voltage in the bridge. After suitable amplification, the imbalance voltage activates a direct writing instrument, such as the GE Photoelectric Recorder or an ink-writer of the type used in electroencephalography.

The block diagram of Fig. 1 shows the general

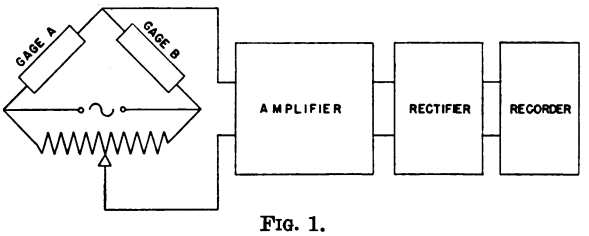


FIG. 1.

arrangement of the apparatus. The amplifier used in our present recorder is specially designed for extremely high sensitivity, low noise and low drift. These design features make the recorder useful in measuring and recording phenomena which are to be observed over a period of many hours.

A sample of direct ink records made with this recorder and the GE Photoelectric Recorder is shown in Fig. 2. The record represents the finger pulse

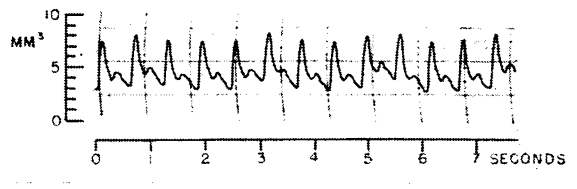


FIG. 2.

volume of the first phalanx of a human finger.

Simple modifications of the equipment make possible electrical recording of blood pressure, arterial pulse, muscle movements and other physiological variables. The sensitivity and stability of the amplifier have also proved useful in engineering applications of the strain gage.

The strain gage recorder was developed by the authors while they were senior physiologist, associate electrical engineer and senior pharmacologist, respectively, at the Climatic Research Unit, Fort Monmouth Signal Laboratory. It has been employed for about six months in the investigations of that Unit.

A full description of the strain gage recorder and of its various physiological applications will be published in an engineering memorandum of the Climatic Research Unit.

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## A MODIFIED TECHNIQUE FOR READING THE RAPID SLIDE AGGLUTINATION OF LEPTOSPIRA

CONSIDERABLE difficulty has been experienced by the author in reading weak (1+ or 2+) reactions in the macroscopic agglutination test for Leptospirosis.[1] The antigen often forms an amorphous precipitate that seriously interferes with the accurate reading of these weak reactions.

In an effort to alleviate this difficulty it was decided to check each dilution with a modified dark-field technique similar to that used in the test-tube agglutination method for Leptospirosis.

The ordinary Abbe condenser is used in combination with a metallic dark-field stop placed in the slot provided beneath the Abbe condenser. Any light source may be utilized. A small drop of each dilution of the test is placed on a slide and examined, without a coverglass, under the low power objective. The condenser is then adjusted so that the organisms appear brilliant in the dark field.

This method clearly demonstrates the slightest clumping or agglutination. A strong positive reaction shows large definite clumps of organisms with a clear background. A weak positive reaction shows smaller clumps of organisms with a few individual organisms in the field. A negative reaction shows a homogeneous field of individual organisms. In all cases artifacts or precipitates appear as distinct brightly illuminated particles easily distinguishable from clumps of organisms.

In order to become familiar with the appearance of these reactions, it is advisable to make dilutions of known positive and negative sera and examine them in this manner.

HENRI P. MINETTE
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[1] Using Leptospira Diagnostic Antigen marketed by Lederle Laboratories, Inc., 30 Rockefeller Plaza, New York, N. Y.

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