

TABLE II.

Group	Ration and Supplements	No. of rats	Avg initial wt	Avg wt at 6 weeks
1	Ration J ₃₀ + ¼ g alcohol-ether ppt./day (factor W)	3	38	96
2	Same as (1) + 2 drops corn oil/day	3	40	153
3	J ₃₀ + 0.5 cc factor 2 + .05 cc factor 1 (B ₆) concentrates	3	42	109
4	Same as (3) + 10% lard	3	44	189

Summary. When our results are compared with those of other workers quoted above, it is evident that the use of liver extract instead of the usual yeast in studies on low fat diets results in an earlier and more acute deficiency and hence a greater growth response when fat is given. Possibly the liver extract is lower than ether-extracted yeast in the essential fatty acids. This fact may be useful in working out better methods for the assay of at least some of the essential fatty acids in fats. Furthermore, it is necessary to have fat in the diet to obtain maximum growth responses to the liver extract concentrates of the vitamin B complex.

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Attempted Quantitative Estimation of Atabrine Retardation of Schizogony in Avian Malaria.

HARRY BECKMAN.

From the Department of Pharmacology, Marquette University School of Medicine, Milwaukee.

Employing female canaries, mosquito infected with *Plasmodium cathemerium* (Hartman) and kept in the dark from 6 P.M. to 6 A.M. and in the light during the other 12 hours, I have found the following features to characterize the peripheral blood picture at 1 P.M.: (a) the majority of the schizonts in singly infected cells are not yet fully segmented though well advanced in size, and they are contained predominantly in mature erythrocytes; (b) pigmentation is pronounced; (c) vacuolation of an apparently degenerative nature is seen occasionally in the larger but not in the smaller forms.

Atabrine,* given repeatedly in adequate therapeutic dosage, alters this picture as follows: The total number of schizonts is reduced;

* Atabrine for this study was kindly supplied by the Winthrop Chemical Company, Inc.

TABLE I.
Distribution of Schizonts in Adult Erythrocytes Before Atabrine.
Bird 89, 1-14-39.

Size (increasing from A to D)	No. in singly infected cells	%	% large (C + D)	% small (A + B)
A	7	3.5		3.5
B	29	14.5		14.5
C	53	26.5	26.5	
D	111	55.5	55.5	
Totals	200	100.0	82.0	18.0

the amount of pigment is diminished; vacuolation appears in the younger as well as in the older forms; and the proportion of large to small schizonts in mature erythrocytes is reversed.

Reducing the amount of atabrine to a single dose given at mid-night, I have found that when this single dose is as small as 0.1 mg per 20 gm of bird the total number of schizonts in single infected cells at 1 P.M. next day is not reduced, but pigment diminution, vacuolation, and the reversed preponderance in size of schizonts in mature erythrocytes do occur. Since vacuolation and pigment diminution are qualitative but not quantitative evidences of the drug's action, I am tentatively looking upon the amount of reversal from large to small schizonts in mature singly infected erythrocytes, occurring without reduction in the total number of schizonts in singly infected cells, as potentially a quantitative measure of the drug's ability to retard the process of schizogony. Borrowing the term of Moshkovsky and Poliakova,¹ such a dose might be called the *dosis affectans*.

Table I shows the typical distribution of schizonts in singly infected adult erythrocytes at 1 P.M. and Table II the altered distribu-

TABLE II.
Distribution of Schizonts in Adult Erythrocytes After Atabrine (*Dosis affectans*).
Bird 89, 1-15-39.

Size (increasing from A to D)	No. in singly infected cells	%	% large (C + D)	% small (A + B)
A	43	21.5		21.5
B	110	55.0		55.0
C	27	13.5	13.5	
D	20	10.0	10.0	
Totals	200	100.0	23.5	76.5

¹ Moshkovsky, S., and Poliakova, A., *Med. Parasit. and Parasitic Dis.*, 1934, **3**, 395. (In Russian; I have seen only the English abstract in *Trop. Dis. Bull.*, 1935, **32**, 409.)

tion at 1 P.M. the next day, one *dosis affectans* of atabrine having been given at midnight between the 2 examinations. Twenty-two birds survived long enough to be included in the record of this investigation; controls were injected with water alone.

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Microincineration of Active Smooth, Transitional and Skeletal Muscles.*

EBEN J. CAREY AND WALTER ZEIT.

From the Department of Anatomy, Marquette University School of Medicine.

The distribution of inorganic salts in the active and inactive smooth muscle of the intestine and the transitional muscle of the gizzard of birds and skeletal muscle is revealed by the technic of microincineration perfected by Scott.¹ He emphasized the distribution of ash in relatively inactive smooth and skeletal muscle by this method. He did not report in detail on the ash distribution in the active smooth, transitional, and skeletal muscles. This method of incinerating microscopic sections of tissue without disturbing the relationship of the mineral components was suggested by Liesegang² and developed by Policard.³ The recent studies of Kruszynski⁴ are on the topography of the mineral content in relatively resting muscle after microincineration.

The muscle is fixed for 24 hours in 9 parts of absolute alcohol and 1 part of neutral formalin. The mineral salts are neither increased nor decreased by this fixative. The tissue is completely dehydrated by several changes in absolute alcohol. The mineral salts remain intact by this method. It is then cleared in xylol, embedded in paraffin, and cut serially at 4 to 6 microns. Alternate sections are mounted by the usual method, and stained with hematoxylin and erythrosin, whereas, the intervening sections are mounted with liquid petrolatum to

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¹ Scott, G. H., *Comp. Rend. Acad. Sci.*, 1930, **190**, 1073 and 1323; *Bull. Hist. app.*, 1930, **7**, 251; *Proc. Soc. Exp. Biol. and Med.*, 1932, **29**, 349; *Am. J. Anat.*, 1933, **53**, 243.

² Liesegang, R. E., *Biochem. Z.*, 1910, **28**, 413.

³ Policard, A., *Protoplasma*, 1929, **7**, 464.

⁴ Kruszynski, J., *Z. f. Zellforsch. und Mikros. Anat.*, 1938, **28**, 35.