

## RESEARCH ITEMS.

**Organolites.**—The phenomenon of base exchange has been known since 1850, but the commercial exploitation of these reactions has been confined almost entirely to zeolites, whose use to-day is very wide-spread.

The organic or humus constituents of the soil have been investigated by several workers, from a scientific standpoint, especially as to effect of soil base exchange on plant life and soil acidity. Fischer and Fuchs suggested in 1927 the use of humates for water purification but the use of humates is not very satisfactory because of the rather low base exchange capacity. Adams and Holmes (*J. Soc. Chem. Ind.*, 1935, **1-6 T**, 54) conceived the idea of purifying water by synthetic resins prepared from polyhydric phenols and formaldehyde. This is probably the first instance of a truly synthetic organic base-exchange material. It has been suggested that all such base-exchange substances of organic origin be called 'organolites', to distinguish them from the inorganic zeolites. H. Burrell has recently prepared several improved forms of organolites (*Ind. and Eng. Chem.*, 1938, **30**, 358) which have the advantages of cheapness, high exchange capacities, etc., over the phenol aldehyde type. They are prepared by rendering initially water-soluble wood extracts, especially those of the tannin type, insoluble by treatment with concentrated acids, such as sulphuric acid. They will exchange either sodium or hydrogen ions for calcium or magnesium, and exhibit some increase over initial capacity with each of the first few regeneration cycles. M. A. G. RAU.

**Speed of a Deer Fly.**—"On 12,000 foot summits in New Mexico I have seen pass me at an incredible velocity what were certainly the males of *Cephenomyia*. I could barely distinguish that something had passed—only a brownish blur in the air of about the right size for these flies and without a sense of form. As closely as I can estimate, their speed must have approximated 400 yards per second," wrote Dr. Townsend in an article to the *Journal of New York Entomological Society*. This statement of his has been referred to several times in newspapers. *The New York Times*, in an Editorial commenting on a new sea-plane record of 300 miles per hour, warned man not to be too boastful of his accomplishments and referred to the findings of Dr. Townsend regarding the speed of the deer fly. (Also *vide Illustrated London News*, January 1938.) Irving Langmuir (*Science*, 1938, **87**, 233) has considered this question carefully and has concluded that a speed of 400 yards per second (or 818 miles per hour) ascribed to the deer fly, is too large to be true, on the following grounds:—

(1) The power consumption needed to give such a speed to the deer fly works out to be about half a horse-power. To produce this power, the fly would have to consume one and a half times its own weight of food each second.

(2) The wind pressure against the head of a fly having the speed works out to be more than half an atmosphere, a pressure enough to crush the fly.

(3) Such a fly striking against human body

should be able to penetrate deep into human flesh.

(4) The speed of an object of the size of a deer fly which would appear as "a barely distinguishable blur in the air" is of the order of 26 miles per hour (as shown by the experiments of Langmuir).

A speed of 25 miles per hour is therefore considered as reasonable for the flight of the deer fly.

K. S. G. D.

**Secondary Sources of Rubber.**—*Hevea Braziliensis*, the chief source of the world's present supply of rubber, being a tropical tree and therefore confined to the possessions of one or two European countries, the fear of a monopoly and desire for self-sufficiency has led other nations to experiment with several rubber-yielding plants which can be grown in temperate climates also. Contrary to the belief that these require the tropical sun to make them economic producers of rubber, recent studies in the U.S.S.R. point to the possibility of establishing plantations of these plants on a wide scale in temperate and even in cold climates. Russian research workers have studied 130 different kinds of rubber-yielding plants both in regard to acclimatisation and rubber content and the following among them have been found most promising, in the regions of Central Asia and the Caucasus:—*Guayule*, *Parthenium argentatum*, *Eucommia*, *Eucommia ulmoides*, some plants belonging to the *Scorzonera* (*Tau Sughya*) and *Taraxacum* (*Kok-Sughyz* and *Krym-Saghyz* genera) *Apocynum venetum* (*Kendir*), *Asclepias cornuti* (*Vatocnik*), *Chondrilla* and *Solidago*. Cultivation methods, methods of propagation, improvement by selection and crossing rubber-containing tissues, rubber content and other factors have all been studied and the results summarised (*Mon. Bul. Agri. Sci. Pract.*, Rome, December 1937).

Two pure lines of guayale have been obtained from the varieties *angustifolium* and *argentatum* and these have yielded rubber at the rate of 100 kgs. per hectare. One-year old plants have yielded from 68.5 to 85.1 kgs. per hectare and two-year old plants upto 186.3 kgs. per hectare. Plantations of over 200 hectares are said to have been established. The *Eucommias* yield gutta and a normal yield of 360 kgs. of gutta per hectare from one-year old plants is estimated. The *Kok-Saghyr* and the *Kryus-Saghyz* yield rubber of somewhat inferior quality, and the latter is estimated to yield from .15 to .2 tons rubber per acre. The *Kendir* of which 10,000 hectares are cultivated yields from the 3rd year onwards and upto its 10th year. The *Tan-Saghyz* of which some 14 million plants are found growing over an area of 20,000 hectares is interesting in the ease with which the rubber is extracted. The roots, which are the chief rubber-containing tissue, are ground to powder; this powder is thrown into water, when the rubber separates out by gravitation. The effect of manuring, irrigation and other factors, and the yield and quality of the rubber are all being studied and before long it looks as if the Soviet may be able to derive a good portion of their rubber requirements from local supplies.