When a survey of the garage and other outbuildings on the premises was made, many mud-dauber nests were located. On examining a few nests, an interesting fact was discovered. The contents of the nests consisted entirely of numerous spiders stored up as food for the growing larvae. In checking the contents of various nests, it was found that many of the spiders were small immature black widows. In some nests the contents were all black widows, in others a mixture of various species of spiders, which included a few *Latrodectus mactans,* and in others none of this species was found (see Table I).

TABLE I

Nest No.	Black widows	All others
1	43	30
2	19	3
3	0	41*
4	19	17
5	16	13
6	0	52*
7	1	7
8	24	3
9	0	33*
10	54	10
11	10	8
12	5	12
13	3	28
Totals	**194**	**257**

* These were evidently nests of the large yellow-marked mud-dauber, whereas the others were undoubtedly the blue mud-dauber nests (see below).

The differences (Table I) noted in the counts of nests Nos. 3, 6 and 9 led to the belief that these were built by a different species. It was therefore thought advisable to make a study of the mud-daubers during construction of the nest. This showed that three separate types exist in this locality: Blue mud-dauber, *Chalybion cyaneum* (Klug); large yellow-marked mud-dauber, *Sceliphron caementarium* (Drury); small yellow-marked mud-dauber, *Trypoxylon texense* (Saussure).

After identifying the above three species of mud-daubers, a close watch was kept on each type during the construction of its nests. When completed, the mud-dauber was captured, the nest opened and a count of the contents made. The results are shown in Table II.

TABLE II

	Nest No.	Black widows	All others
Large yellow-marked mud-dauber	14	0	11
	15	0	10
	16	0	19
	17	0	9
	23	0	42
	24	0	56
	Totals	**0**	**147**
Blue mud-dauber	18	27	0
	19	14	37
	20	3	16
	21	35	56
	22	12	33
	Totals	**91**	**142**

The count as shown in the above table indicates that the large yellow-marked mud-dauber rejects the black widow, whereas the blue mud-dauber uses it as food for its young. Taking the total of 15 nests of the blue mud-dauber (Tables I and II) it was found that 285 black widow spiders had been stored in these nests, an average of 19 per nest.

This proves conclusively that the blue mud-dauber is an important predator of the black widow. The protection of the blue mud-dauber in those parts of the country where it exists and where the black widow is prevalent would tend to inhibit the propagation of this poisonous spider.

The writers are indebted to Dr. Karl V. Krombein, Department of Entomology, Cornell University, for confirming the identification of the species of mud-daubers.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

GLASS ELECTRODES

THE glass electrode possesses a number of advantages over other types of electrodes for determining hydrogen-ion concentrations. The chief objection to the thin membrane type of glass electrode is its fragility, which militates against its wide-spread use. Moreover, the potentials obtained with such electrodes vary, depending upon the depth of immersion. The thick membrane glass electrode is characterized by its high mechanical strength, making it applicable in many situations where the thin type could not be used satisfactorily. Since an increase in the thickness of the membrane entails a corresponding increase in its electrical resistance, the use of an amplifying system in conjunction with thick glass electrodes is essential. With the aid of certain inexpensive and highly stable single tube amplifiers now available, readings reproducible to a fraction of a millivolt can be obtained in a few seconds.

It should be noted, however, that the electrical resistance of the common forms of thick glass electrodes is sufficiently high to cause serious errors due to leakage over the surface of the glass shank. Furthermore, the potentials vary according to the depth of immersion, similar to those obtained with thin membrane electrodes. To eliminate the first of these sources of error, it is essential to make the pathway of leakage as long as possible. If this is attempted by increasing the length of the glass shank, the result is an unwieldy piece of apparatus. A more satisfactory procedure consists in using two glass shanks, one placed within the other, and carefully sealed together at the bulb end of the electrode so that they contact each other only at this point, as shown in Fig. 1. The

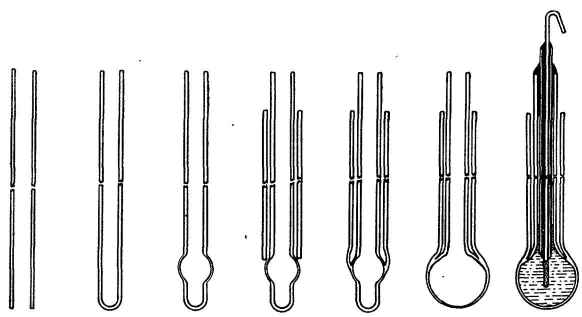

FIG. 1. Steps in the construction of the double-shank electrode.

pathway of leakage of an electrode with two shanks $5\frac{1}{2}$ inches and $6\frac{1}{2}$ inches long, respectively, is sixteen to seventeen inches in length, so that errors due to this source may be neglected. Moreover, since the inner shank of this electrode is completely insulated from the fluid which is being tested, the errors resulting from the effect of variation in the depth of immersion of the outer shank in the fluid are eliminated. It is essential of course to completely immerse the bulb.

An electrode of chemically pure silver wire is used as a reference electrode, and this is sealed inside a small glass tube completely filled with a sealing compound impervious to HCl, having one quarter inch of the wire protruding. After a silver chloride has been deposited upon the wire the latter is slipped inside the glass electrode until the treated tip is completely immersed in the N/10 HCl solution with which the bulb has previously been filled. The bulb is then sealed to prevent leakage of HCl by flowing hot sealing wax into the space between the silver electrode and glass shank.

A number of procedures can be used for assembling this form of glass electrode, one of which is illustrated in Fig. 1. Dry, chemically and physically clean Corning 015 glass only is used, and this is worked at the tip of a small oxy-gas flame, carefully avoiding the use of a carbon flame. Annealing of the glass junction must be thorough, and should be done only with a blue flame. It is essential to blow the bulb so as to form a thin, flexible junction between the two glass shanks, otherwise strains may be set up which eventually result in cracking. The bulb can be varied from 10 to 20 mm in diameter and from 0.05 mm to 0.5 mm in thickness without affecting the accuracy of the electrode. Repeated heating of the glass has no apparent deleterious effect upon its characteristics, provided it is worked at a sufficiently high temperature.

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A METHOD OF NUMBERING LABORATORY RATS

ALL those who have worked with a large number of rats and mice have experienced much difficulty in not being able to number the animals in a satisfactory manner. The method which I here suggest has been found easy and completely reliable. The plan of Dr. Strong, who uses the notches and holes in the ear, was incorporated in this scheme but was used in a different manner.

The toes of the hind feet are taken as units and the toes of the forefeet as 10's. The units begin on the small toe of the left hind foot, the animal being

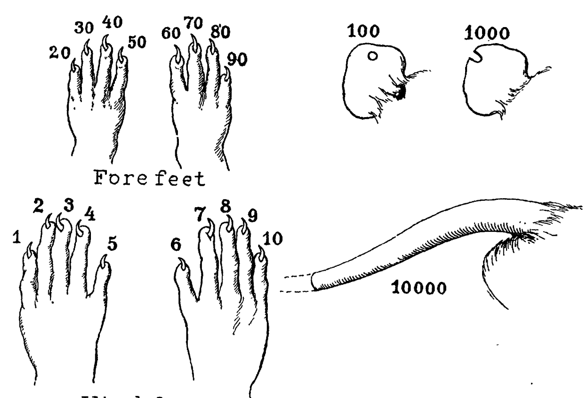

Fig. I

The numbering of the toes, the holes and notches in the ears and the clipping of the tail.

on its feet (see Fig. 1). No. 1 is the first toe, No. 2 the second toe and so on across to the other foot. From No. 5, the great toe on the left hind foot, the numbering goes directly across to No. 6, the great toe on the right hind foot. The last toe is No. 10. The first toe on the left forefoot is No. 20, and the last toe on the right forefoot is No. 90. To number the animal 13, the third toe, No. 3, on the left hind foot, and the last toe, No. 10, on the right hind foot, are clipped with a pair of scissors. No. 18 would be toe No. 8, right hind foot, and toe No. 10, right hind foot.

The hind toes permit the numbering up to 19, above that figure a combination is made of the 10's on the