electric current. By the use of vacuum tubes this pulsating current is so amplified that each pulsation causes a flash of a light. These flashes are recorded on the moving photographic film simultaneously with the electric cardiogram. It is not difficult to use two microphones and two lamps and record their flashes along with the electrocardiogram on the ordinary 6 cm. photographic ribbon. By the aid of the usual time marker, it is easy to determine the time interval between the contraction of the ventricle and the arrival of the pulse wave at either microphone.

It is believed that this instrument will make it possible to study accurately a large number of cases under varying conditions. It seems most likely that these lamps will be found useful as recorders in many types of cardiovascular instruments other than that just described.

A complete description of the apparatus and method, with evidence as to its limitations and possible usefulness, will be published shortly. This is a preliminary report.

[1] Bramwell, J. C., *Quarterly J. of Med.*, 1924, xvii, 225.

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Studies on Immunity to Measles.

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In 1925, Tunnicliff,[1] working with the diplococcus she had isolated from cases of measles, found that almost invariably a skin reaction was produced in persons who had not had measles, whereas in individuals who had had the disease, 96 per cent gave no reaction. Her antigen was a culture of organisms grown anaerobically in 1 per cent dextrose broth to which was added ascitic fluid, killed with 0.5 per cent phenol. Ferry and Fisher,[2] with an organism probably the same as Tunnicliff's, tested 35 individuals with negative measles history, and found 14 gave positive skin reactions. Thirty children who had had measles gave a negative reaction.

In the present studies, the 24-hour bouillon culture filtrate for organisms isolated by blood culture and prepared by Duval was used. Two-tenths of a cubic centimeter of a dilution of 1 to 10 was injected intracutaneously with the following results. In a home for

children, with 18 children without record of having had measles, 17 gave positive reaction varying in size from 1 by 1.5 cm. to 2.5 by 5 cm. One child was negative, and on going over this child's record it was found that he had had measles. One child with a 3 by 2 reaction developed measles the day following the reading made 18 hours after the injection. Eight students with a history of measles were tested, and two gave a faint questionable reaction. One was subsequently retested with a dilution of 1 to 2 and gave a strongly positive reaction. Thirteen small children in the Charity Hospital were tested and 8 gave a positive and 5 a negative reaction. Three of the patients with a positive reaction subsequently developed measles. One of the children with a negative reaction was kept for 3 weeks in the measles ward without developing the disease. Fifteen convalescent measles cases gave a negative reaction. One child, just as rash was appearing, gave a positive reaction which two days later was negative; another a slight, faint erythmia 2 x 3 cm.

Summary. The toxic filtrate of a bouillon culture of organisms isolated by blood culture when injected intradermally into susceptible individuals causes a transient erythmia, whereas in persons who have had measles, the skin reaction is negative: Confirmatory proof that there is a specific, now isolated, organism of measles which produces a toxin that may be used as an index of immunity to the disease.

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[1] Tunnicliffe, R., *J. Inf. Dis.*, 1925, xxxviii, 193.

[2] Ferry, N. S., and Fisher, L. W., *J. Am. Med. Assn.*, 1926, lxxxvi, 932.

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Further Studies Upon the Etiology of Measles.

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In a previous communication[1] we reported having obtained in pure culture a hemophilic diplococcus from the unfiltered blood of human measles, which apparently was identical to the coccus isolated by Tunnicliff[2] and similar in some respects to the coccus described later by Coronia.[3] These workers regard their respective isolation as the active exciting agent in measles. In our earlier report we reserved opinion regarding the possible causal relation that the coccus