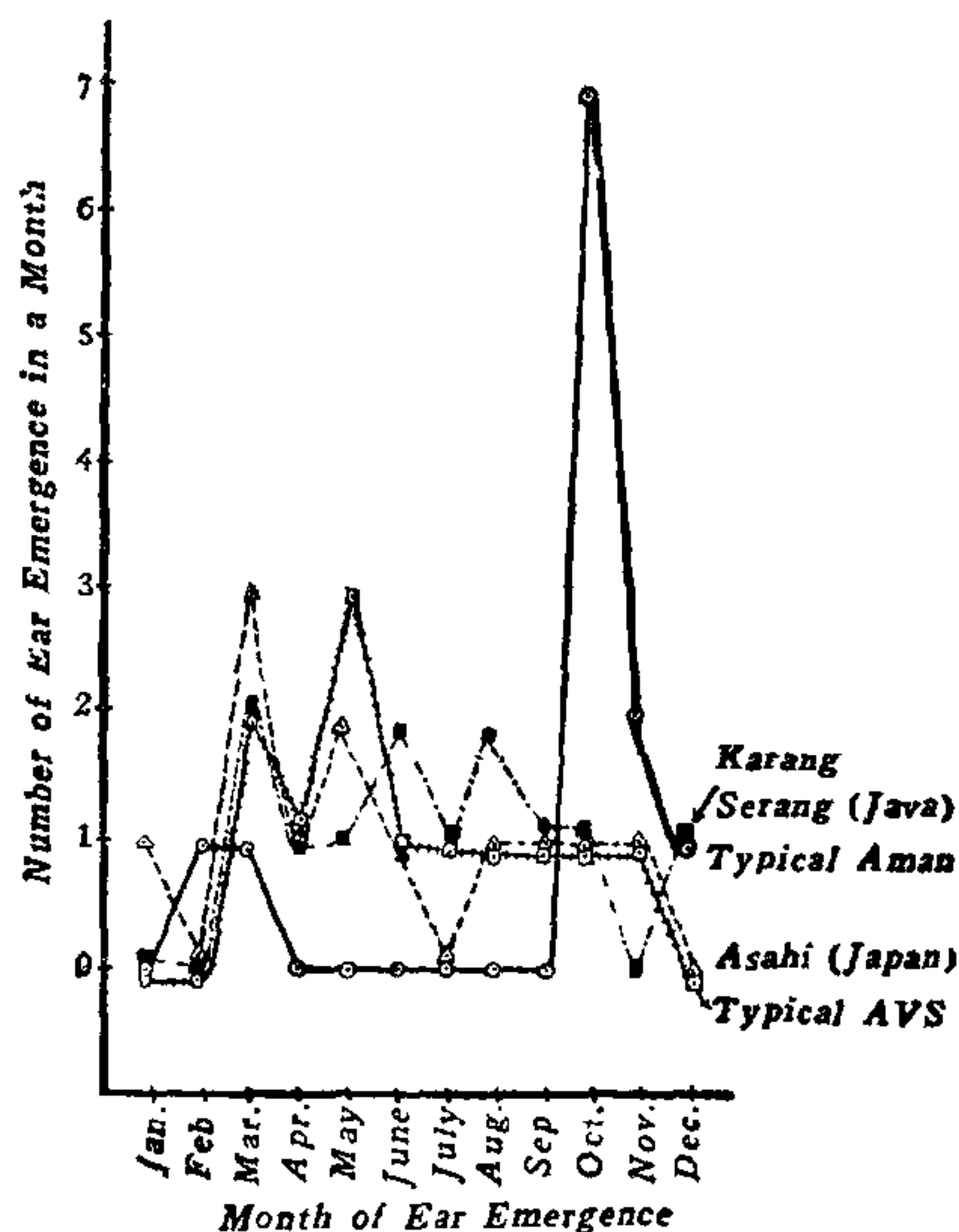


FIG. 2

the year excepting the cold winter months and a consequent increase of flowering in spring.

There is nothing peculiar in the behaviour of the *Aman*, *Aus* and *Boro* varieties which may perhaps be explained by the sensitiveness of the *Aman* to photoperiods and the indifference of the others. But, the same argument does not explain the *Aus*-like behaviour of all the foreign varieties which are known to include many sensitive ones.^{1,2,3} In a previous experiment, the author grew (1947 to 1949) six of the foreign varieties (4 U.S.A., 1 Japanese and 1 Javanese—all included in the later Indian experiment) in the U.S.A. in open rice fields during warm seasons and in temperature-controlled green houses during winter. The result is shown in Fig. 3 which shows that two were highly sensitive short-day varieties

(Asahi and Cody), three were slightly sensitive or indifferent (Zenith, Nira and Arkansas Fortuna) while the sixth (Karang Serang) seemed to be a long-day one.

The experiment conducted in India, thus, clearly brings out the distinctiveness of the *Aman* type as opposed to all other non-*Aman* varieties. The flowering behaviour of the non-*Aman* varieties, as shown in this experiment, does not show any distinction between short-day, indifferent and long-day varieties and between *indica* and *japonica* types that are included within this assemblage. Possibly, the interaction between daylength and other environmental factors controlling flowering time is different in the *Aman* and non-*Aman* groups.

Further investigation is likely to show that while the *Aman* varieties have a particular *F1* gene, the non-*Aman* assemblage includes different short-day, indifferent and long-day genes which are differently affected by other environmental factors. Such work is being undertaken. Also, the distinctiveness of the *Aman*, which may be considered as a seasonal ecotype within the *indica* subspecies, may have some bearings on the evolutionary history of the rice species.

A detailed report of the above work will be published elsewhere.

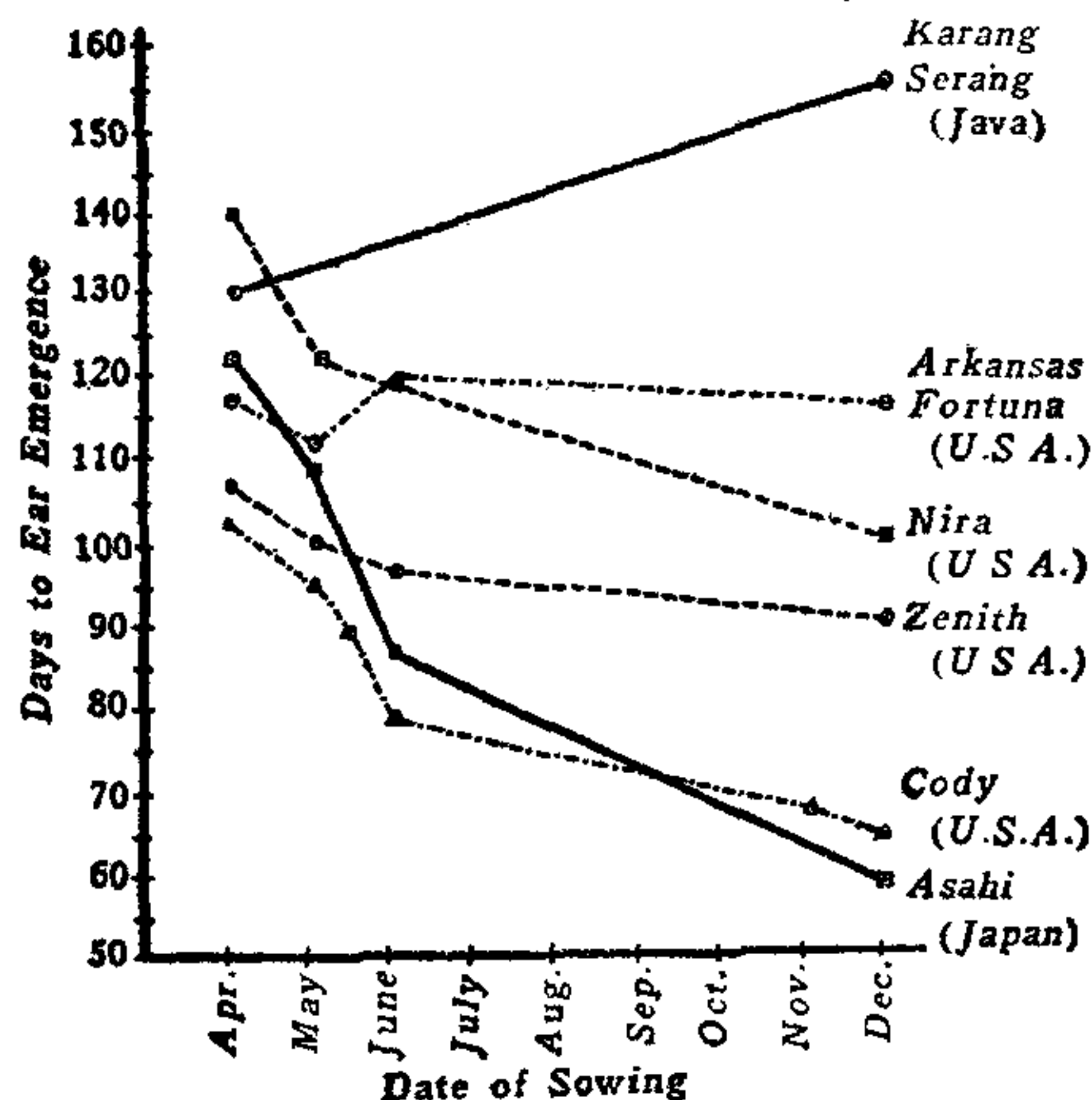


FIG. 3

1. Noguchi, *Jr. Agri. Soc. Jap.*, 1927, *Jap. Jr. Bot.*, 1929, 4, 237.
2. Kondo *et al.*, *Ber. Ohara. Inst.*, 1932, 5, 243.
3. Beachell, *Jr. Agri. Res.*, 1943, 66, 325.
4. Sircar and Sen., *Curr. Sci.*, 1951, 20, 238.
5. Sircar, *Nature*, 1944, 153, 378.
6. — and Ghosh, *Ibid.*, 1947, 159, 605.
7. Kadam and Ramiah, *Ind. Jr. Genet. and Plnt. Breeding*, 1943, 3, 7.
8. Ramiah, *Ind. Jr. Agri. Sc.*, 1933, 31, 377.
9. Jodon, *U.S.D.A. Bulletin*, 1948.

UNESCO SCIENTIFIC EXHIBITION IN INDIA

THE second of the mobile scientific exhibitions organised by UNESCO with the co-operation of scientists and manufacturers of scientific instruments is now in India at the invitation of the Indian National Commission for Co-operation with UNESCO. The first exhibition which travelled in the Latin American countries in 1949-50 was prepared on the twin theme of physics and astronomy. The present travelling exhibition which was on view this month at Calcutta is designated as 'Our Senses and the Knowledge of the World'. It consists of about 50 experiments which the public can

perform, and these are divided into five sections, namely, touch, hearing, smell, taste and sight. Twenty illustrated panels explain to the visitor the main points that he should know about each sense.

The Exhibition is in charge of Mr. P. C. Bandyopadhyay who was formerly Assistant Scientific Officer of UNESCO South Asia Science Co-operation Office at New Delhi. The local arrangements are being made by the State Governments, which have invited the Exhibition to various centres.