spike rush (*Eleocharis quadrangulata*), soft-stem bulrush (*Scirpus validus*) and three-angled bulrush (*S. americanus*) are tolerant to fluctuation and draw-down of water-level and might be effectively fitted into existing plant associations at certain contours so that they would not add materially to the malaria control problem.

A large number of soil samples for arsenic determinations were taken from the reservoirs in the spring of 1940 prior to the application of Paris green, and similar series in October at the cessation of larvicidal activities. Analyses of these samples show no significant increase in the amount of arsenic in the soil.

A study was conducted to obtain information on the feeding habits of *Gambusia* with special reference to its predation on *Anopheles* larvae. The forage ratio[3] was adopted as a measure of the feeding preference of *Gambusia* for anopheline larvae and pupae. The forage ratio is obtained by dividing the percentage of a given kind of organism in the fish stomachs by its percentage in the environment. The ratio will vary above and below one accordingly as the predator prefers or avoids the particular prey. The forage ratio may be calculated from number, weight or volume of organisms; in this study numerical forage ratios were used. Enclosing the study plots with a barrier seine made it certain that the fish whose stomachs were examined had fed in the same plot from which the samples of food organisms were collected. About 30 square-foot samples were selected at random from each plot to be investigated, and both the macroscopic and larger microscopic organisms were counted and identified. Immediately after the collection of these organisms, the *Gambusia* were collected from the plot, preserved in formalin, and taken to the laboratory for analysis of stomach contents. Three ecological conditions were studied, and in each of these, study plots were selected which contained the maximum number of larvae. One represented typical problem areas of the reservoir subjected to fluctuation; a second was a protected bay of the main reservoir dammed off so that terrestrial vegetation was flooded and the water-level kept relatively constant; the third type was an area newly impounded during the late summer after terrestrial vegetation was well advanced and when wind action had caused flotage concentration. These studies involved the collection and examination of 295 square-foot samples of surface-dwelling food organisms and the collection and examination of stomach contents of 968 *Gambusia*. The feeding preference for anophelines increased as their absolute density increased, the forage ratio being one when the larval density was about two per square foot; above this density the forage ratio increased, and below this density it decreased. The feeding preference for anophelines increased as the size of the larvae increased; no first instar larvae were found in the stomachs and the forage ratio for fourth instar larvae was greater than for second or third instar larvae. The forage ratio for pupae was greater than for any larval instar. It was concluded that predation of *Anopheles* by *Gambusia* in these areas was sufficient to reduce materially production of adults. However, this reduction is not considered sufficient, under the conditions represented in certain areas, to eliminate the need for other control measures.

Preliminary investigations have been carried on regarding the *Odonata* as predators of anopheline mosquitoes. Dr. Allan F. Archer also conducted certain investigations on the predation of spiders on adult mosquitoes.

Through the cooperation of the Fish and Wildlife Service, the Tennessee Valley Authority and the WPA, provisional plans were made to dyke off an extensive shallow area in the Wheeler Refuge as a means of eliminating a serious anopheline breeding area and at the same time providing a source of winter food for migratory waterfowl. The areas will be dyked off, connected by dragline ditches, and a single pumping structure will be utilized to dewater the area at the onset of mosquito production. The area can then be maintained in a dewatered state throughout the summer, permitting the planting of suitable species of plants for wildlife food. At the close of the mosquito breeding season the area will be flooded to provide feeding grounds for migratory waterfowl. The inclusion of two-way pumps will permit these operations even at times when the lake is at low elevations.

At a joint meeting of the Policy and Technical Committee at Knoxville, December 6, 1940, it was agreed that, since a working relationship now exists whereby a study of these problems may be continued as a part of the regular research programs of the interested agencies, the formal organization should be discontinued. It was stated further that it would be the purpose of the participating agencies to continue at the present or increasing levels the program of cooperative research which has been developed.

[3] A. D. Hess and A. Swartz, *Trans. 5th North Amer. Wildlife Conf.*, pp. 162–164, 1941.

THE CHICAGO MUSEUM OF SCIENCE AND INDUSTRY

LAST fall the Chicago branch of the American Association of Scientific Workers appointed a distinguished committee of its members to look into the problems raised in connection with the dismissal from the Museum of Science and Industry of a number of members of the scientific staff. The accompanying report by this committee has been unanimously approved by the executive committee of the association.

R. W. GERARD,
President, Chicago Branch

REPORT OF THE COMMITTEE

Your committee wishes to report its conclusions in regard to recent dismissals of members of the staff of the Museum of Science and Industry in Chicago. A study has been made of the facts available to us. Our recommendations are given as a part of our findings.

Preamble

a. It seems clear that a change in the general policy of the museum was favored by the trustees, partly in the interest of necesssary saving, and that these changes in policy could be furthered by a change in personnel, such as was actually ordered. Whether such changes in policy are themselves desirable is a point on which your committee, having only a limited acquaintance with the management of the museum, can scarcely pass. Such decisions are properly within the responsibilities of the Board of Trustees of the museum. We have, however, no evidence that the Board of Trustees consulted competent men, outside its own ranks and the museum staff, in reaching a decision.

b. There may have been budgetary savings in the reorganization effected by the discharges; the significance of such savings your committee is not in a position to evaluate.

c. Your committee is pleased to observe that the policy expressed by the president of the museum is to continue emphasis on education rather than on entertainment.

Findings

a. *The method of dismissal of the Director and the chiefs of departments, without consultation and without due process, is, in our opinion, contrary to justice and to sound practice, especially in a public educational institution.* According to Mr. Lohr, this procedure of avoiding contact with the men before action was taken and basing his decision primarily upon administrative and budgetary needs, was adopted in an effort to avert implications detrimental to the individuals dismissed. We believe that in a public educational institution, staff members, after proven competence, should have tenure and be subject to removal for cause only after a proven hearing. Moreover, from a financial viewpoint, a minimum of ameliorative measures seems to have been taken to lighten the blow upon those discharged. Such amelioration was scaled upon the standards prevailing in business rather than upon those prevailing among scientists.

b. We trust that the board will provide more adequate restitution to the persons discharged. Such steps would restore to the museum a place of confidence with the citizens of Chicago and the scientific public.

c. It will be helpful to the understanding of the museum's position if its Board of Trustees will make a public statement of its policy.

ANTON J. CARLSON
ARTHUR H. COMPTON
CHAS. H. BEHRE, JR.

SPECIAL ARTICLES

ASSOCIATION OF THE WASSERMANN ANTIGEN WITH HEAVY MATERIALS PRESENT IN TISSUES[1]

THE material present in normal and neoplastic tissues and sedimentable at 27,000 r.p.m. during one hour has been shown to contain the Forssman antigen,[2] tissue and organ specific antigen,[2,3] and several enzymes as cytochrome oxidase, succinic dehydrogenase (heart muscle,[4]) and phosphatase (mouse kidney[5]).

The experiments to be described in this report indicate that these heavy materials also contain the Wassermann hapten since they react with most Wassermann positive human sera even when highly diluted, but not with Wassermann negative sera. Table I shows that the Wassermann hapten, present in saline extracts of beef heart, can be sedimented at about the same speed that is required to sediment the agents producing leukosis and sarcoma of chickens[6] and the heterogenetic and tissue and organ specific antigens. Partial sedimentation of the Wassermann antigen occurs at 15,000 r.p.m. for one-half hour, and almost complete sedimentation at 27,000 r.p.m. for one hour.

Similar results were obtained with saline extracts from human heart tested with a Wassermann positive human serum. The reacting substance, as present in

TABLE I

COMPLEMENT FIXATION TESTS WITH A WASSERMANN POSITIVE HUMAN SERUM AND FRACTIONS FROM BEEF HEART

Antigen dilution	A Crude extract	B Sediment after centrifugation at 15,000 r.p.m.	C Supernatant from B	D Sediment from C after centrifugation at 27,000 r.p.m.	E Supernatant from D
1/1	–	–	–	–	o
1/10	o	o	o	o	ac
1/30	o	o	o	mod	c
1/90	o	mod	ac	c	c
1/270	c	c	c	c	–
1/810	c	–	–	c	–

The sediments were suspended in saline to the original volume.

Abbreviations: o = no hemolysis, tr = trace, sl = slight, mod = moderate, st = strong, ac = almost complete, c = complete hemolysis.

The technique of the complement fixation has been described (6).

1 These studies have been supported by grants from the International Cancer Research Foundation and The Jane Coffin Childs Memorial Fund for Medical Research.

2 J. Furth and E. A. Kabat, SCIENCE, 91: 483, 1940.

3 W. Henle and L. A. Chambers, SCIENCE, 92: 313, 1940.

4 K. G. Stern, *Cold Spring Harbor Symposia on Quantitative Biology*, 7: 312, 1939.

5 E. A. Kabat, SCIENCE, 93: 43, 1941.

6 E. A. Kabat and J. Furth, *Exp. Med.*, 71: 55, 1940.