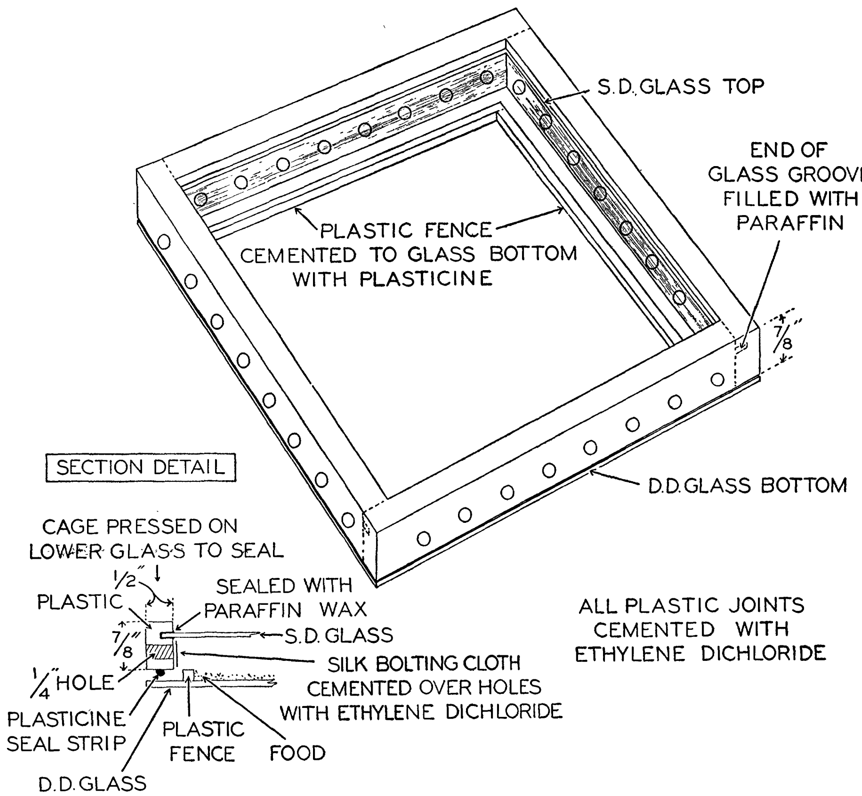

FIG. 1. Cage, with details of construction.

A plastic fence that retains the food is fastened upon the glass plate with plasticine. The sides of the cage are a unit with the glass top. In making the top of the cage the sides are cut from a sheet of plastic ½ in. thick (the length of the sides depends, of course, on the size of the cage), the groove to hold the glass top is cut, and the ventilating holes are drilled. Silk bolting cloth is then cemented, by means of the solvent ethylene dichloride, on the inside of the plastic strips between the groove that holds the glass top and the bottom. For low-density populations of the grain mite, 15 XX cloth is satisfactory, but for high-density populations a cloth of finer mesh is preferable. The four sides are then placed around a sheet of single-diamond glass and the corners cemented together. Finally, the glass is sealed in the groove cut in the plastic with paraffin wax. The top and bottom parts of the cage are sealed by a ribbon of plasticine. The ribbon is formed by forcing black plasticine through a small circular opening in the end of a compression tube similar in design to a hand-operated grease gun.

In practice, a thin layer of food is sifted upon the bottom of the cage and removed from the area outside the plastic fence. Foods that tend to become moldy at high humidities are sprayed with a 2% solution of Shirlan N.A. in 50–70% ethyl alcohol. After the food has completely dried, the top of the cage is sealed in place. Each time individual predators or prey are added or removed from the cage it is necessary to break the plasticine seal. Afterward a fresh ribbon of plasticine is applied. For the observation and census of the mites a binocular dissecting microscope is suspended above the cage and a light source is placed underneath the cage. Movement of the mites can be prevented if necessary either through the use of carbon dioxide or by cooling the cage.

Populations of the flour mite generally move to the edge and corners of the food area when they are introduced into the cage. It is not known whether this indicates a lack of uniformity within the cage or whether it is characteristic of the species. The distribution becomes more uniform a few months later, when the population has increased or has been subject to attack by the predator.

Manuscript received September 22, 1952.

Growth and Regeneration in *Hevea* Seedlings

T. J. Muzik

Federal Experiment Station, U. S. Department of Agriculture, Mayaguez, Puerto Rico

In view of the present interest in Para rubber, *Hevea brasiliensis* (Ex. Adr. Juss.) Muell. Arg., methods of vegetative propagation are of considerable importance. Twigs of mature trees do not form roots, whereas stem cuttings from the base of seedling plants root readily (*1*). Clonal multiplication is usually done by budding, but the effect of stock on scion yield is still unsettled (*2*). A new method for the propagation of cuttings from seedlings is described here in the hope that such material may be useful in the study of stock-scion relationships.

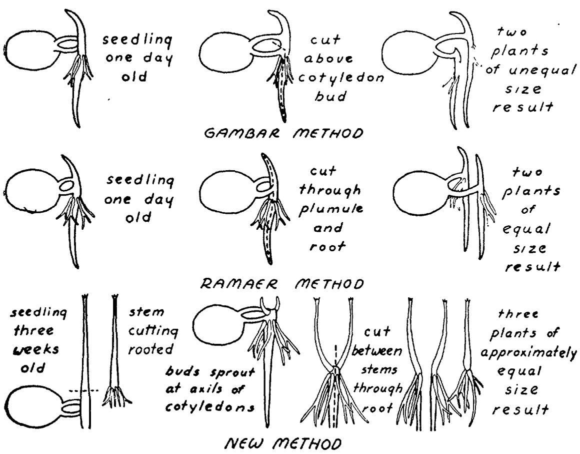

FIG. 1.

Coster (*3*) reports the use of twin seedlings in Java for stock-scion experiments. Methods of splitting the seedlings of *H. brasiliensis* have been described by Loomis (*4*) and Dykman (*2*). The two best-known methods are the Ramaer, in which germinated seedlings about 3 days old are split into two equal parts by a vertical cut passing through the plumule and taproot between the cotyledon petioles; and the Gambar, in which the vertical cut does not completely divide the main stem but begins at a point slightly above the axil formed by one of the cotyledon petioles with the main stem and passes obliquely inward to the center of the main stem and downward between the cotyledon petioles, dividing the taproot into two equal parts. Both these methods produce "twin" plants (Fig. 1).

In studies of regeneration in *H. brasiliensis* a new method of splitting Hevea seedlings to obtain three or more plants was developed.[1] The young stem is cut off at 6 weeks of age and planted as a cutting. As previously shown (*1*), this is the age at which the seedling separates from the seed and rooting potential is highest. Removal of the stem stimulates the growth of buds at the base, in the axils of the cotyledons. Generally one sprouts in each axil. When these have reached a height of about 6 in., the taproot can be split, and thus three plants are obtained (Fig. 1). The shoots from the axils of the cotyledons can also be rooted, although they take about 6 days longer than the primary stems. Removal of these shoots induces new buds to grow, and these may be removed and planted, thus offering a potentially unlimited source of material, although the sprouts tend to get smaller each time a cutting is taken. Under greenhouse conditions, as many as 7 plants have been obtained from one seed by maintaining the cuttings in a damp chamber. It seems possible that this division could go on almost indefinitely under optimum conditions.

The new method is advantageous because more than two plants are obtained from each seed and less mortality occurs among the split plants, since a better balance of root and leaf is maintained.

[1] From a dissertation submitted, as a partial requirement for the Ph.D. degree, to the Graduate School, University of Michigan, Ann Arbor.

References

1. MUZIK, T. J. *Am. J. Botany,* **34,** 587 (1947).
2. DYKMAN, M. J. *Hevea, Thirty Years of Research in the Far East.* Waltham, Mass.: Chronica Botanica (1951).
3. COSTER, C. H. In P. Honig and F. Verdoorn (Eds.), *Science and Scientists in the Netherlands Indies.* Waltham, Mass.: Chronica Botanica (1945).
4. LOOMIS, H. F., *J. Agr. Research,* **65,** 97 (1942).

Manuscript received September 17, 1952.

The Nature of Perceptual Processes

Rayford T. Saucer

Department of Psychology, Georgia Institute of Technology, Atlanta

In 1912 Wertheimer used the phenomenon of apparent motion to provide a point of entry into a new phase of psychological theory. Though other phenomena could have been used as a basis for the same theories, apparent motion is one of the most striking examples of the fact that the organism can and often does respond in relation to a perceptual process which displays attributes having no counterpart in the external stimulus complex. This process is produced by organizational forces within the nervous system of the organism.

A frequent objection to Gestalt theory is that there have been few efforts to relate the field forces postulated as an explanation of phenomena to the actual physiological mechanisms. While the concept of psychoneural isomorphism can hardly be denied a place in the theoretical structures of psychology, it is too often merely a convenience rather than an explanation. Other workers, not always professed followers of the Gestalt school, have chosen a path which may prove fruitful. The work of Lashley and Hebb in the field of neurophysiological theory is important to a synthesis of psychology in which phenomenology and psychobiology become parts of a rational science, a science which relies upon neither blind atomism nor metaphysical explanation. In spite of some objections, however, it is felt that field theory can be related to physiological mechanisms by recourse to study of the phenomena that provided the initial impetus to the move away from mechanical linkage of the stimulus to the perception or to the response by circumventing the organism.

By applying electronic control to the switching of light sources, investigations into the problem of ap-