

Table 2.—Comparative repellent action of the 10 compounds showing good activity in preliminary tests against the American roach. Results are averages of four readings expressed as the nearest whole number.

CPD. No.	NAME	COM- PARED No.	POSITION OF 10 ROACHES	
			Shelter Listed	Treated With Compound Com- pared No shelter
A. 5-Chloro-4-amino-2,6-dimethylpyrimidine	B	9		1
	G	8		2
B. Butadiene-furfural copolymer	A		9	1
	C	9		1
	D		9	1
	E	1	2	7
	F	1	2	7
	G		9	1
C. <i>tert</i> -Butylsulfenylthiocyanate	B		9	1
	F	8		2
	J	9		1
				10
D. Isopropylsulfenylpiperidine	B	9		1
	H	8	1	1
	J	8	1	1
E. O-Ethyl-S- <i>tert</i> -butylsulfenyl xanthate	B	2	1	7
	F	3	1	6
	G	2		7 <sup>1</sup>
	H	1	1	8
	J	7		3
F. O-Ethyl-S- <i>tert</i> -butylthiosulfenyl xanthate	B	2	1	7
	C		8	2
	E	1	3	6
	J	3	1	6
G. N,N-Dimethyl- <i>tert</i> -butylsulfenyl dithiocarbamate	A		8	2
	B	9		1
	E		2	7 <sup>1</sup>
	F		3	7
	H		1	9
	I		6	4
H. 1,2,3,4-Tetrachlorobutane	D	1	8	1
	E	1	1	8
	G	1		9
	J	5	1	4
I. Acetophenone	G	6		4
	J	10		
J. Cumene isopropyl peroxide	B			10
	C		9	1
	D	1	8	1
	E		7	3
	F	1	3	6
	G		2	8
	H	1	5	4
	I		10	

<sup>1</sup> One roach died.

RESULTS OF TESTS.—Of the more than 200 compounds tested, most showed little or no effect on the roaches. Some were attractive but more were repellent. Table 1 shows some typical results. After the preliminary screening the following compounds<sup>1</sup> were found to be repellent:

- A. 5-Chloro-4-amino-2,6-dimethylpyrimidine
- B. Butadiene-furfural copolymer (2,3,4,5-bis( $\Delta^2$ -butenylene)tetrahydrofurfural)<sup>2</sup>
- C. *tert*-Butylsulfenyl thiocyanate
- D. Isopropylsulfenylpiperidine
- E. O-Ethyl-S-*tert*-butylsulfenyl xanthate
- F. O-Ethyl-S-*tert*-butylthiosulfenyl xanthate
- G. N,N-Dimethyl-*tert*-butylsulfenyl dithiocarbamate
- H. 1,2,3,4-Tetrachlorobutane
- I. Acetophenone
- J. Cumene isopropyl peroxide

As shown in table 2 these 10 compounds were then tested against each other in various combinations. It was found that the butadiene-furfural copolymer and cumene isopropyl peroxide were the most effective repellents. A further investigation of other peroxides and hydroperoxides was then made and nearly all are repellent. The butadiene-furfural copolymer is a high boiling compound with little odor and is stable over long periods. A practical test in a photographic dark room inhabited by roaches kept them away for more than six weeks.

SUMMARY.—A method is described for the determination of the repellent and attractant action of chemicals to cockroaches. The chemicals were deposited on the inside of shelters which were placed in large cages containing the roaches in a lighted room. The light drives the roaches to seek shelter and to choose the one of the shelters least repellent to them. Over 200 chemicals were screened and those showing a repellent action were tested against each other. Organic peroxides and butadiene-furfural copolymer show a high degree of repellency. The butadiene-furfural copolymer is quite stable and appears to have considerable practical value as a roach repellent.

<sup>1</sup> Some of these are covered by pending patent applications.

<sup>2</sup> Recent tests have shown butadiene furfural copolymer is also repellent to mosquitoes, house flies and stable flies.

## Two-spotted Lady Beetles Biting Man

ARTHUR SVIHLA, *Department of Zoology, University of Washington, Seattle*

Two-spotted lady beetles, *Adalia bipunctata* L., are usually considered to be beneficial insects feeding largely upon plant lice. Stiles & Hassall in their "Key Catalogue of Insects of Importance in Public Health," Hygienic Laboratory Bulletin 150, 1928, do not mention this beetle as biting man. The following note reports their doing so. During the latter part of September 1951 large numbers of these beetles were concentrating prior to going into hibernation. At this time while working in their vicinity many of the insects in their fortuitous flights alighted on my body and upon several occasions bit strongly enough to be unpleasant. The natural reaction following the bite was to brush the insect off hence they did not remain in one position long enough to actually bite through the skin although there is no reason to suppose that they were not capable of accomplishing this.