The pathological lesions observed in the brains of fatal human cases are identical with those described in the previous epidemics.[5, 6] The changes produced in mice by the 1937 strains are also the same as those reported by Smadel and Moore[7] in the case of the 1933 virus.

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Photoelectric Plethysmography of the Nasal Septum in Man.

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Advantage has been taken of the fact that the opacity of tissues to light varies with the blood content, to record photoelectrically the changes in the blood content of the nasal septum.

The arrangement used (shown schematically in Fig. 1) is essentially an adaptation of the photoelectric plethysmograph for the finger, previously reported.[1] Illumination of the septum is provided by a small ophthalmoscope bulb inserted in one nares. Local heating is largely prevented by a heavy metal cap which, placed over the bulb, conducts the heat away to the lamp carrier. Local heating may be practically eliminated by using a mirror arrangement which permits the light source to be placed some distance from the nares. The latter method of providing illumination has the additional advantage of offering opportunity to control amplification, independent of septal luminosity, through predetermined decrements in light intensity by means of suitable filters. The light transmitted by the septum is reflected out the other nares by the mirror to the photoelectric cell. The entire assembly is mounted on a dental impression plate which, carried between the teeth, not only provides a rigid mount but also guarantees constancy of alignment with the nasal septum. The mirror and light tubes may be varied in diameter to fit varying nares. Any desired penetration is readily provided. The apparatus is light and comfortable and may be worn for hours without discomfort. Breathing through either the mouth or nose is equally feasible. The photoelectric oscillations are recorded galvanometrically on the photokymograph after amplification.

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[5] McCordock, H. A., *Am. J. Public Health*, 1933, **23**, 1148.

[6] McCordock, H. A., Collier, Wm., and Gray, S. H., *J. Am. Med. Assn.*, 1934, **103**, 822.

[7] Smadel, J. E., and Moore, E., *Am. J. Path.*, 1934, **10**, 829.

[1] Hertzman, A. B., and Spealman, C. R., *Am. J. Physiol.*, 1937, **119**, 334.

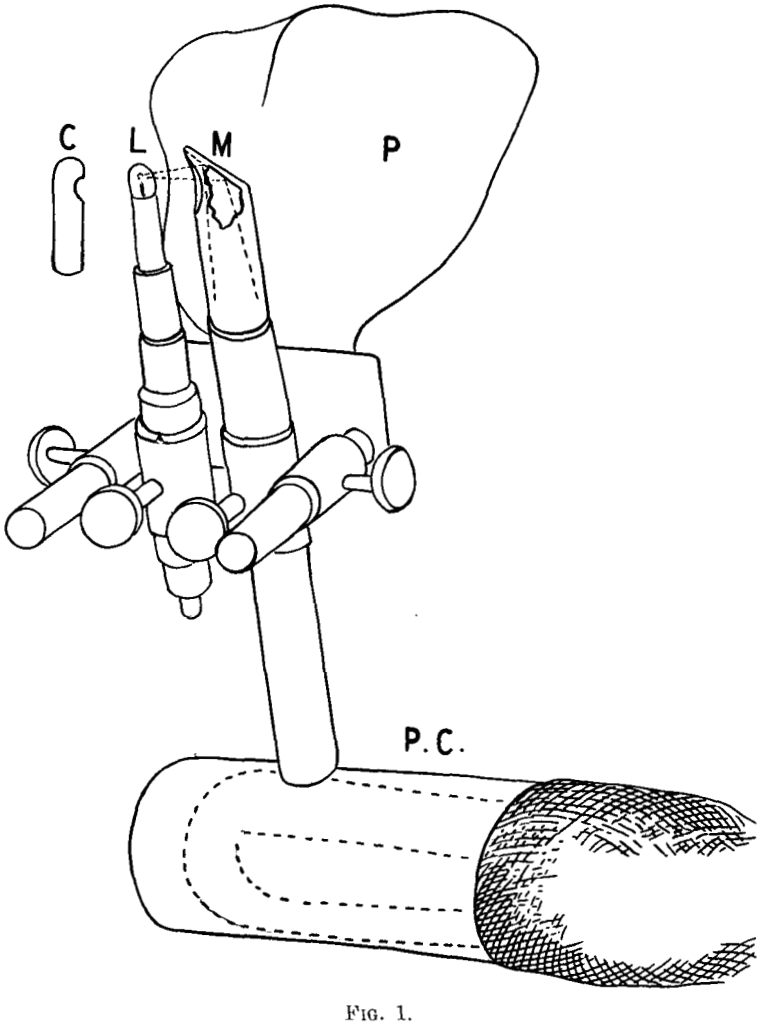

FIG. 1.
Photoelectric plethysmograph for the nasal septum.
M—mirror.
L—ophthalmoscope light bulb.
C—cap for light.
P—dental impression plate.
P.C.—Photoelectric cell housing.

Preliminary observations indicate the feasibility of using the same arrangement for photoelectric plethysmography of the skin of the nose, employing either transmitted or reflected light.

Fig. 2-A shows the volume pulse of the septum so recorded, contrasted with the finger volume pulse (B) of the same subject. Differences in amplitude are in part due to differences in amplification, intensity of transmitted light, etc. The form of the two waves is not

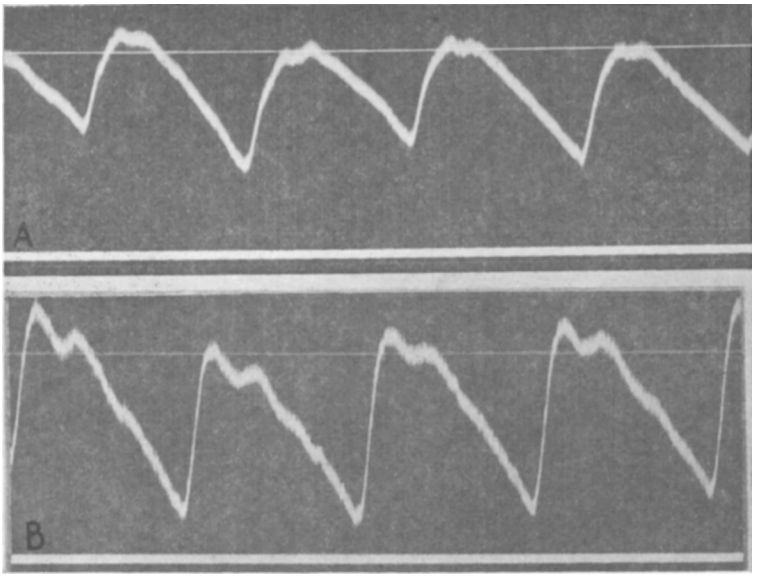

FIG. 2.
Photoelectric plethysmograms.
A—volume pulse of nasal septum.
B—volume pulse of finger—the same subject.

alike; that of the septum is more sustained, more rounded; the dicrotic wave is placed higher and is less pronounced. These differences are regularly encountered in "normal" subjects in this locality although no claim can be made for the "normality" of the septal records so far obtained. It is hoped that the study of wave forms in various circulatory disturbances will provide data for the interpretation of "normal" wave forms.

The apparatus lends itself to prolonged observation on the blood content of the septum although difficulty is experienced due to the movement of the cartilaginous portion of the septum with the passage of air over it. Breathing through the mouth largely obviates this source of error but even an intelligent coöperative subject finds it practically impossible to consistently deviate all the air through the mouth for prolonged periods. Swallowing movements also produce changes in "apparent" blood content. The reporting and interpretation of septal plethysmographic studies is being delayed until these sources of error have been eliminated. They have little significance apparently for the study of wave form. Thus, the septal volume pulse becomes more collapsing in form on the administration of amyl nitrite, suggesting vasodilatation. The opposite change, vasoconstriction, is suggested in the decrease in wave amplitude when the hand is placed in ice-water.