Electroretinography nowadays has achieved a firm position in a number of Soviet and foreign clinics, particularly in making it possible to establish a diagnosis for tapetoretinal degeneration even in those cases where the changes in the optic fundus are insignificant or absent. The information from electroretinography combined with information from other electrophysiological examinations (electrical sensitivity of the eye, lability, and electroencephalograms) is of great diagnostic value for turbid optic media. These examinations often make it possible to form an opinion about the condition of the optic fundus in those cases where the ordinary tests, the measurement of light projection, give no definite results. Meanwhile, domestic industry has not produced any standard equipment for clinical retinography.

We have taken up the problem of developing a standard technique for electroretinography which would be simple and available for the eye clinics of medical institutes and polyclinical institutions.

At the present time the type ĖKPSCh-3 two-channel electrocardiograph is used extensively in practical clinical electrocardiography. This instrument can be employed to advantage for clinical electroretinography.

It should be noted, however, that the sensitivity of the instrument is inadequate for electroretinography. This is quite evident when there are pathological changes in the visual analyzer which bring about a change in the amplitude of the retinogram waves.

The sensitivity of a standard two-channel electrocardiograph can be increased in two ways: 1) by replacing the type 6P1P tube in the output stages with type 6P14P tubes which have a greater mutual conductance; 2) by employing a portable preamplifier connected between the examinee and the electrocardiograph input.

The second way is more convenient because the technical characteristics of the cardiograph can be left unaltered. A functional diagram of the apparatus for this method will look like that shown in Fig. 1. The amplifying attachment has been built around P13B type transistors which have a comparatively low internal noise level. The circuit of the auxiliary amplifier must necessarily be push-pull.

In order to eliminate the effect of the dc potential difference that develops in the output system, it is necessary to insert isolation capacitors in the amplifier input. The preamplifier circuit is shown in Fig. 2. A calibrating arrangement is incorporated in the amplifier.

The branches of the push-pull amplifier are made of compound transistors. The input resistance of a stage with such a transistor arrangement was found to be around 300 kΩ, and the time constant around 6 sec.

Fig. 1. Functional diagram of the apparatus.
Fig. 2. Circuit of the transistorized preamplifier. Legends given in the text.

Fig. 3. Helmet-switching unit for clinical electroretinography with the electrodes for the ERG leads (I and II), the photocell (III), and the distribution block (IV).

The variable resistors $R_1$, $R_3$, and $R_7$ in the base circuits of transistors $T_1$ and $T_2$, and resistor $R_4$ in the emitter circuits of $T_3$ and $T_4$ are used only for adjusting (preliminary alignment) the instrument.

The output voltage magnitude can be varied by means of resistor $R_6$. The gain of the amplifying attachment is approximately 30.

We suggest a standard filmoscope for demonstrating diafilms and equipped with a standard photographic shutter as a light stimulant.

In order to record the light stimulation a selenium photocell was employed which was connected to one of the electrocardiograph's amplifier channels. In making an ERG recording the contacts 1 of the chest leads for electrocardiograms, C and F (green and blue) are employed.

The corneal electrode used for recording electroretinograms is a silver wire mounted in a standard contact lens 22 mm in diameter of which the corneal portion is 11 mm in diameter; these electrodes are fabricated in the contact lens laboratory of the Helmholtz Institute. The electrode must be sealed into the corneal portion of the unit that provides, according to Sandmark data, the highest ERG amplitude. The