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Effect of Hyperpyrexia, Produced by Baths, on Permeability of the Meninges.

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It has been previously demonstrated that after sodium bromide is given by mouth for 5 days, a comparison of the bromide found in the blood and spinal fluid shows about 3 times as much bromide in the blood as in the spinal fluid. In certain pathological states of the nervous system this ratio shows a characteristic change. It was concluded that this method gives us a reliable method of estimating changes in permeability.

We used Malamud's[1] modification of Walter's[2] technique on patients whose mouth temperatures had been raised to 103°-106° F. for at least 30 minutes daily for at least 5 consecutive days. The patients were put into an ordinary bath tub or, more comfortably, into a continuous bath tub, the temperature of the bath being gradually raised to 110° F.

The following examples will illustrate the range of the permeability quotient.

TABLE I.

	P. Q.	Consecutive Days Fever	Total Hours Fever	Mouth Temperature
No. 171712				
Control	3.0			
	1.95	7	3	103°-105°
	1.7	12	6	103°-105°
	1.6	25	13	103°-106°
No. 180857				
Control	3.0			
	3.0	3	1	103°-105°
	1.8	9	2	103°-105°
	1.8	16	4	103°-105°

[1] Malamud *et al.*, *Arch. Neurol. and Psychiat.*, 1928, xx, 780.

[2] Walter, F. K., *Z. f. d. ges Neurol. u Psychiat.*, 1925, xcv, 522.
Stecker, H. A., *J. Mental Sci.*, 1928, lxxiv, 73.

Conclusions: The ratio of bromide in blood and spinal fluid is changed after fever. This hyperpyrexia must be greater than 103° F., continued at least 30 minutes and be repeated at least 5 successive days. The permeability quotient (P. Q.) in all cases was lowered, showing increased permeability. The maximum lowering was a P. Q. of 1.6; the least result was *2.7.* A lower temperature than 103° F. or one continued for less than 5 days produced uncertain results.

The above results indicate that a hyperpyrexia produced by hot baths is capable of lowering the permeability quotient in the same manner as does the malarial fever.

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Presence of Afferent Nerve Fibers in Meningeal Blood Vessel Walls.

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The presence of vasomotor nerves in the cerebral blood vessels seems well established as a result of the work of Nothnagel,[1] Wiggers,[2] Brown,[3] Anrep and Starling,[4] and Forbes and Wolff.[5] Anatomical studies, particularly by Alexander,[6] Gulland,[7] Huber,[8] Hunter,[9] Traum,[10] and Stohr,[11] have suggested the presence of sensory nerve-endings in the pial blood vessel walls. We have been unable to find any physiological work on these supposed afferent nerve-endings.

In connection with a series of dogs, in which dilatation of the

[1] Nothnagel, H., *Virchow's Arch.*, 1867, xl, 203.

[2] Wiggers, C. J., *Am. J. Physiol.*, 1907, xx, 206.

[3] Brown, E. D., *J. Pharm. Ex. Therap.*, 1916, xiii, 185.

[4] Anrep, G. V., and Starling, E. H., *Proc. Roy. Soc. Biol. Sci.*, 1924-25, xcvii, 463.

[5] Forbes, H. S., and Wolff, H. G., *Arch. Neurol. Psych.*, 1928, xix, 1057.

[6] Alexander, W. T., *Arch. f. Mikrosc. Anat.*, 1875, xi, 231.

[7] Gulland, L., *Brit. Med. J.*, 1898, ii, 781.

[8] Huber, C. C., *J. Comp. Neur.*, 1899, ix, 1.

[9] Hunter, W., *J. Phys.*, 1900-01, xxvi, 465.

[10] Traum, E., *Zeit. f. Anat. u. Entwick.*, 1925, lxxvii, 488.

[11] Stohr, P., *Zeit. f. Anat. u. Entwick.*, 1922, lxiv, 555.