by the writer lived as long as the controls, no irreversible injury was manifest.

It has been shown that the apparent discrepancies in the findings of Irwin and those of the writer may be attributed to differences in methods. It seems best, therefore, in comparing results found by one investigator with those of another, to make sure that identical methods have been used, otherwise it is not justifiable to expect similar results. Differences creep in which are responsible for much confusion.

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Tissue Lactates and Blood Lactates as Affected by Muscular Exercise.

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In dogs anesthetized with amytal the following preparations were made: 3 fore limb muscles and 2 hind limb muscles were prepared for rapid excision, with care to avoid injury to said muscles or interference with their blood and nerve supply. A carotid artery was cannulized, and a brachial vein and the inferior vena cava below junction with the renal veins were exposed. The blood vessels leading to both kidneys were tied off. Stimulating electrodes were imbedded under the skin of the back at the levels of the first lumbar and last sacral vertebrae.[1]

Continuous records of arterial blood pressure and of oxygen consumption were made. At the end of a 15-minute basal period a sample of arterial blood was drawn and one fore limb muscle rapidly excised and thrown at once into liquid air. Artificial exercise (confined to the hind quarters by the location of the electrodes) was then induced for 15 minutes. At the end of the exercise period blood samples were drawn from the cannulized artery, from the inferior vena cava (representing the outflow from worked muscles) and from the brachial vein (representing the outflow from non-worked muscles). One hind limb muscle (worked) and one fore limb muscle (non-worked) were excised rapidly and thrown into liquid air.

At the end of a recovery period approximately one hour in length blood samples were again drawn, as above, and one previously

[1] Martin, E. G., Field, J., and Hall, V. E., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 273.

worked and one non-worked muscle excised and thrown into liquid air. Blood and muscle lactates were determined by the method of Friedmann, Cotonio and Shaffer.[2]

The results of 5 experiments are summarized in Table I.

TABLE I.

a. Blood lactates; mgm. per 100 gm. blood.

Expt. No.	Before Exercise	Immediately after exercise			About 1 hr. after exercise		
	Artery	Artery	Vena Cava Inf.	Brachial Vein	Artery	Vena Cava Inf.	Brachial Vein
H 3	20.1	36.3	53.3	25.3	20.0	21.9	21.9
4	18.5	42.0	51.3	34.6	15.6	19.5	16.6
5	13.7	29.6	57.2	33.0	17.0	16.0	16.3
6*	21.5	32.0	38.0	26.7	24.8	24.5	26.6
8*	22.0	76.7	100.2	57.4	51.8	67.9	53.1

b. Muscle lactates; mgm. per 100 gm. tissue.

	Resting muscle	Worked muscle	Non-worked muscle	Worked muscle	Non-worked muscle
H 3	38.9	117.6	52.8	48.7	48.4
4	42.8	156.8	70.8	56.0	35.6
5	29.7	85.4	42.3	33.1	30.2
6*	41.2	75.7	61.1	78.2	40.2
8*	37.2	140.3	40.5	104.6	40.2

* Arterial pressure low during post-exercise period.

These experiments appear to us to show that lactates accumulate, sometimes to high concentration, in worked muscles during periods of exercise; that they tend to diffuse into the blood and be taken up by non-worked muscles during the same periods; that after exercise both worked and non-worked muscles gradually dispose of their lactate accumulations; that the partition coefficient for lactates between blood and tissue is not the same in dogs as assumed by some authors for man;[3] finally that arterial pressure is a significant factor in the disposition of the lactates formed during exercise.

[2] Friedmann, T. E., Cotonio, M., and Shaffer, P. A., *J. Biol. Chem.*, 1927, lxxiii, 335.

[3] Hill, A. V., Long, C. N. H., and Lupton, H., *Proc. Roy. Soc. B.*, 1924, xcvi, 438.