TABLE II

COMPARATIVE ANTIRACHITIC POTENCY OF COD LIVER OIL, VIOSTEROL AND IRRADIATED, HEATED CHOLESTEROL IN RATS AND CHICKS

Supplement to basal ration	Rat units per 100 gm diet	Chick assay				Remarks
		Av. wt. at 30 days	Av. gain in wt.	Line test	Bone ash per cent.	
		gm	gm			
None	0	116	66	Rickets	29.9	All symptoms of leg weakness; marked tendency to squat at 2½ weeks.
0.25 per cent. cod liver oil	10	196	146	Good calcification	44.7	Chicks strong; active.
0.25 per cent. viosterol 1–10,000X diluted 1,000 times	100	108	63	Rickets	33.3	All symptoms of leg weakness; marked tendency to squat at 2½ weeks.
0.01 per cent. irradiated, heated, purified cholesterol	10	204	159	Good calcification	44	Chicks strong; very active.
0.03 per cent. irradiated, heated, purified cholesterol	30	195	144	Good calcification	47	Chicks strong; very active.
0.06 per cent. irradiated, heated, purified cholesterol	60	169	121	Good calcification	45.5	Chicks strong; very active.
0.1 per cent. irradiated, purified cholesterol	1	133	86	Rickets	28.6	All symptoms of leg weakness; tendency to squat at 3 weeks.
0.01 per cent. irradiated filtrate residue from heated cholesterol	>10	110	63	Rickets	29.6	All symptoms of leg weakness; tendency to squat at 3 weeks.
0.01 per cent. irradiated cholesterol W	10	174	129	Good calcification	44.8	Chicks strong; very active.
0.03 per cent. irradiated cholesterol W	30	164	117	Good calcification	43	Chicks strong; very active.

The purified cholesterol was prepared through the dibromide. Irradiated, this unheated product produced a 2+ cure when fed to rats in 10-mg daily doses for 10 days. The Steenbock rat unit is therefore 100 mg. The heated cholesterol was prepared by placing 3 gm of the purified cholesterol in a 250-cc flask with two capillary openings and heating this in an oil bath to 185°–195° C. for one hour. The solidified mass was dissolved in boiling alcohol, and the crystals which separated at room temperature were filtered off, dried and irradiated. A daily dose of 0.1 mg produced a 2+ cure in rats. The semi-crystalline residue left after evaporation of the filtrate was also irradiated. Cholesterol W was a fairly pure product obtained from The Wilson Laboratories.

The results show unmistakably the superior effectiveness of cholesterol W and the heated purified cholesterol over viosterol or the purified, unheated cholesterol in preventing leg weakness. Ten rat units of either preparation per 100 gm of diet were equivalent to 0.25 per cent. or 10 rat units of cod liver oil. The provitamin D of heated cholesterol evidently separates readily in the crystallization from alcohol, since the filtrate residue has no potency when given in comparable doses to rats or chicks. The chicks receiving 100 rat units of viosterol per 100 gm of diet were in no better condition than those receiving the basal ration only.

This is a preliminary report. Efforts to concentrate the provitamin-D factor of heated cholesterol are under way.

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THE BLUE MUD-DAUBER AS A PREDATOR OF THE BLACK WIDOW SPIDER

DURING the past few months, a study of the black widow spider, *Latrodectus mactans* Fabr., was made to find a method of securing a large quantity of venom for experimental work. It was finally decided to breed black widows in large numbers. The question of food for the breeding stock and for growing young spiders became a problem. In the building where the cages were kept, many mud-dauber nests were observed, which suggested feeding spiders on the young mud-daubers found in them. This type of food was satisfactory—both young and adult spiders ate the larvae of the mud-daubers.

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