sirable fruit or plant characters. In experiments to be reported in detail elsewhere we have found that the Lloyd George variety, an outstanding parent from the standpoint of fruit quality,[2] completely escapes mosaic infection in the Puyallup Valley of western Washington by virtue of its resistance to the aphid vector, *Amphorophora rubi* Kalt., and that it transmits this characteristic when hybridized with a susceptible variety.

During the three-year period of our investigations no effective vector other than *A. rubi* was found upon the red raspberry. That varieties grown in the field differ greatly in their susceptibility to this aphid is shown in the following table.

TABLE I

FIELD COUNTS OF *Amphorophora rubi* KALT., MADE UPON TEN RED RASPBERRY VARIETIES IN 1936

Variety	June 25		July 23	
	Range of aphid counts per cane	Ave. no. aphids per cane	Range of aphid counts per cane	Ave. no. aphids per cane
Antwerp	0–2	0.2	0–5	1.8
Chief	8–104	42.7	3–108	41.1
Cuthbert	0–16	5.0	0–30	10.8
Herbert	0–3	0.3	0–6	1.8
Latham	2–27	14.7	4–49	23.1
Lloyd George	0–0	0.0	0–0	0.0
Marlboro	1–9	4.6	4–42	16.8
Newburgh	0–6	2.0	0–9	4.6
Newman	4–17	10.1	1–26	12.5
Viking	0–39	16.0	3–83	32.8

Although populations of *A. rubi* on susceptible varieties varied throughout the summers of 1935 and 1936, repeated field counts were sufficiently consistent to permit a general classification of varieties relative to aphid susceptibility. Antwerp, Herbert and Newburgh show marked resistance to the vector, while the other varieties, except Lloyd George, show greater susceptibility. Observations indicate also that the rate of spread of mosaic in the 10 varieties appears to be directly proportional to their relative aphid populations. Many field counts were made upon Lloyd George, in addition to those shown in the table and all gave negative results. The only specimens of *A. rubi* found upon Lloyd George were a few winged individuals that probably landed there accidentally while in flight. That such chance visitors do not infect the Lloyd George is shown by the fact that red raspberry mosaic was not observed on this variety in the field, although artificial infection by graftage resulted in the development of distinct mottling, indicating that Lloyd George is susceptible to the virus. In another experiment, a Lloyd George plant that remained in constant contact with a mosaic-infected, aphid-infested Newman plant throughout one summer did not develop symptoms of mosaic during two years thereafter.

In greenhouse experiments, stem mothers were placed upon individual plants under cheesecloth cages. Large populations developed upon highly susceptible varieties; little reproduction occurred upon more resistant varieties; and the aphids could not maintain themselves on Lloyd George. They gradually died without reproducing after wandering about over the cage and the plant, apparently without feeding. Greenhouse testing of varieties by means of cages proved to be a convenient, rapid and accurate method of determining relative susceptibility to *A. rubi* and is a valuable aid in the breeding of resistant varieties.

Both field counts and greenhouse tests were conducted with hybrids resulting from crossing several red raspberry varieties. Of 31 hybrids of Lloyd George × Cuthbert and the reciprocal cross, six proved to be completely resistant and several others were highly resistant. Of six hybrids of Lloyd George × Latham and the reciprocal, three were resistant and three susceptible. Of nineteen hybrids of susceptible parents, all were definitely susceptible.

The numbers of plants whose relative susceptibility was definitely determined were too small to permit genetic analysis. The behavior of *A. rubi* when confined to Lloyd George plants under cages indicates that resistance probably results from a lack of suitable food for the insect rather than the presence of an actively repellent substance. Such a negative character may be expected to be a recessive. The data thus far obtained support this theory.

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[2] C. D. Schwartze, *Proc. Amer. Soc. Hort. Sci.*, 30: 113–116, 1933; 32: 411–415, 1934.

THE SIMILARITY OF ACTION OF PURIFIED CORTICAL ADRENAL EXTRACTS TO CRYSTALLINE ANDROSTERONE AND TESTOSTERONE

HAVING shown that crystalline androsterone and testosterone can initiate the lengthening of the ovipositor of the female bitterling,[1] we were interested in the observation of Barnes, Kanter and Klawans.[2]

[1] I. S. Kleiner, A. I. Weisman and D. I. Mishkind, *Proc. Soc. Exp. Biol. and Med.*, 35: 344, 1936; I. S. Kleiner, A. I. Weisman, D. I. Mishkind and C. W. Coates, *Zoologica*, 21, part 4: 241, 1936.

[2] B. O. Barnes, A. E. Kanter and A. H. Klawans, SCIENCE, 84: 310, 1936.

They stated that crude ether extracts of the adrenal cortex of the dog had this effect also.

We can now report that purified extracts of adrenal cortex, prepared for administration to human beings and obtained from three different sources,[3] also possess this property. These tests were repeated several times with each preparation with positive results.

Several questions arise; among them are the following. Is the reaction of adrenal cortical extracts caused by some oxidation product of a cortical substance such as Mason, Myers and Kendall have prepared?[4] Is it due to a preformed substance which stimulates the growth of the capon's comb, such as the one which was isolated from adrenal cortex by Reichstein?[5] Or is this effect caused by the cortical factor or factors essential to life?

If this test is a reaction for a specific cortical hormone as well as for the "male hormones" it may prove to be a more valuable test than if it were for the latter alone.

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PERMEABILITY OF THE BLOOD-C. N. S. BARRIER TO SODIUM BROMIDE IN EXPERIMENTAL POLIOMYELITIS[1]

CHANGES in the permeability of the blood-C. N. S. barrier are known to occur in a number of pathological conditions involving the central nervous system.[2] Perhaps the most widely used method for determining such alterations in permeability is that devised by Walter.[3] The concentration of bromide in the serum and spinal fluid is determined after oral administration of NaBr, and the degree of permeability given by a ratio (concentration in serum/concentration in spinal fluid) which is expressed as the permeability quotient (P. Q.)

In the present investigation slight modifications were made of Walter's original method. For example, NaBr was administered subcutaneously twice daily for two consecutive days. Each injection consisted of forty-five milligrams per kilogram body weight. Approximately eighteen hours after the last injection, samples of blood and spinal fluid were obtained and quantitatively analyzed for NaBr. Chemical analyses were made by methods differing in several respects from those employed by Walter. These modifications were necessary to adapt the method to the smaller amount of spinal fluid available from monkeys. Since the NaBr persisted in the body fluids for several weeks following administration, only one test was made on each animal, *i.e.*, the P. Q. was not determined on the same animal for both the preparalytic and paralytic stages.

The average P. Q. value for 19 normal monkeys was found to be 1.72 with a probable error $(= \pm 0.8453\frac{\Sigma(v)}{n\sqrt{n-1}})$ of $\pm$ 0.029. Eighteen preparalytic monkeys gave an average value of 1.01 with a probable error of $\pm$ 0.0137. The value for frankly paralyzed monkeys was approximately the same as for the previous group, the average P. Q. for eleven animals being 0.99 with a probable error of $\pm$ 0.0132.

The data obtained so far indicate that NaBr passes into the spinal fluid more readily in poliomyelitic (low P. Q.) than in normal monkeys (high P. Q.). Since a low P. Q. value for Br^- is generally attributed to an increase in blood-C. N. S. barrier permeability,[2] the results of the present investigation point to the occurrence of a similar change in experimental poliomyelitis.

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[3] For these potent, standardized adrenal cortical extracts we are indebted to Professor W. W. Swingle and Dr. W. M. Parkins, of Princeton University, Professor Frank A. Hartmann, of the Ohio State University, and Dr. Oliver Kamm, of Parke, Davis and Company.

[4] H. L. Mason, C. S. Myers and C. C. Kendall, *Jour. Biol. Chem.*, 116: 267, 1936.

[5] T. Reichstein, *Helv. chim. acta*, 19: 223, 1936.

[1] This work was supported by a grant from the President's Birthday Ball Commission for Infantile Paralysis Research.

[2] S. Katzenelbogen, "The Cerebrospinal Fluid and Its Relation to the Blood." The Johns Hopkins Press, Baltimore, 1935.

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