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.

the crude extract, is unstable, and beef heart after autolysis for one week at room temperature contained only a small amount of this material—the complement fixing titre of such material being 1/3 as compared with 1/90 of extracts from fresh tissues.

Table II shows that heavy materials from all tissues tested gave complement fixation tests with the Wassermann positive human serum, but the antigenic titre was lower with the Wassermann positive serum than with the homologous immune serum.

TABLE II

COMPLEMENT FIXATION TESTS OF HEAVY MATERIALS FROM DIFFERENT TISSUES WITH WASSERMANN POSITIVE HUMAN SERUM AND HOMOLOGOUS IMMUNE RABBIT SERUM

Serum	Antigen mg N/ml	Heavy material: Human liver	Mouse spleen	Mouse kidney	Chicken spleen	Chicken tumor	Crude extract from chicken tumor
	0.10	–	o	o	o	o	o
Wassermann positive human serum (1/100)	0.033	o	mod	o	st	st	tr
	0.011	o	c	o	c	c	st
	0.0036	st	c	st	c	c	c
	0.0012	ac	c	c	c	c	c
Homologous immune serum (1/100)	0.011	o	o	o	o	o	o
	0.0036	o	sl	tr	o	tr	o
	0.0012	tr	ac	sl	ac	c	o

All antigen and serum controls showed complete hemolysis. The antigen was used in volumes of 0.2 ml.

Several of these sera contained Forssman antibody, but previous experiments have shown that the reaction with homologous immune serum persists after removal of the Forssman antibody from these sera. The Wassermann positive human serum used did not contain Forssman antibody.

Comparison of the reactivity of several Wassermann positive and negative human sera with the usual Warsermann antigen and with heavy material from human liver shows that the sera react more strongly with the Wassermann antigen (Table III). *E.g.*, serum No. 124 reacted with the alcoholic extract of beef heart to a serum dilution of 1/27, but with heavy material from human liver only to a dilution of 1/9. Two Wassermann positive sera failed to react with heavy material from human liver.

Table I indicates that the Wassermann hapten is contained in a complex antigen of large size. Nevertheless, immune sera obtained by immunization of rabbits with heavy material from different human, chicken and mouse tissues failed to react with alcoholic extracts from beef heart used for the routine diagnosis of syphilis. Sixteen sera prepared with high-speed deposits from human liver, kidney, spleen, from mouse spleen and kidney, and from chicken spleen and sarcoma were tested with the Wassermann antigen in serum dilution 1/20, 1/40, 1/80. Reactions with homologous antigens are shown in Table II. Only one immune serum against the heavy material from mouse kidney gave a positive complement fixation test in

TABLE III

COMPLEMENT FIXATION TESTS OF WASSERMANN POSITIVE AND NEGATIVE HUMAN SERA WITH HEAVY MATERIALS FROM HUMAN LIVER

Antigen	Serum dilution	Serum: Wassermann+ * No. 188‡	Wassermann+ * No. 124‡	Wassermann± * No. 197, 181	Wassermann – * No. 60, 61, 64	Wassermann – * No. 63	Wassermann – * No. 62
Purified alcohol extract from beef heart	1/3	–	–	0	st	0	0
	1/9	0	0	0	c	mod	0
	1/27	*0*	*0*	*mod*	*c*	*c*	*ac*
	1/81	c	tr	c	–	–	–
Heavy material from human liver	*1/3*	*mod*	*0*	*ac*	*c*	*c*	*c*
	1/9	c	0	c	c	c	c
	1/27	c	c	–	–	–	–
Serum control	1/3	ac	ac	ac	c	c	c
	1/9	c	c	c	c	c	c

* The sera so designated were obtained from the Central Laboratory of New York Hospital through the courtesy of Dr. R. G. Stillman.

‡ Similar reactions were obtained with 3 other sera.

serum dilution 1/20. The control sera were as follows: 2 sera from normal rabbits, 2 from rabbits immunized with streptococcus, 2 with pneumococcus, 1 with B mesentericus, and 2 with B subtilis. The two sera prepared by immunization with B subtilis gave a positive complement fixation test in dilution 1/20. Many rabbit sera are anti-complementary at dilutions below 1/20.

These observations are consistent with the opinion expressed by Weil and Braun[7] and by Sachs, Klopstock and Weil[8] that the Wassermann reaction results from auto-immunization to lipoidal substances liberated from tissues and activated to a complete antigen by the Spirocheta pallidum, as well as with the more recent experiments of Eagle and Hogan[9] indicating that cultured spirochetes contain material serologically related to the substance in normal tissues. Experiments are in progress to determine why Wassermann antibodies are not formed on immunization with heavy material from tissues, although this material is highly antigenic and produces Forssman and other antibodies.

Summary. The Wassermann hapten is associated with materials sedimentable at high speed present in normal and neoplastic tissues. Although these heavy materials are strongly antigenic, the immune sera produced by them in rabbits react strongly with homologous heavy materials but do not give a positive Wassermann reaction.

JACOB FURTH
ELVIN A. KABAT

DEPARTMENT OF PATHOLOGY,
CORNELL UNIVERSITY MEDICAL COLLEGE

[7] E. Weil and H. Braun, *Wien Klin. Woch.*, 21: 151, 1908.

[8] H. Sachs, A. Klopstock and A. J. Weil, *Deutsch. Med. Woch.*, 51: 589, 1925.

[9] H. Eagle and R. B. Hogan, *Jour. Exp. Med.*, 71: 215, 1940.