than that occupied previous to either auricular or ventricular systole. In the latter portion of diastole (diastasis) they gradually float upward but to a slight extent only. Superimposed upon the main curves of closure are found oscillations of much smaller amplitude and of shorter period. Further investigation is necessary before it may be justly concluded that these correspond to the vibrations responsible for the heart sounds.

The conclusion is reached that the mitral valves undergo two movements toward closure in each cardiac cycle, the first near the end of auricular systole, which is transient and incomplete, and the second lasting throughout ventricular systole which is complete and insures the effective closure of the valves.

5 (1069)

Blood fat in relation to heat production and depth of narcosis.

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Experiments on dogs have been designed to answer the questions: (1) whether fat injected directly into the circulation can be oxidized at once, and (2) what is the relation between the concentration of fat in the blood and the heat production. Incidentally it has been necessary to determine whether the depth of narcosis had any effect on the amount of fat in circulation, and on the heat production.

The following experiments may be cited as typical of the effect on percentage of blood fat and on heat production, of a single intravenous injection of 100 c.c. 3 per cent. emulsion of lard oil. It will be seen that the heat production rises and the R. Q. falls as the fat becomes more concentrated in the blood, indicating, therefore, that the injected fat burns.

In order to insure complete muscular rest chloretone was administered to a number of the animals and it was while controlling the effect of this narcotic that the following observations were made: (1) The percentage of blood fat runs parallel with the depth of narcosis, *i. e.*, the deeper the narcosis the lower the blood

Dog No.	Wt. Kgm.	Hour.	Liters CO_2 per Hr.	Liters O_2 per Hr.	R. Q.	Per Cent. Blood Fat (Carotid).	Heat Production Cal. per Hour.
102	7.0	I	2.171	3.013	.72	0.45	14.17
		II	2.478	3.108	.79	0.47	14.92
	100 c.c.	emulsion (3 per cent.) by jugular vein					
		III	2.327	3.100	.75	0.51	14.69
		IV	2.627	3.653	.72	0.58	17.18
111	7.0	I	2.581	3.016	.85		14.66
		II	2.578	3.023	.85		14.70
	100 c.c.	emulsion (3 per cent.) by jugular vein					
		III	2.435	3.008	.81		14.48
		IV	2.442	3.251	.75		15.41
		V	2.494	3.412	.73		16.09

fat; (2) following a single injection (intraperitoneal, in mineral oil) the heat production rises as the narcosis wears off, independently of muscular motions, but parallel to the percentage of fat in the blood. The following experiment illustrates the point.

Dog No.	Wt. Kgm.	Hour.	Liters CO_2 per Hr.	Liters O_2 per Hr.	R. Q.	Per Cent. Blood Fat (Carotid).	Heat Production Calories per Hr.
						0.41	
117	9.0	I	1.880	2.223	.85		10.81
		II	1.812	2.038	.89		10.01
						0.44	
		III & IV [1]	2.08 2.08	2.401 2.401	.87		11.74 11.74
						0.46	
		V	2.093	2.458	.85		11.95
		VI	2.081	2.589	.80		12.43
						0.51	

This relationship as regards depth of narcosis and percentage of fat in the blood has been confirmed with morphine. With ether a second narcosis had the effect of raising the blood fat to a higher point than the first.

Blood fat has been determined by the nephelometric method and heat production by indirect calorimetry.

[1] A single two-hour period.