DISCUSSION AND CORRESPONDENCE

A NEW TOY MOTOR

I MADE of wood a nacelle about two inches long, pointed at one end and open at the other, shaped like a skiff without a sternboard. It was rendered water-repellent by a slight coating of paraffin. A slice of soap was fitted into the stern and the boat thus completed was placed on still water in a bath tub. As was anticipated, the craft began to move off as soon as the water came in contact with the soap. After gathering way it reached a velocity of a couple of inches per second. Sometimes the course was nearly straight, sometimes erratic, as might have been expected in the absence of steering apparatus.

The power is derived from the potential energy of the surface water-film set free by the diminution of surface tension, this reduction being due to solution of the soap.

If the whole immersed surface of the boat is allowed to become soapy, converse conditions set in. The boat is then approximately in stable equilibrium in the center of an area of low surface tension and, if displaced by a half an inch or so, may return to its place almost as if anchored.

It seems *a priori* improbable that the means of locomotion illustrated by this little motorboat has not been utilized in nature. If, for example, the ripe seeds of a plant growing in shallow, still water were boat-shaped and provided with a store of soluble material at the blunt ends, they might attain a much wider dissemination or more varied environment than that open to similar seeds not fitted to utilize the potential energy of surface tension.

I am not aware that such seeds have been described, but my acquaintance with botanical literature is of the slightest. If the facts are already known this note may assist to diffuse a knowledge of them.

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A COMMON ERROR CONCERNING CECIDIA

IT is well known that many errors which are recognized by scientific workers are repeated in various publications, including text-books, until they threaten to become as thoroughly engrafted into our literature as the George Washington hatchet and cherry-tree story, although not nearly so useful. Among these errors is the prevailing opinion that vegetable galls which are due to insects are the result of an irritating fluid secreted by the female parent insect at the time of ovipositing. Many of our scientists cling to this ancient theory as tenaciously as the young American clings to the wonderful hatchet story.

The latest outbreak is in the recent edition of the Encyclopædia Britannica, in which, under the heading "Galls," it is said that "The exciting cause of the hypertrophy, in the case of typical galls, appear to be a minute quantity of some irritating fluid or virus, secreted by the female insect, and deposited with her egg in the puncture made by her ovipositor in the cortical or foliaceous parts of plants. This virus causes the rapid enlargement and subdivision of the cells affected by it, so as to form the tissues of the gall. Oval or larval irritation also, without doubt, play an important part in the formation of many galls."

In consideration of this prevailing idea it may be worth while to review our knowledge on this point. This theory was first advanced by Malpighi in his "De Gallis" (1686), who believed that the female parent secreted a poison when she deposited the egg and that this caused a fermentation of the plant acid which stimulated the plant cells and thus caused the gall. This theory was repeated almost without question until the latter part of the last century; Réaumur accepted it but thought that the egg might have some thermal effect and that the character of the wound might also be a factor; Dr. Derham said it might be "partly due to the act of the plant, and partly to some virulency in the juice or egg, or both, deposited in the vegetable by the parent animal; and just as this virulency is various according to the difference of its animal, so is the form and texture of the gall excited thereby"; Darwin expressed the opinion that galls were caused "by a minute atom