benzyl effect with the vasodilator action of the nitrites and the author decided to study the pharmacology of *benzyl nitrite* in this connection. Benzyl nitrite is a definite chemical compound described by a number of chemists. It is a yellow liquid, boiling at 115½° to 116° C. at 35 millimeters pressure. The drug is slightly soluble in water, but freely soluble in alcohol. While pure benzyl nitrite rapidly decomposes on exposure to the air, alcoholic solutions of the same keep fairly well. Laboratory experiments with benzyl nitrite revealed the typical benzyl effects on smooth muscle organs both in vitro and in vivo. The effect on blood pressure showed a rapid fall, but unlike the case of sodium nitrite and nitroglycerin the vaso dilatation was of much longer duration. The toxicity of benzyl nitrite is not very great, but on intravenous injection the nitrite effect on the blood is manifested after large doses (100 millimeters per kilo weight of dog or cat). An alcoholic solution of the drug has been administered to a number of patients by mouth for the relief of excessive hypertension. The results so far obtained have been very satisfactory but the investigation has not yet been completed and further work on the subject is in progress.

88 (1670)

New method for graphic study of heart murmurs.

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Methods hitherto in use have proved unsatisfactory for recording murmurs, except such as are loud and low-pitched or of a sustained musical character and not very high-pitched. Einthoven's method, in which a carbon microphone is used, gives murmur records which are often more complicated than the sounds themselves, a circumstance which appears to be due to lack of damping in the moving parts of the microphone, especially of the carbon particles. In most microphones the diaphragms have a natural period too low for best results, but the undamped motion of the carbon particles is the most serious drawback. The

methods not involving use of a microphone all suffer from a common defect. They are insensitive if the instruments are made of high natural period and if made sensitive they give records so distorted as to be almost valueless except for time-relation studies of the first and second sounds and of very intense murmurs.

To overcome these difficulties an electromagnetic telephone has been used to convert the sound oscillations into electrical oscillations. This telephone is provided with an air-damped diaphragm of high natural period. A shallow ring fastened to the telephone cap serves as "mouthpiece" and has a small lateral opening to maintain atmospheric pressure within it except for the sudden variations due to sound. This device is applied directly to the chest wall and the air column confined between the diaphragm and the chest wall is very short and has a high natural period.

The currents produced by the telephone are amplified by a four-stage amplifier used in such a manner as to give practically distortionless amplification. It is necessary to protect the vacuum tubes against extraneous sound and mechanical vibration. It is also necessary to shield all parts of the circuit against electrostatic disturbances and to keep the amplifiers away from sources of magnetic disturbance or else shield against them also.

The recording instrument is a string galvanometer. The preliminary work has been done with the natural period of the galvanometer approximately .002 second. This is too slow for best results and an instrument of higher period will be substituted in future work. Between the galvanometer and amplifier a condenser is placed in series, its capacity being so chosen relative to the other parts of the circuit that the comparatively low-pitched first and second sounds are partially suppressed in the electrical record while pulsations due to the higher pitched murmurs are transmitted undiminished. It is thus possible to produce the necessary amplification of the murmur record without the enormous excursions of the galvanometer which the first and second sounds would otherwise produce. A further advantage of this selective sound filter is that the appearance of the record corresponds more closely with the impression which the sounds make on the ear.

The general character of the first, second and third heart sounds

as rendered by this method *without* the selective filter is in close correspondence with the curves recorded by the method of Einthoven. The murmurs are rendered better than by the microphone and the disturbances due to undamped motion of diaphragm and carbon particles being absent, the murmur records look less complicated.

A more detailed description with constants of the instruments and a discussion of results will be communicated after measurements with a galvanometer of higher natural period have been carried out.

89 (1671)

Concerning toxic byproducts of bacillus botulinus.

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Attempting to shorten the incubation period of botulinus toxin by injecting gradually increasing amounts of toxin into mice, one of us (Orr) has observed early that when the amount of culture filtrate injected reach 0.5 c.c. animals frequently died within a few minutes after injection. Further study of the nature of this intoxication has brought out that when *B. botulinus* is grown on suitable medium there are produced, in addition to the specific toxin, other poisonous products. If such a culture is filtered through a Berkfeld candle and the filtrate treated with alcohol these secondary toxic products remain in solution. The alcoholic extract equivalent to 0.5 c.c. of the original filtrate is fatal when injected intraperitoneally into mice of 17–22 grams.

The first symptoms are noted immediately after injection and consist of restlessness and marked contraction of the abdominal muscles. Within a minute or two the animal shows increased response to external stimuli especially to sharp sound. Shortly the animal becomes prostrated. The increased excitability persists a few minutes longer, the respiration increases in depth and decreases in frequency, and may become as infrequent as 5 inspirations a minute. The animal goes into coma interrupted