reduced by the arrangement of the observing post at the ends of two almost parallel troughs. The reaction of a fish to currents of water has also been considered in furnishing it control and experimental flows close together.

5. Habit formation has been studied by changing the control to the experimental trough after a series of trials with any of the substances.

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Pharmacological examination of cinnamein, benzyl succinate and benzyl nitrite.

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The discovery of the interesting pharmacological properties of benzyl benzoate and benzyl acetate first announced by the author in these Proceedings and the widespread therapeutic use of benzyl benzoate which immediately followed it, has naturally stimulated various observers to search for other benzyl compounds which might be available for clinical work. A number of such compounds have been since described, but none of these to the author's knowledge possessed together the two characteristics of benzyl benzoate, namely simplicity of chemical structure and efficiency of pharmacological action. The present author has also examined a number of benzyl preparations and found a majority of these unimportant in comparison with the original drug. In the present communication, however, it is proposed to describe briefly three benzyl preparations which have more than scientific interest in as much as at least two of these may be suitable for therapeutic application in special cases.

Benzyl benzoate is a synthetic compound, but is also found in nature and it has been suggested that for the production of the benzyl effect *Cinnamein* might be used. Cinnamein is a mixture of esters, alcohols and other substances obtained from the balsams of Peru and Tolu. Among these are benzyl benzoate and *benzyl cinnamate*. Cinnamein is a drug possessing a pleasant aromatic odor and bitterish taste and is anesthetic to the tongue and lips.

Pharmacological experiments with it showed distinct benzyl effects on smooth muscle organs. The toxicity of the preparation was, however, found to be greater than that of benzyl benzoate, for rats, guinea pigs and cats, the ratio of toxicity between cinnamein and benzyl benzoate being three to two. This drug was administered therapeutically to a number of cases. It produced very much the same effects as benzyl benzoate, but was found to be very much more irritant to the stomach and therefore its use was discontinued.

While benzyl benzoate is not disagreeable to the taste of most people, there are individuals who are nauseated by some of the preparations on the market. For the treatment of such cases attempts have been made to synthesize solid benzyl compounds. A number of these have been examined by the author and with one exception, *benzyl succinate*, were found to be inert. This is a beautiful crystalline powder, soluble in alcohol, ether and chloroform and practically insoluble in water. It melts at 49°–50° C. This drug is soluble also in olive oil. Experiments with benzyl succinate have shown that it produces typical benzyl effects on smooth muscle when ingested by mouth and when applied to isolated tissues, but to a much lesser extent. This compound seems to break up much more slowly than the benzoate when taken into the body and as a consequence its action is much milder than that of benzyl benzoate. The toxicity of this compound for rats and cats was found to be practically the same as that of benzyl benzoate. A number of clinical tests were made with the drug. It was found to be much less effective than benzyl benzoate in cases of spasmodic dysmenorrhea and still less so in cases of bronchial spasm and angiospasm. The best therapeutic results with this compound were obtained in gastro-intestinal cases. Here a milder action than that of benzyl benzoate was produced but the effects were possibly of longer duration owing to the slow breaking up of the drug.

One of the indications for the therapeutic use of benzyl benzoate originally described by the author was of angiospasm or vascular hypertension. While benzyl benzoate was found to be effective in many such cases, other patients failed to react to the drug. It was deemed desirable to combine the anti-spasmodic

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.

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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