It may also be recorded here that inositol (30 mg. per day) has not, in our experience, been effective in preventing the occurrence of the hemorrhagic kidneys which develop in young rats on diets low in choline and methionine.

References

1. BEVERIDGE, J. M. R., and LUCAS, C. C. *J. biol. Chem.*, 1945, **157**, 311.
2. GAVIN, E. G., and MCHENRY, E. W. *J. biol. Chem.*, 1941, **139**, 485.
3. GAVIN, E. G., and MCHENRY, E. W. *J. biol. Chem.*, 1941, **141**, 619.
4. GAVIN, E. G., PATTERSON, J. M., and MCHENRY, E. W. *J. biol. Chem.*, 1943, **148**, 275.
5. MACFARLAND, M. L., and MCHENRY, E. W. *J. biol. Chem.*, 1945, **159**, 605.
6. MCHENRY, E. W., and GAVIN, E. G. *J. biol. Chem.*, 1940, **134**, 683.
7. MCHENRY, E. W., and PATTERSON, J. M. *Physiol. Rev.*, 1944, **24**, 128.

TDE, 1,1-Dichloro-2,2-bis(*p*-chlorophenyl)ethane, as an Anopheline Larvicide

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Compounds related to DDT, including those present in the technical product, have been tested for their toxicity to fourth instars of *Anopheles quadrimaculatus* Say. One of these compounds, 1,1-dichloro-2,2-bis(*p*-chlorophenyl)ethane,[3] hereinafter called TDE from the generic name "tetrachlorodiphenylethane," has been found to have a toxicity equal to, and in some forms of application greater than, that of DDT. Tests have been made to compare the toxicity of DDT and TDE when applied in acetone suspensions, dusts, and oil solutions. The methods used in testing acetone suspensions and dusts were those described by Deonier, *et al.* (*J. econ. Ent.*, 1945, **38**, 241–243).

Acetone suspensions. Tests comparing the initial kill of acetone suspensions of TDE and DDT are reported in Table 1. In this form the two compounds were not significantly different in effectiveness. TDE, however, is indicated to be better than DDT in its residual toxicity, as shown in Table 2.

In a comparison at 0.01 p.p.m., the average length of time required for complete knock-down of larvae was 0.81 hour for DDT and 1.166 hours for TDE.

Dusts. Table 3 shows that, when impregnated on talc and applied as a dust, TDE had a toxicity to *Anopheles quadrimaculatus* equal to, or greater than, that of DDT. In other tests TDE has shown some indication of being superior against culicine larvae.

TABLE 1

COMPARATIVE TOXICITY OF TDE AND DDT IN ACETONE SUSPENSIONS TO FOURTH INSTARS OF *Anopheles quadrimaculatus*
(20 larvae per test, 3 replications)

	Material	Mean mortality in:	
		24 hours	48 hours
	p.p.m.	%	%
TDE	0.0050	88.3	100.0
	.0033	68.3	93.3
	.0025	58.3	95.0
DDT	0.0050	83.3	96.6
	.0033	73.3	93.3
	.0025	55.0	81.6

TABLE 2

COMPARATIVE STABILITY OF TDE AND DDT WHEN APPLIED IN ACETONE SUSPENSIONS AT 0.01 P.P.M. AGAINST FOURTH INSTARS OF *Anopheles quadrimaculatus*
(20 larvae per test, 3 replications)

Material	Time between treatment and introduction of larvae	Mean mortality in:	
		24 hours	48 hours
	Days	%	%
TDE	0	98.6	100.0
	2	93.3	100.0
	4	100.0	....
	7	93.3	98.3
	9	43.3	61.6
DDT	0	100.0	....
	2	55.0	75.0
	4	3.0	8.3

Fuel-oil solutions. One of the difficulties encountered in laboratory comparisons of DDT in oil solutions is that the toxicity of the oil may affect the results where it is used in appreciable quantities. The smallest amount of oil that can be accurately measured is toxic when applied to a beaker or a pan. A spray chamber has been constructed in which larvae in small containers are exposed to small amounts of atomized spray. By dispersing a small quantity of spray in the spray chamber, larvae can be exposed to sublethal dosages of DDT or other materials in solutions.

In a spray chamber ($8 \times 8 \times 8$ ft.), 0.4 ml. of No. 2 fuel oil containing 0.5 per cent of DDT gave an average mortality of 76.6 per cent in 48 hours in three containers exposed simultaneously. Paired tests of TDE used at the same dosage gave 100 per cent mortality in 24 hours.

In further tests against fourth instars of *Anopheles quadrimaculatus,* the mean mortality of 0.4 ml. of No. 2 fuel oil containing 0.5 per cent of DDT was 55.8 per cent after 24 hours and 69.1 per cent after 48 hours. Against the same larval population 0.2 ml. of No. 2 fuel oil containing 0.5 per cent of TDE gave

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[3] The term "DDD" has been used for this compound, but the designation "TDE" seems preferable. The latter is used in order to avoid possible phonetic confusion with DDT and also because two proprietary products called DDD are on the market.

a mean mortality of 49.1 and 53.3 per cent. TDE in fuel-oil solutions appears to be definitely more toxic to anopheline larvae than DDT.

TABLE 3

COMPARATIVE TOXICITY OF TDE AND DDT WHEN APPLIED AS A 0.1-PER CENT DUST IMPREGNATED ON TALC AGAINST FOURTH INSTARS OF *Anopheles quadrimaculatus*
(20 larvae per test)

Material	Dosage of active ingredient	Mortality in: 24 hours	Mortality in: 48 hours
	Pounds per acre	%	%
TDE	0.00156	95	100
	.00156	100	...
	.00078	100	...
	.00078	95	100
DDT	.00156	95	100
	.00156	95	100
	.00078	55	70
	.00078	75	80
Checks (untreated)	.....	10	20
	.....	5	15

These laboratory tests are only preliminary, but TDE shows sufficient toxicity to warrant further study. Although early advice indicated that the compound might be difficult to manufacture, from more recent information it appears that TDE may be manufactured on a large scale.

The Age of Jerome Bog, "A Carolina Bay"

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The unique elliptical depressions on the Coastal Plain of the Carolinas have received the attention of several physiographers, and three suggestions have been made as to how these depressions were formed. The most fascinating is that they were caused by a shower of meteorites (*7*). Cooke (*4*) has ascribed their origin to wind action and water currents in coastal lagoons. Johnson (*6*) has proposed an hypothesis of complex origin which involves artesian, solution, lacustrine, and aeolian factors. If the bays were formed by a shower of meteorites, their origin was simultaneous. On the other hand, if Cooke's hypothesis is correct, they could not possibly all be of the same age, since the bays are on different terraces. Likewise, if Johnson is correct, it is highly improbable that the time of origin was identical for all of them. Hence, if either Cooke or Johnson is right, this report is of interest only with respect to the one bay under consideration, since it is based upon a study of the deposits in the bottom of only one depression—that lying just to the east of the hamlet of Jerome, Bladen County, North Carolina.

The age of the "Carolina Bays" has been suggested as late Pleistocene previous to mid-Wisconsin time (*1*). On the basis of the data now at hand it seems safe to say that at least the depression under consideration was formed during Wisconsin time and, specifically, about the time of the Wisconsin maximum glaciation in the East.

Evidence for this has been arrived at in the study of pollen from a series of peat samples taken every 6 inches to a depth of 7 feet and four samples at 6-inch intervals from lake clay underlying the peat. Below the clay is the hard, sandy bottom of the bay. Although the pollen spectrum constructed from the peat samples shows some evidence of climatic fluctuations, it does not indicate any severe change. About the level where the clay is reached, however, there is an indication of a cooler climate, and, within a foot of the bottom, elements of the boreal forest appear in abundance. Fir and pine pollens (possibly jack pine) are very common. (The jack pine, *Pinus banksiana* Lamb., was identified on the basis of the size-frequency technique developed by Cain (*3*).) But it is by no means a pure boreal forest that is represented. Oak and hickory are conspicuously present. The composition strikingly resembles the transition forests such as those of northern Minnesota today, where the northern conifers reach their southern limit and compete with the hardwoods (*2*). Farther down in the clay at the very bottom of the deposit, the pollen represents a forest reflecting a slightly less severe climate. Fir is scarce and black gum, a southern species, absent at the fir maximum of the younger clay, is present as it is in the peat above the clay.

Assuming that the pollen in the deposit records the vegetation of the surrounding region, one is led to the conclusion that at the time the lake sediments first began to accumulate in this bog the climate was moderately cold and was becoming increasingly colder, soon reaching a maximum and persisting only long enough for the accumulation of scarcely more than a foot of clay. Dr. W. H. Hobbs suggests in correspondence that the fir and pine pollen in this case may have been blown in from the higher Appalachians. It is true that some pollen is carried great distances and has, in fact, been collected at points all the way across the Atlantic Ocean (*5*). That this is certainly not the origin of the fir pollen in Jerome Bog is obvious when one considers the high proportion of fir pollen to other species. If other species were grow-