THE INFLUENCE OF SUNLIGHT UPON THE BACTERICIDAL POWER OF HUMAN BLOOD.

BY

LEONARD COLEBROOK, M.B., B.S.LOND.,

ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH
COUNCIL.

(From the Inoculation Department, St. Mary's Hospital, London.)

It has recently been shown (Colebrook, Eidinow, and Hill¹) that when the shaved skin of a rabbit is exposed to sunlight, ultra-violet light, radiant heat, and certain other mildly irritant influences, the animal's blood quickly acquires an enhanced power of killing the ordinary pyogenic cocci—for example, staphylococci and streptococci. Both the serum and the leucocytes were found to contribute to this increased bactericidal effect. Exposure of human skin to ultra-violet light similarly produced an increased killing power of the blood.

An opportunity occurred in February last to determine the effect of exposure to the intense sunlight of the High Alps. By the kindness of Sir Henry Lunn and Dr. Bernard Hudson, to whom thanks are due, I was able to carry out two experiments at Montana, above the Rhone Valley. The first experiment, in which a normal man and a case of arrested phthisis were exposed, nearly naked, to the midday sun for half an hour, gave no result—that is, there was no appreciable change in the killing power of the blood of the subjects when tested by the "slide cell" method² with staphylococcus.

On the second occasion the exposure to sun was for one hour, the subjects being the same normal man as before and another individual who was in poor health, although without any recognized infection. Determination of the bactericidal power of the blood before and after the sun bath showed a definite change in each case, but in opposite directions. The normal man developed a quite exceptionally high power two hours after the sun bath, and the improvement was maintained for several hours. In the other subject, whose bactericidal power was considerably below the normal level before the sun bath, the change was from bad to worse, and after twenty-four hours her blood had not regained its previous level.

There was no decided change in the bactericidal power of the serum in either case, and it may therefore be inferred that the changes in bactericidal activity demonstrated in the whole bloods were referable to changes in the functioning of the leucocytes. This inference receives direct support from a recent experiment which showed that two hours after exposure of a normal individual to a carbon arc lamp the phagocytic efficiency of his leucocytes was increased by 50 per cent.

Several points of practical interest emerge from this experiment. In the first place there is the obvious suggestion that an improvement in the bactericidal efficiency of the blood may be largely responsible for the curative effects obtained in tuberculosis and other infections by heliotherapy.

Similarly it would seem natural to associate the fall of bactericidal efficiency in the second subject's blood with the well attested clinical observation that patients suffering from severe infections—in particular active pulmonary tuberculosis—may be made worse by incautious exposure to sunlight. It is too early to generalize upon the matter, but the facts at present available are: (1) that a number of febrile patients with active phthisis showed a low bactericidal efficiency when the blood was tested by the slide cell method, whereas afebrile cases who were doing well showed a normal or high efficiency; and (2) that following exposure to a carbon arc lamp we have occasionally registered a fall of the bactericidal efficiency of a patient whose blood was already low in this respect before the treatment. We have here, then, the suggestion that leucocytes which are functioning badly are easily harmed by the action of light upon the skin, while those which are functioning well are tolerant

of large doses and respond to them by displaying a still greater activity.

Finally it may be pointed out that we have at our command, in the new methods of blood examination which have yielded these experimental results, a valuable means of guiding and of gauging the effects of treatment.

REFERENCES.

¹ Colebrook, L., Eidinow, A., and Hill, Leonard: The Effect of Radiation on the Bactericidal Power of the Blood, *Brit. Journ. Exper. Path.*, 1924, 5, 51.

² Wright, Sir A. E., Colebrook, L., and Storer, E. J.: *Lancet*, 1923, i, 365, 417, 473.

POST-ANAESTHETIC VOMITING: AN ATTEMPT AT PREVENTION.

BY

E. H. P. CAVE, M.R.C.S., L.R.C.P.,
HOUSE ANAESTHETIST,

AND

HAROLD C. EDWARDS, M.B., B.S.LOND.,
ASSISTANT HOUSE ANAESTHETIST, KING'S COLLEGE HOSPITAL.

MANY methods have been adopted to check the nausea and vomiting which so frequently follow upon operations under general anaesthesia. The accompanying table shows some results obtained by an attempt to eliminate the late effect of the anaesthetic by the administration of some pleasantly flavoured substance during the final stages of the operation.

The substances used were the oils of cloves, peppermint, and lavender, all of which have a high molecular weight and therefore are absorbed but little. Acetic acid was also tried in some cases after ether, the interaction of the two producing the sweet smelling ethyl acetate—

The methods of administration were either inhalation through an open mask, or swabbing out the mouth with a few drops on a sponge.

For purposes of classification, every case in which the amount of vomit exceeded 10 oz. has been termed "severe." Nausea, being a subjective phenomenon, is obviously not measurable, but a fairly accurate estimate of its degree is generally possible by noting whether or not the patient enjoys his food.

No claims are made in favour of the method. Indeed, the table at first sight appears to be a confession of failure. The cases of severe nausea and vomiting seem to be reduced when acetic acid and oil of cloves were used, but the number of cases is too small to draw any very definite conclusions.

In a separate part of the table is shown a comparison of results obtained by induction with ethyl chloride, with other methods. It will be seen that the results compare favourably with those of the other anaesthetics.

We publish the table in the belief that negative results have their own value, and in the hope of stimulating others to similar experiments.

	No. of Cases.	Percentage Results.		
		Vomiting and Nausea Severe.	Vomiting and Nausea Slight.	Vomiting and Nausea Nil.
Acetic acid	21	4.8	52.2	43.0
Oil of cloves	61	5.0	50.8	44.2
Oil of peppermint	8	12.5	75.0	12.5
Oil of lavender	10	20.0	60.0	20.0
No flavouring agent	100	9.0	46.0	45.0
Ethyl chloride induction	128	7.9	46.8	45.3
Induction by other methods	72	6.9	54.1	39.0