

Application of the Transducer Tube to the Recording of the Peripheral Pulse.

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The observation and recording of the form of the venous, radial or other peripheral pulses in man has some value in teaching the dynamics of the circulation as well as in aiding clinical diagnosis.¹ Conventionally the pulsation is picked up by a cup-like device pressed over the area involved. The impulses are transmitted by rubber tubing to a tambour or segment capsule for recording.

This paper presents the application of the Transducer Tube (RCA Developmental Tube No. C 798 B) to this problem. In this tube the plate is connected to a peg extending

through a flexible diaphragm to the outside so that micromovements of the peg will produce changes in the plate current. A light weight button and lever are attached to the peg. The button is touched to the pulsating area and its movements are transformed to current changes, amplified and recorded by an ink writing crystograph (Fig. 1) or by a galvanometer recording on photographic paper. The natural frequency of the moving part is remarkably high and with careful mechanical design and a light weight button it can be as high as 100 cycles per second, a value which

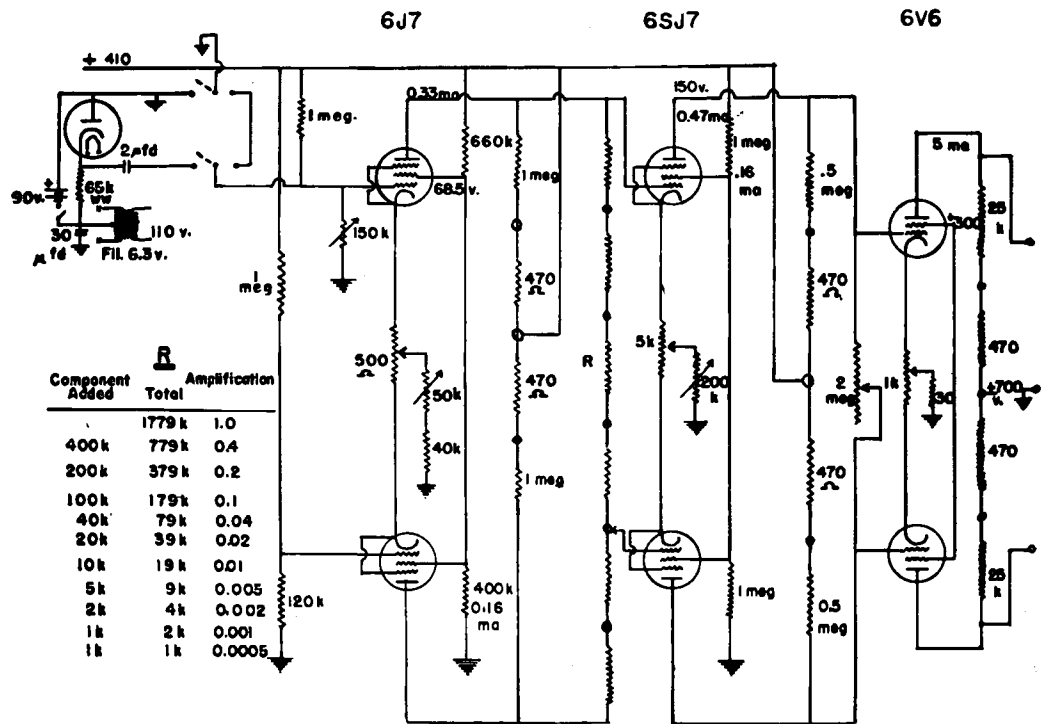


Fig. 1.

The transducer circuit with its amplifier of successive push-pull stages of 6J7, 6SJ7, and 6V6 to the direct writer is shown.

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¹ Wiggers, C. J., Physiology in Health and Disease.

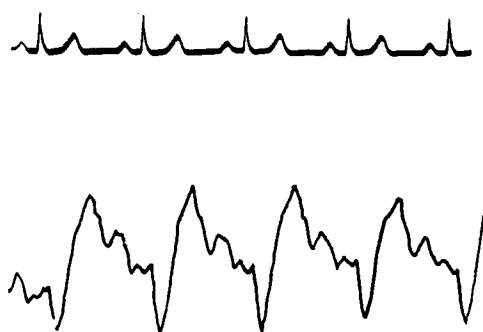


Fig. 2.

Illustrates the simultaneous record of the jugular pulse and the electrocardiogram.

compares favorably with the best devices in the literature. In Fig. 2 is shown a record of the venous pulse with a simultaneous recording of the electrocardiogram.

In presenting this application of the transducer tube it is desired to point out that this is only one of its many possible uses and that

it should have rather wide usefulness in biology and medicine. The tube itself is about the size of the end of a pencil and can thus be used in small places if necessary. Furthermore, since the plate current in the transducer tube depends upon the displacement of the plate it is possible with a slight change in the circuit of Fig. 1 to measure displacements rather than changes in displacement. The sensitivity is high, and it has been our experience that it is easier to obtain a given sensitivity with a transducer than with a resistance wire strain gage.

Summary. This paper presents the application of the transducer tube to the detection and recording of movements of the type associated with the peripheral venous pulses. An adequate amplifier circuit is given and the usefulness of the device in other applications is suggested.

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The Fate of C¹⁴-Labeled Palmitic Acid Administered Intravenously as a Tripalmitin Emulsion.*†

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The need for providing sufficient calories in small volumes for parenteral feeding has focussed attention upon methods for the intravenous administration of fat in a highly emulsified form. Now that several investigators have shown that the intravenous administration of fat can be achieved with some degree of safety,¹⁻³ it has become of im-

portance to determine whether fat so administered pursues a normal metabolic path. Several attempts have been made to study the utilization of parenterally administered fats but the results obtained until recently were not conclusive. Thus Dunham and Brunschwig⁴ failed to observe protein-sparing effects in 9 of 11 dogs when a highly emulsified fat was injected intravenously for periods as long as one month. Their emulsions, however, were quite toxic. McKibbin *et al.*,¹ on the other hand, have concluded that intravenously administered emulsions of fat are

* Aided by grants from the American Cancer Society (recommended by the Committee on Growth), and the Cutter Laboratories, Berkeley.

† A preliminary report of the results of the present investigation has appeared in *Science*.

¹ McKibbin, J. M., Pope, A., Thayer, S., Ferry, R. M., Jr., and Stare, F. J., *J. Lab. Clin. Med.*, 1945, **30**, 488.

² Meng, H. C., and Freeman, S., *J. Lab. Clin. Med.*, 1948, **33**, 689.

³ Shafiroff, B. G. P., Baron, H., and Roth, E., *Proc. Soc. Exp. Biol. and Med.*, 1948, **69**, 387.

⁴ Dunham, L. J., and Brunschwig, A., *Arch. Surg.*, 1944, **48**, 395.