the control material alone. In some experiments the suspensions prepared from dry tissues were heated at 52° for 30 minutes, but as this treatment had little effect on the results they will not be presented separately. The outcome of eight experiments in which desiccated skin from mouse embryos was the test material are given in Table I.

TABLE I

Material inoculated	Number inoculated	Number negative	Per cent. negative
Carcinoma No. 63 plus extract embryo skin	128	74	57.8
Carcinoma No. 63 plus Ringer's solution	164	29	17.7
Sarcoma No. 180 plus extract embryo skin	40	1	2.5
Sarcoma No. 180 plus Ringer's solution	59	0	0

The second material tested for possible inhibiting action was desiccated mouse placenta. The results with the two tumors are shown in Table II.

TABLE II

Material inoculated	Number inoculated	Number negative	Per cent. negative
Carcinoma No. 63 plus extract of placenta	158	98	62
Carcinoma No. 63 plus Ringer's solution	234	49	20.9
Sarcoma No. 180 plus extract of placenta	86	0	0
Sarcoma No. 180 plus Ringer's solution	129	1	0.7

The inhibiting action of the extracts was shown not only by the low percentage of takes resulting from inoculation of the carcinoma grafts treated with the extracts, but also by the fact that the tumors that did arise from these inoculations were on the average much smaller than the controls. It is evident that neither of these extracts tested had any retarding action on Mouse Sarcoma 180. Extracts of fresh tissues tested included whole embryo, embryo skin, skinless embryo and placenta; those of desiccated tissues, whole embryo and skinless embryo. None of these extracts, heated or unheated, had any significant effect on either of the tumors tested, nor on another sarcoma of the mouse (S/37). A few preliminary experiments on the local injection of these extracts about an established tumor have shown no evidence of retarding growth.

The principal value of the general observation is the possible light thrown on the nature of the mechanism involved in malignancy. The relation of this factor from normal tissues to the inhibitor from the chicken sarcoma will be discussed in a subsequent paper when more definite information is available.

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META-AMINO PARA-HYDROXY PHENYL ARSINE OXIDE AS AN ANTI-SYPHILITIC AGENT

THIS trivalent arsenical preparation, meta-amino para-hydroxy phenyl arsine oxide, studied by Ehrlich and Bertheim, later by Voegtlin and others, has generally been thought to be the most important effective breakdown product of the arsphenamines. It is relatively toxic and on this account its use has been heretofore limited to purely experimental fields. Our own theoretical interests led us to study this substance first as a trypanocide, then later in experimental syphilis. We soon found that in experimental trypanosomiasis, the therapeutic index was relatively very high compared to most other effective agents. In rabbit syphilis, we found the therapeutic index to be higher than for any other single antisyphilitic agent known to us. So far as we are aware, it had never received a trial in the treatment of human syphilis.

We have felt for some time that absolute toxicity alone is without special significance, but that the ratio of curative dose to the toxic dose furnishes real evidence of promise. On the basis of abundant data obtained in our laboratories, we readily enlisted the interest of Drs. W. F. Lorenz and W. J. Bleckwenn, of our Department of Neuropsychiatry, and Drs. O. H. and H. R. Foerster, R. L. McIntosh, and L. R. Wieder, of our Department of Dermatology. Complete reports of clinical investigations in the use of this drug will be made in due time by our clinical colleagues. Suffice it to say at this time that sixty patients have received, collectively, a total of seven hundred intravenous injections of this drug in quantities varying from 5 up to 130 milligrams per dose. The usual dosage ranges from 30 to 60 milligrams for the single dose.

Clinically, the results have been exceedingly promising, both in therapeutic effects and freedom from toxic manifestations. We fully realize the necessity, however, of a very careful and prolonged study before a full report can be made on questions of thoroughness of disinfection, optimal dosage, freedom from possible serious toxic manifestations, and practical utility in the treatment of syphilis in its several stages, when used alone and in conjunction with mercury or bismuth.

We have been designating this drug as "158," or more or less tentatively by the name *Mapharsen* from (m)eta-(a)mino-(p)ara-(h)ydroxy (ars)ine oxide. This drug was first prepared for us by Professor C. S. Hamilton, of the University of Nebraska, and later by the Research Department of Parke, Davis & Com-

pany, which has been kindly supplying the larger quantities necessitated by more extensive and intensive studies.

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AIRPLANE OILING TO CONTROL MOSQUITOES[1]

THE airplane has already shown its usefulness in dusting large swamp areas with Paris green[2, 3] in control of *Anopheles* mosquito larvae. In New Jersey swamps and marshes, where the larvae of the prevailing species of mosquitoes are primarily bottom feeders, Paris green or any other arsenical dust does not produce efficient control, except when applied in such large quantities as to become an actual menace of poisoning animals and men. This danger is especially feared on mosquito breeding areas, located in close proximity to congested cities and towns. Experiments with other dust larvicides, such as various toxic oils and tar hydrocarbons incorporated in inert carriers such as kaolin, peat moss, sawdust, etc., have thus far not proven successful.

While these experiments are in progress, the mosquito control workers in New Jersey and in other states are still confronted with many large areas of swamps and marshes which can not be successfully drained and which are inaccessible from land for mosquito eradication.

In view of the fact that these mosquito breeding areas can not be efficiently oiled from land, the possibility of applying oil or liquid larvicide by the aid of an airplane has presented itself. Accordingly, experiments were carried out during the summer of 1931, the results of which are here presented.

EXPERIMENTAL

For this purpose an airplane was procured from the Unger Aircraft Corporation, located at Hadley Flying Field, New Jersey, and was equipped with the necessary apparatus for the experiment. Two tanks, of about 50 gallons capacity each, were installed in the forward cockpit of the plane and were connected to a steel pipe 3 inches in diameter. This pipe extends along the bottom of the fuselage throughout the length of the plane, terminating just below the rudder in a cross pipe, 7 feet long and 1½ inches in diameter. This horizontal pipe is perforated with holes ranging from ⅛ to ¼ of an inch in diameter and serves the purpose of a nozzle from which the liquid flows out.

A valve, placed at the rear end of the longitudinal pipe, and operated by the pilot from his cockpit, controls the flow of the oil. This entire equipment is removable and the plane can be used for other flying purposes. The actual application of the larvicide is carried out in the following manner. As soon as the loaded plane reaches the area to be treated the pilot is warned by flags or signals, previously agreed upon, where the larvicide should be sprayed. The pilot then swoops down as low as possible within safety limits and releases the valve. The liquid flows out by the force of gravity as a fine spray, depositing a thin film on the breeding areas.

By this method both pyrethrum larvicide[4, 5] and oil were tested in Morris and Middlesex Counties. The results thus far obtained have shown that on a still day when there is no appreciable wind to blow away the larvicide from its course, a killing film of oil or larvicide is deposited on the surface of the breeding area.

The last two experiments carried out on the Cheesequake salt marsh meadow and on the Florham upland meadow, have produced very encouraging results. Practically complete kill of larvae and pupae in each case was obtained. About 8 acres of the Florham meadow were covered with a killing film of oil in about 40 minutes. The amount of oil required for this purpose was about 140 gallons. The cost of the application, as estimated by several field men experienced in mosquito control work, was found to be cheaper than hand oiling.

While this problem is still under investigation, the preliminary results thus far obtained indicate that on certain large breeding places where the entire area has to be oiled, successful control may be obtained by applying oil or other liquid larvicides from a properly equipped airplane. This method, however, may prove uneconomical on such marshes or swamps where the breeding is scattered and where coverage of the entire area is not necessary.

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[1] Paper of the Journal Series, New Jersey Agricultural Experiment Station, Department of Entomology.

[2] W. V. King and G. H. Bradley, "Airplane Dusting in the Control of Malaria Mosquitoes," U. S. D. A. Department Circular No. 367, 1926.

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