Three trout were killed from each group at regular intervals and erythrocyte counts made in duplicate. The results are summarized in Table 1.

TABLE 1

Diet no.	Extract fed	Average of 6 counts in thousands at end of: 4 weeks	6 weeks	8 weeks	13 weeks
466	Fresh beef liver	973	1,051	1,130	1,120
467	Chappel's secondary	866	960	1,014	....*
468	Chappel's P.A. fraction..	861	851	1,025	1,010
469	Chappel's whole extract .	871	875	930	1,040
470	Armour whole dried liver	840	926	978	1,040
471	Lilly	820	901	993	1,040
472	Squibb	823	830	933	978
473	No supplement	671	651	656	660
474	Fly maggots	886	1,056	1,020	1,290

* Diet discontinued because of insufficient fish.

All liver fractions permitted the regeneration of erythrocytes, but none were as potent as the larvae. These must be very rich in the anti-anemic factor. In 1937 Trager[2] reported that both house fly maggots and liver were rich in a substance essential for the growth of mosquito larvae. Furthermore, his data indicated that one factor essential for the growth of mosquito larvae seemed to be involved in pernicious anemia, inasmuch as the urine of those suffering from this disease lacked the essential while normal urine contained it.

The factor needed for the regeneration of trout blood may also be similar to that found essential for chickens[3] and pigeons[4] by Hogan and his associates.

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A NOTE ON SERUM CHOLINESTERASE VARIABILITY IN MALE AND FEMALE RATS

DURING the course of an experiment involving the determination of cholinesterase in rat sera, it was observed that a large number of them displayed little or no activity. It was noted that the sex of the mature animals was the factor which determined whether the cholinesterase was high or low. In a group of 74 mature rats, all the male sera (41) showed little or no activity. All the female sera, with the exception of four, were relatively very active.

These exceptions suggested the possibility that the degree of sexual maturity of the females influenced the activity of serum cholinesterase, a point which was next investigated. Sera from thirteen immature female rats (50–80 g) were examined and found to possess a very low cholinesterase activity, similar to that of the normal males. Of five old and supposedly senile female rats, three had a low serum cholinesterase activity (in the normal male range) and two displayed the high activity characteristic of the normal mature female. Despite the fact that histological examination of the ovaries of all five of these animals revealed the presence of developing ova, the cholinesterase determinations suggested that these five animals did not constitute a representative sample from the same population as the normal mature female rats.

The sera of male and female mice, examined by the Warburg manometric method,[1] show that in this species also the serum cholinesterase of the female is markedly higher than that of the male.

Although a large number of additional experiments are indicated, due to the pressure of other duties the lead can not be further investigated at this time.

EXPERIMENTAL PART

The cholinesterase determinations were carried out at pH 7.2 by the continuous titration method.[2] The titration figures were so low in the case of males and immature females that there was some doubt as to the actual presence of cholinesterase activity in these sera. By the more sensitive Warburg procedure[3] it was

TABLE I

VARIATIONS IN SERUM CHOLINESTERASE ACTIVITY WITH SEX DEVELOPMENT

	No. of animals	Range: Warburg	Range: Titrimetric	Average† : Warburg	Average† : Titrimetric
		cu. mm. CO_2	*cc*	*cu. mm. CO_2*	*cc*
Mature female rats ..	33	255– 617	0.68–2.77	415 ± 78	1.57 ± 0.51
Immature female rats ..	13	62– 160	x	107 ± 27	x
Senile (?) female rats ..	5	49– 447	x	217 ± 122	x
Mature male rats ..	41	77– 157	x	113 ± 9	x
Mature female mice .	5	1850–3000		2393 ± 325	
Mature male mice .	5	1300–2017		1545 ± 218	

x Practically all these were so low that they could not be distinguished with certainty from the blank.
† With average deviations from the mean shown.

[1] All Warburg determinations were done by H. Rudney, to whom the authors extend thanks for technical assistance.

[2] Knaffl-Lenz, *Arch. exp. Path. Pharmacol.*, 97: 242, 1923. Hall and Lucas, *Jour. Pharmacol. and Exp. Therap.*, 59: 1, 1937.

[3] Ammon, *Arch. ges. Physiol.*, 233: 486, 1933.

[2] W. Trager, *Jour. Exp. Biol.*, 14: 240, 1937.

[3] A. G. Hogan and E. M. Parrett, *Jour. Biol. Chem.*, 132: 507, 1940.

[4] A. G. Hogan, L. R. Richardson, P. E. Johnson and R. N. Nesbit, *Jour. Nutrition*, 20: 203, 1940.

found that such sera did possess a demonstrable activity which, however, was usually only from one fifth to one third of the values found for the sera from mature females.

Activities found by the titrimetric method are reported as cc 0.01 N acid liberated by 0.50 cc serum in 20 min.; by the Warburg method as cubic mm CO_2 liberated by 0.50 cc serum in 20 min.

In order to determine whether or not there were any activators in the mature female sera or inhibitors in the mature male sera, equal portions of these two were mixed and the activity of the mixed sera determined. The results are shown in Table II. The cholinesterase activity of the mixed sera being equal to the average activity of the component sera indicates the absence of activators or inhibitors in the female and male sera, respectively.

TABLE II

ACTIVITY OF MIXED MALE AND FEMALE SERA

Warburg method		Titrimetric method	
Calc. mean	Found	Calc. (from Warburg)	Found
272 cu. mm.	263 cu. mm.	1.22 cc	1.30 cc
283	282	1.27	1.35

SUMMARY

(1) The serum cholinesterase activity of mature female rats is three to five times as great as that found in mature male rats. Mice sera exhibit similar sexual variations in activity, but to a lesser degree.

(2) Immature female rats and probably senile female rats possess a low serum cholinesterase activity, in the same range as that of the mature male rats.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE NEW ELECTRON MICROSCOPE

THE new electron microscope that is now being manufactured by the RCA Manufacturing Company, Inc., has a simplicity and ruggedness which makes it a research tool of importance for scientific and industrial work.

The experimental predecessors of this new instrument, by virtue of their high magnifying powers, aroused the interest of research men all over the country. Magnifications as high as 100,000 opened up many new fields for research endeavor. Previous maximum useful magnification of 2,000 to 3,000 diameters placed severe limitations on such studies as particle size and shape of various materials, crystalline structures, colloidal suspensions, internal structure of bacteriological specimens, filterable viruses and many others. Much information along these lines had to be obtained from tedious and complicated indirect methods which yielded, at best, only mildly accurate results. And even these indirect methods failed to supply many of the answers. Quite often the situation was encountered where two materials were exactly alike so far as ordinary chemical analysis and observation under high power optical microscopes were concerned, yet the materials produced widely different results in actual usage. It was with the hope of solving some of these baffling problems that scientists enthusiastically welcomed the first electron microscope.

This experimental instrument did promise to be of aid. With it, particles only 50 Ångstrom units in diameter could be clearly resolved, and many new and interesting structures were observed. Such organisms as streptococci, typhoid and anthrax bacilli were not the homogeneous masses they appeared to be under ordinary microscopes, but possessed surprisingly intricate frameworks and internal compositions. Also, this electron microscope afforded a means of clearly photographing and observing some of the previously invisible filterable viruses, those tiny little agents of destruction that are so mysterious to even our most learned bacteriologists. An idea as to the importance of this may be had from glancing at the imposing list of diseases apparently caused by viruses of this sort. To name just a few—the common cold, infantile paralysis, sleeping sickness, yellow fever, and—who knows—perhaps even cancer.

However, as in most new developments, there were a few disadvantages that had to be overcome. The experimental microscope was bulky—its power supply alone occupied an entire room—it required installation in a location absolutely free from vibration and magnetic fields, and last but by no means of less importance to a prospective user, a specially trained electronic engineer was necessary for its successful operation. Obviously, these facts imposed conditions that could not be met by the average research laboratory. Their need was for an instrument that could be set on the floor of a small-sized room, plugged into a light socket and put into operation by simply throwing a switch.

The new electron microscope was designed expressly to fill this need. A microscope, power supply and all, is contained in one rack about seven feet tall and weighs approximately five hundred pounds. It fits into a corner of the room and obtains current from the normal 110-volt power line. The operator can seat himself on a chair in front of the instrument from