In searching for the naturally occurring anthelmintic agents, the choice of pomegranate, *Punica granatum*, was made on account of its reputed value in this respect (WIBAUT & HOLLSTEEN, 1957). The active anthelmintic matter reputed from the plant grown in several Mediterranean and Far East countries are the pelletierine alkaloids. From the very beginning it was realised, in this present work, that *Punica granatum* grown in Egypt (Giza) is either devoid of the taenicide pelletierine alkaloids or may contain them in insignificant quantities. This finding correlates with the well known fact that the active constituents of plants depend quantitatively and qualitatively on the different environmental conditions. It is very interesting to find, from biological testing, that the total extracts of the different parts of the plant inhibited and in large doses stop the motility of taenia, in vitro, an effect which resembles that of pelletierine, though the plant has been proved to be devoid of the pelletierine alkaloids. This observation suggested to proceed to look for other constituents in the various parts of the plant and to examine their pharmacological properties.

**EXPERIMENTAL**

β-Sitosterol was isolated from the unsaponifiable fractions derived from the leaves, seeds and stem and root bark of the *Punica granatum* plant. The acetate, benzoate and 3,5-dinitrobenzoate derivatives were prepared from β-sitosterol. Friedelin was isolated from the unsaponifiable fractions obtained from the fatty matter of the stem and root bark. From friedelin the oxime, oxime acetate and 2,4-dinitrophenylhydrazone derivatives were prepared. D-mannitol was found in abundant quantities in the stem bark and in lesser amounts in the root bark and in the alcoholic extracts of the defatted leaves and seeds. The usual identificatory derivatives were prepared from D-mannitol along with 1,6-dibenzoyl derivative. The novel 1,6-
dibenzoyl-2,3,4,5-tetra-p-nitrobenzoyl derivative and the condensation product of 1,6-dibenzoyl D-mannitol with vanillin were also prepared. Ursolic and betulic acids were identified in the triterpenic mixture obtained by ether extraction of the defatted leaves and ursolic acid alone was detected in the same extract derived from the fruit peels.

Results

Biological testing of the various extracts of the different parts of the plant revealed their hypotensive (Fig. 1), antispasmodic (Fig. 2) and anthelmintic (Fig. 3) effects. This may explain the reputed taenicial action of pomegranate growing in Egypt. Pharmacological examination of mannitol was deemed of interest in view of its abundance in the plant (1.9 % in stem bark, 0.87 % in root bark, 1 % in the leaves and 0.5 in the seeds). The test was performed to determine the action on the uterus, intestine, blood pressure and respiration. Mannitol inhibited the uterine activity and relaxed the

![Fig. 1. The effect of 1 ml of a 20 % alcoholic extract of the root bark on the blood pressure and respiration of an anaesthetised dog.](image-url)