

The rectal temperatures of the majority of the rabbits with marked leucocytosis showed a rise of from 1 to 4°.

The tests described demonstrate that of the substances used for injection, consistent leucocytic increase was obtained by intravenous and intraperitoneal administrations of globulin, milk, unfiltered arthritic exudate, *Staphylococcus aureus* and *B. typhosus*. The intraperitoneal injections yield as a group the highest estimations.

These experiments represent preliminary tests to determine certain reactions relative to the resistance of infection, the study of which is now in progress.

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Production of Local Leucocytosis in the Rabbit by Mild Provocative Measures.*

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Many reports describing the normal leucocytic findings in the rabbit have been published. (Pearce and Casey,¹ Bushnell and Bangs,² Kleineberger and Carl.³) The estimations of these workers are tabulated below:

TABLE I.

	Total Leucocyte Count	Neutro- philes	Lympho- cytes	Large Mononu- clear	Eosino- philes	Baso- philes
		%	%	%	%	%
Bushnell and Bangs....	10,657	39.1	53.9	0.43	1.1	3.4
Pearce and Casey	9,562	45.4	31.8	10.5	2.2	9.9
Kleineberger and Carl	8,150	50.5	35.0	10.5	1.0	2.5

The findings of Scott and Simon and of Cunningham, Sabin, Sugiyama and Kindwall are cited by Pearce and Casey.

In our observations upon the normal count of rabbits, the blood from the marginal ear vein of 27 normal full grown rabbits, mostly males, was employed. Two hundred counts were made from these animals, and the following estimations obtained:

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¹ Pearce, Louise, and Casey, A. E., *J. Exp. Med.*, 1930, **51**, 83.

² Bushnell and Bangs, *J. Inf. Dis.*, 1926, **39**, 291.

³ Kleineberger and Carl, cited by Kolmer and Boerner, *Approved Laboratory Technic*, 1931, **65**. D. Appleton & Co., New York and London.

TABLE II.

Total Leuco- cyte Count	Neutro- philes	Lympho- cytes	Large Mononu- clear	Eosino- philes	Baso- philes
8,000	30.8%	64.4%	0.2%	2.2%	2.4%

While estimating these total leucocytic counts, it was noted after several counts had been made on successive mornings that an afternoon check made on the third day showed in some of the animals a very marked increment in the number of white blood cells. Without any apparently sufficient reason, the count made in the afternoon from the ear which had been used to collect the blood, would rise from 15,000 to 25,000 cells per cu.mm. The blood collected from the opposite ear at the time of these increased counts would show a normal result, *i. e.*, a difference of 7,000 to 17,000 cells, with no change in the differential count.

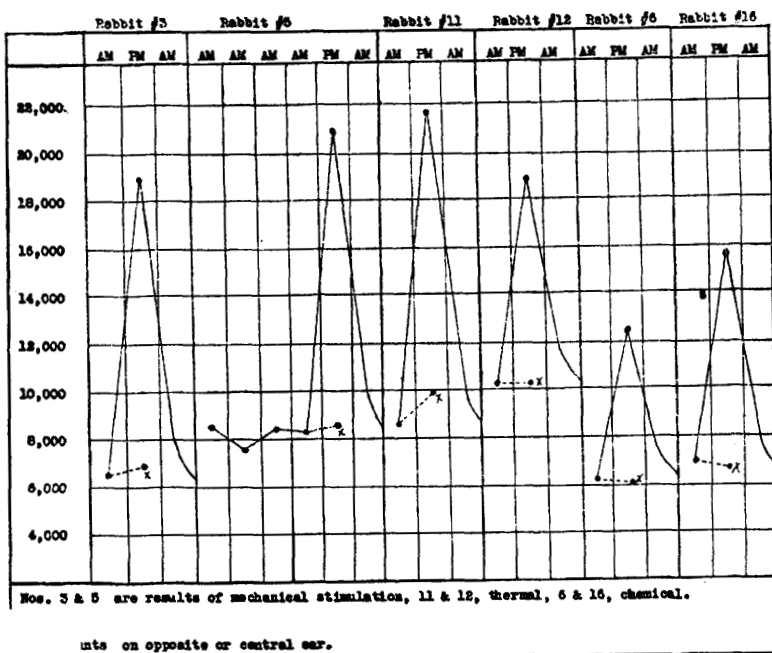
While it is to be expected that any frank inflammatory reaction in a given area will yield a local accumulation of leucocytes with a neutrophilia, it is to be noted that in these animals the ears appear normal and present no cardinal signs of inflammation, and that the blood was collected from the circulatory venous system and not from the more diffuse capillary network.

In the animals wherein the local leucocytosis occurred, several pricks had been necessary to obtain a free flow of blood from poorly shown veins. While no thrombotic blockage was present, sufficient injury to the vascular wall had no doubt occurred and a temporary accumulation of the slowly moving leucocytes resulted. That the condition is temporary is demonstrated by the return to the normal count in 24 hours. The reflex reactions of vaso-dilation and constriction may also play a rôle. Müller⁴ believes that the injury to the tissues produces a stimulation of the parasympathetic nervous mechanism. There occurs a vaso-dilatation and a change in the normal condition of the vessel walls, which as a reflex results in an increase of leucocytes in these dilated parts. We have observed that when the veins are well shown and one direct puncture procures a proper amount of blood abnormal rises of the leucocytes do not occur.

To ascertain if this phenomenon could be produced with slight disturbances of the circulatory balance or by mild irritation of the tissues, applications of cold, heat, xylol and alcohol to the ears of 8 rabbits were made, using 2 rabbits for each measure. The warmth

⁴ Müller, E. F., *Arch. Int. Med.*, 1925, **35**, 796.

CHART—Local Leucocytosis.



was applied by the use of water at 44°C.; cold was applied as ice water; pure xylol and 95% alcohol were employed. These applications were made for 30 minutes each.

The cold and alcohol yielded negative results. Where the warmth was applied an increase of 8,000 and 13,000 cells, respectively, occurred. The xylol application increased the count approximately 5,000 cells. In these animals showing a local leucocytosis, there were increases in the neutrophilic count of from 20% to 30%. All counts returned to normal within 24 hours. The chart reveals a few graphic examples of the extent of the leucocytosis.

In the control rabbits wherein intense heat or prolonged xylol applications were made to the ear producing a marked inflammatory reaction, an increase of 20,000 cells occurred with a neutrophilic increment of between 60% and 70%. In such controls the neutrophilic leucocytosis prevailed during and subsided with the inflammatory lesion present.

The diurnal tide described in the human being and considered by some as due to meal intake, plays no part in these observations, since the control counts on the undisturbed ear reveal normal findings.

It is apparent from these observations that marked variation in

the leucocytic count of the blood obtained directly from the marginal ear vein of the rabbit may be produced, even with causal factors of a mild and apparently harmless nature.

The fact that considerable experimental work on the leucocytic count has been carried out upon the rabbit appears to warrant the report of these observations.

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Effect of Activity on the Excitability of Cardiac Muscle.

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In a preliminary study undertaken to ascertain the changes produced in excitability of the excised turtle ventricle by rest and activity, 11 hearts were used from *Chelydra serpentina* and *Emys* sp. The Lapique potentiometer and chronaximeter were used. The stimuli were applied by way of non-polarizable electrodes.

The results, confirming and extending those previously reported by Garrey and Ashman¹ and by Ashman and Hafkesbring,² were variable, but certain conclusions clearly emerge.

1. Excitability, expressed either as rheobase, chronaxie or least time is greatly influenced by activity.

2. In hearts in good physiological condition when excised (3 examples) there was a treppe in excitability, comparable to the treppe in contractility, and the treppe was demonstrable both in rheobase and "least time". Our evidence shows, although less clearly, that there was a treppe in chronaxie. Expressed in terms of quantity of electrical energy required to excite the tissue, activity definitely increased the excitability.

3. In 6 other hearts, also in good or fair physiological condition, it was impossible to demonstrate a definite treppe in rheobase, yet in these the treppe in least time and probably, therefore, in chronaxie was definite or striking. Compared with the resting heart, after several responses the least effective duration of a current of constant strength may be decreased by 20 to 25%.

4. In 2 ventricles the manifestations of fatigue completely masked the treppe. In these the rheobase was markedly raised by

¹ Garrey, W. E., and Ashman, R., *Am. J. Physiol.*, 1931, **98**, 102.

² Ashman, R., and Hafkesbring, R., *Am. J. Physiol.*, 1928, **85**, 347.