from among the applicants who have the desired professional background and who are deemed to excel in the personal qualities and stamina indicative of success as an Army officer. Selection will be made during the thirteen weeks in which the selectee is getting his basic military training. He will then enter on a period of four or five months of apprenticeship or interneship, assisting classification officers and examiners in the work of interviewing, examining, trade-testing and classifying recruits, filling requisitions, following up the performance of soldiers who seem to need re-classifying or transfer, and the like. Attendance at a central four-weeks school will be provided for during this interneship period, after which the selectees will take the regular three-months course in an officers' training school. If successful here, he will be commissioned in the Officers' Reserve Corps (Adjutant General's Section) and immediately thereafter will have a year of active duty as a personnel technician officer.

It is anticipated that some qualified selectees who are interested in personnel work but who for personal reasons do not wish to commit themselves for a period of two years will nevertheless find their best Army usefulness during a considerable part of their year of selective service training in duties connected with some phase of the Army's personnel program. Some, with superior ability as leaders, will prefer to spend their year in training and duty with combat troops.

In the field of officer classification, studies and recommendations have been made looking toward improvement of the Officers' Efficiency Report. Procedures to be followed in selecting candidates for admission to Officers' Training Schools are also being developed. Several examinations are now in preparation: for Warrant Officers, at the high-school level; and at the college level, for applicants to Officers' Training Schools and for National Guard and Reserve Officers on active duty who want commissions in the Regular Army.

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These are trying days. America may be only arming so that we shall not be attacked during the years ahead; or we may be attacked in the not distant future. In either event, the profession of psychology is shouldering at least a part of its appropriate load. The Committee on Classification of Military Personnel assures the Adjutant General of the Army, Major General E. S. Adams, and the National Research Council of its readiness to carry on.

Respectfully submitted,

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SPECIAL ARTICLES

EFFECT OF LOCAL EDEMA AND INFLAMMATION IN THE SKIN OF THE MOUSE ON THE PROGRESSION OF HERPES VIRUS

HERPES virus, when injected intracutaneously into the abdominal wall[1] or applied by needle puncture to the skin of the tail,[2] induces in the white mouse an ascending myelitis. Hindlimb paralysis is first noted on about the eighth day, followed within 24 to 48 hours by quadriplegia and finally prostration and death. As will be shown in this preliminary report, certain chemicals, introduced into a cutaneous area prior to its exposure to the virus, have an enhancing or retarding effect on the development of this clinical syndrome.

Albino mice, Rockefeller Institute strain, about 30 days old, were used. Four groups of materials were injected subcutaneously into the tails near the base as a preparatory treatment. The materials were: (*a*) hypertonic solutions of inorganic salts (5 per cent. and 10 per cent. NaCl, 10 per cent. NH_4Cl, 14 per cent. NaH_2PO_4, 7 per cent. Na_2SO_4, 16 per cent. KI) or 20 per cent. dextrose; (*b*) isotonic .85 per cent. NaCl, 1.71 per cent. KI, normal rabbit serum or hypotonic distilled water, and (*c*) an irritant, turpentine-ether-olive oil in equal parts. 0.1 cc of one of the substances was injected and at varying intervals thereafter, a superficial skin abrasion was produced at the same site, covering an area of about 7×3 mm. A broth suspension of brain and cord infected with the HF strain of herpes virus was then applied to the entire abraded area and gently rubbed in by means of the shank of the needle.

Table I shows the results obtained in a typical ex-

[1] H. B. Andervont, *Jour. Infect. Dis.*, 44: 383, 1929; *ibid.*, 45: 366, 1929.

[2] F. O. Holmes, personal communication.

TABLE I

Groups of mice	Material injected subcutaneously	HF-virus dilution applied to abraded skin 24 hours later	Number dead Total number injected	Average time between virus application and death
A	NaCl 10 per cent.	10^{-2}	12/12	6.4 days
		10^{-3}	18/18	7.0 "
		10^{-4}	8/12	7.9 "
		10^{-5}	0/6	...
B (control)	NaCl 0.85 per cent.	10^{-2}	12/18	9.4 "
		10^{-3}	1/18	10.0 "
		10^{-4}	0/12	...
C	Turpentine-ether-olive oil, equal parts	10^{-2}	1/6	10.0 "
		10^{-3}	1/6	9.0 "

periment. Group A mice which received the preparatory treatment with hypertonic 10 per cent. NaCl solution, in comparison with Group B mice which were treated first with isotonic NaCl, revealed the enhancing action of the hypertonic solution. This enhancement was demonstrable in two ways: (1) the titre of virus was one hundredfold greater and (2) the average time between virus application and death was about one third less than when isotonic saline solution was used for the preliminary injection. All other mentioned hypertonic solutions had the same effect as 10 per cent. NaCl, while no difference was noted between animals treated with any of the isotonic materials or distilled water and non-treated control mice. Duration and course of the experimenal disease were not affected, once the clinically apparent infection arose. The results were the same when the interval between injection of the solutions and application of virus was shortened to $3\frac{1}{2}$ and 6 hours. No enhancement was seen, however, when virus was given 1 week after or 24 hours before inoculation of the solutions, or when the two were mixed *in vitro* and injected together. Moreover, the enhancing effect was not elicited when first the chemicals, and later the virus also, were inoculated subcutaneously.

The next step was to compare the action of these enhancing substances with that of turpentine, since King[3] found that this material, when injected into the pad of the mouse, had a retarding effect on the progression of pseudorabies virus from that site to the central nervous system. Table I (Group C) shows similar findings obtained with herpes virus applied to abraded skin. King ascribed the inhibiting effect to inflammation caused by the irritant.

This retarding action, then, would be in contrast to the enhancement brought about by hypertonic substances which produce local edema. In studying the characteristics of local edema and inflammation respectively, it was recalled that Hudack and McMaster,[4] and others,[5] have shown that local edema causes a considerable dilation and increased permeability of the minute lymphatics of the skin, thus leading to greatly increased lymphatic flow and absorption from an edematous area. This type of reaction is in contrast to that characterizing acute inflammation, as brought about by turpentine. A number of investigtors[6] have shown that inflammation is associated with a total or partial blockade of lymphatic channels by thrombi or fibrin clots, thus fixing particles within the inflamed area.

A prerequisite for infection of the central nervous system by herpes virus, postulated by Goodpasture and his associates,[7] is that a sufficient number of nerve fibers be exposed to the virus, whence the virus progresses axonally. A hypothesis is therefore offered to explain the described enhancing and retarding effects of certain substances: the virus may be brought to the nerve fibers in the skin by way of the lymph channels. Hence edema which opens these channels and renders their walls abnormally permeable, and increases the rate of flow, may bring the virus in contact with a greater number of nerve fibers in the corium; while in acute inflammation, total or partial blockade of the lymphatics may prevent or diminish such contact.

The results here reported fit in with this hypothesis: When a mixture of hypertonic solutions and virus was inoculated; when the hypertonic solutions were given after the virus was applied; or when the virus was applied after the edema caused by the solutions had subsided, then the enhancing action of the hypertonic solutions was not observed. Moreover, when the virus was introduced subcutaneously instead of cutaneously, again no enhancement was seen—on subcutaneous injection, the virus comes in contact with relatively fewer lymphatic channels and these not opened by trauma, while on cutaneous application the virus encounters a dense net of lymphatics and these opened by trauma.[8] Further work is in progress.

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[3] L. S. King, *Jour. Exp. Med.*, 72: 573, 1940.

[4] S. Hudack and P. D. McMaster, *Jour. Exp. Med.*, 57: 751, 1933.

[5] B. D. Pullinger and H. W. Florey, *Brit. Jour. Exp. Path.*, 16: 49, 1935.

[6] For experiments and literature, see V. Menkin, "Dynamics of Inflammation." New York: Macmillan Company, 1940.

[7] E. W. Goodpasture, *Medicine*, 8: 223, 1929; E. W. Goodpasture and O. Teague, *Jour. Med. Res.*, 44: 121, 1923.

[8] The richness of the lymphatic plexus in the papillary layer of the corium has been stressed (see footnote 4); also the fact that scarification and the slightest penetration beneath the epithelium opens these vessels to the entrance of particulate matter (see footnote 4).