when the leaves were very tender, almost when these were in the bud stage. If the mites are introduced after the leaves have developed, it is seen, that the galls formed are either very few in number or they will not be formed at all.

Since the Itonidid by itself cannot produce galls as admitted by Mani and since the mite by itself can produce galls as seen from my experiments I think Mani should revise his views and admit that the mites are the true gall formers.

M. C. CHERIAN.

Agricultural College and
Research Institute,
Coimbatore.
March 19, 1935.

[1] *Ann. and Mag. Natural History*, 1933, **11**, 201.
[2] *Ann. and Mag. Natural History*, 1933, **12**, 138.
[3] *Proc. 21st Ind. Sci. Cong.*, 1934.
[4] *Curr. Sci.*, 1934, **3**, 208.
[5] *Records of the Indian Museum*, 1934, **36**, 427.

Note.—Mr. M. S. Mani agrees with Mr. M. C. Cherian's findings and accepts his results as correct.

A Central Nutrition Board for India.

YOUR editorial in the April number of *Current Science* is much to be welcomed. Several times during the last three years and especially in connection with some University extension lectures delivered at Calcutta in 1932 and lately in connection with the symposium on Vitamins, held under the auspices of the Indian Science Congress at Calcutta, I had occasion to stress the need for the establishment of a Central Nutrition Board for India. It is encouraging to note that some nutritional investigations are being carried on in India in different laboratories. While it is desirable in the interest of science that there should be some individuality about the researches that are being conducted at different centres, the necessity for a co-ordinating central organisation would appear to be paramount. Such an organisation may be entrusted with the task of (1) co-ordinating the nutritional work of different laboratories, (2) suggesting investigations of practical importance in relation to the varying climates, soils, habits, traditions, availability of food-stuffs, etc., in different parts of the country, and, especially, in relation to the purchasing power of different classes of people, and (3) making the results available to the general public in simple non-technical language.

This board should work in close co-operation with the Imperial Agricultural Council and with the chief medical organisations of the country. It would be a great thing if your editorial can stimulate thought in this direction and lead to the establishment of a committee to go into the proposal in detail.

B. C. GUHA.

P. 109, Lake Road, Calcutta,
May 1, 1935.

The Distribution of a Simple Epidemic Disease.*

By Prof. J. A. Strang,
University of Lucknow.

THE population N being divided into groups $v_0, v_1, \ldots, v_n$ in which v_n means the number of persons who have experienced (or are experiencing) an nth attack of illness, it is shown that the numbers v_n are determined by the equations

$$N = v_0 + v_1 + v_2 + \ldots\ldots\ldots + v_n + \ldots\ldots$$

$$\frac{dv_0}{dt} = -p_0 v_0$$

$$\frac{dv_1}{dt} = p_0 v_0 - p_1 v_1$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$\frac{dv_n}{dt} = p_{n-1} v_{n-1} - p_n v_n$$

where p_n is the probability that an individual of the group v_n will experience another attack within unit time.

Modifications are suggested for the cases in which

(i) only a finite number of attacks is experienced by each individual, either because the kth attack is always fatal, or because the kth attack confers immunity;
(ii) migration occurs during the epidemic;
(iii) births are included in the reckoning, affecting v_0, or v_0 and v_1, according as

* A resume of the lecture delivered under the auspices of the Faculty of Sciences, Lucknow University, Feb. 1935.

the child of infected parents is not or is infected at birth ;

(iv) individuals are removed by death or otherwise.

If the factors p_n are independent of the numbers v_0, v_1, v_2,..... the differential equations are *linear and homogeneous*, and solutions are therefore linearly additive. The bearing of this on the application of results is pointed out when statistics refer, as they often do, to the sum of a number of outbreaks of disease and not to a single outbreak.

2. The equations are integrated in various cases.

(i) When the probability of infection is constant. Application to the occurrence of cancer. A set of statistics is discussed in some detail, and is shown to be better fitted by taking

$$p_0 = p,\ p_1 = \frac{r-1}{r}\ p,\ p_2 = \frac{r-2}{r}\ p, \ldots\ldots,$$

where $r=4$ or 5, and represents the average number of persons in a household. The effect of increased liability with age is estimated and rejected as insufficient to explain the outstanding discrepancy. Probable reasons for the discrepancy.

(ii) Integration when p_n is a function of the time and independent of n ; when a constant mortality rate is introduced ; when the general mortality rate and that due to the epidemic are separately allowed for.

Conditions for the existence of a static condition are obtained and interpreted when p is constant.

(iii) Integration when p_n is not independent of the numbers v_n, but is proportional to the number of infective cases, and is therefore given by

$$p = p_0\left[v_1 + 2v_2 + 3v_3 + \ldots + nv_n + \ldots\right]_{t-\mathrm{T}}^{t}$$

where T is the time during which infection persists after the occurrence of a given case, *i.e.*, the infective period.

Integration by stages when T is constant. The nature of the solution.

The equation

$$\frac{dv}{dt} = p\ (\mathrm{N}-v)\ [v - \mathrm{V}\ (t-\mathrm{T})]$$

and its exact solution by means of the substitution $\mathrm{N}-v = \frac{1}{w}$

First approximate solution. Application to the Great Plague of London.

Second approximate formula valid near the beginning of the epidemic when T is constant.

An approximate solution is obtainable even when T is not constant, by substituting for V $(t-\mathrm{T})$ a mean value k. The solution

$$\frac{v-k}{\mathrm{N}-v} = \frac{u-k}{\mathrm{N}-u}\,e^{(\mathrm{N}-k)\,pt.}$$

Simplification when N is large compared with u, r, k to $v-k = (u-k)\ e^{\mathrm{N}pt}$.

Application to plague statistics. The evaluation of k furnishes an approximate value of T, and it is shown graphically that the variation of T closely follows changes in the relative humidity of the atmosphere. Effect of temperature and humidity on the rat flea, and its connection with the above.

Exploration of the Sea.

THE report of the delegates of the United Kingdom of the 27th meeting of the International Council for the exploration of the Sea, held in Copenhagen from June 4–11, 1934, contains very useful recommendations for preventing the capture of young fish below the size at which they can be sold at remunerative price for the food of man, thereby assuring a continuity of stock. The regulation of the size of the mesh in the trawl nets and the imposition of a size limit for food fishes which may be landed for sale, formed important subjects of discussion and the Council stated that with a view to ultimate solution of all questions connected with the exploration of the seas it is essential that each Government should arrange for further observations to be carried out by competent observers not only in research vessels but also in commercial vessels and fish markets.