tion does not occur, or when blood shows a tendency to dilution, we may postulate variations of balance between blood flow and the increased pressure in the vessels.

47 (2570)

Cinematography of skin capillaries in the living human subject.

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Lombard[1] in 1911 showed that by illuminating the skin, the capillaries could be seen under the microscope. Many observations have since been carried out on the changes which take place in various diseased conditions. The possibility of studying alterations in the capillaries by means of cinematography first suggested itself to Krogh and Rehberg.[2] They developed a method of taking pictures of the circulation in the capillaries in the tissues of *Rana temporaria.* It is naturally simpler to obtain records from the tissues of frogs than from human tissues since for this purpose a technique resembling that used in histological photomicrography suffices. In the human case transmitted light cannot be used. The method of illumination from above has therefore been universally adopted. This method is difficult because, by it, contrast and intensity of light are much reduced as compared to these qualities obtained by transmitted light. Weiss,[3] in 1916, devised an apparatus for photographing human capillaries, and published photographs obtained by his method in various diseased conditions. He used indirect illumination and required an exposure of one-quarter to three-quarters of a second to obtain pictures. Siedentopf (Zeiss) likewise has devised an apparatus for the instantaneous photography of skin capillaries under normal

[1] Lombard, *Am. J. Physiol.*, 1911-12, xxix, 335.

[2] Krogh and Rehberg, *Am. J. Physiol.*, 1924, lxviii, 153.

[3] Weiss, E., *Deutsch. Arch. f. klin. Med.*, 1916, cxix, 1.

conditions. In this apparatus also indirect illumination is used. Sheard[4] has reported the fact that he has been able to make photographs in rapid succession, but not cinematographic, of skin capillaries in the living human body.

During the past year experiments have been continuously in progress in the Hospital of the Rockefeller Institute having as their object the photography, and more especially the cinematography, of human capillaries. In July, 1924, the first cinematographic records were made by us. At first we also used indirect illumination and by this means obtained photographs. These, we thought, were not sufficiently satisfactory for our purpose. Since then we have improved our apparatus and can now obtain fairly satisfactory cinematographic pictures.

Our apparatus in its present form consists of four parts: (1) a lighting system, (2) the microscope, (3) a stand for holding and adjusting the finger, and (4) the camera.

(1) As our source of illumination we use a 15 ampere direct current arc lamp with special carbons. The light from this passes through a series of heat and light filters, and also through a powerful condensing system, so that the cool light is focussed on a small point. We have introduced a new feature in capillary microscopy, namely, direct illumination. The point of light enters the system for direct illumination and also passes through a polarizer. The latter has been introduced to prevent the reflection of light from the surface of the oil on the finger, which takes place with direct illumination and prevents the capillaries from being seen. With this illumination we have been able to obtain detail in our pictures to a degree which was impossible with the indirect method.

(2) In the microscopic system we use a 16 mm. apochromatic objective with a 5x (Leitz) eye piece. This combination, which gives a magnification of fifty, has so far proved the most satisfactory arrangement. The tube of the microscope is kept fixed and all focussing, except fine adjustment, is managed by moving the stage of the microscope. The tube of the microscope fits accurately into the camera.

(3) The stand for the finger has been constructed so that it is part of the stage of the microscope. The patient's finger is placed in a holder and fixed—without in any way interfering with

[4] Sheard, *Science*, 1924, lx, 409.

the circulation of the finger—so as to avoid independent movement. By means of certain adjustments on the stand, the finger can be moved to any desired position.

(4) The camera was devised for us especially for this purpose. The film is driven by a motor, and the number of exposures a second is indicated by a special speedometer recorded on the film.

With the apparatus in its present form satisfactory cinematographic photographs can, as has been said, be taken. A film taken by our method which showed the corpuscles in motion was demonstrated to the meeting. The detailed description will be published later.

48 (2571)

Twelve per cent dextrose media for prolonged anerobe growth.

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The following easily prepared media permits the vigorous growth of several strains of a typical anerobe, the bacillus of symptomatic anthrax (*B. gangraenae emphysematosae,* or *B. chauvei*) for 30 or more days.

Composition of media:

water	7000 cc.
liver, hog	2500 gm.
peptone	80 gm.
Ringer salt	40 gm.
chalk	350 gm.
dextrose	1000 gm.

The above quantities are for one 12 liter flask. It is essential that the liver be not more than 24 hours old, and should be obtained at the abbatoir. The media is sterilized by placing the flasks or jars in the autoclave, bringing the steam pressure up to 15 lbs., and maintaining it at 15 lbs. for 45 minutes. The media is not injured by this severe heat treatment. Several lots