

oil, is present in small amounts, is readily soluble in petroleum ether and does not require long contact with the solvent nor frequent changes of fresh solvent. It was found, therefore, that much larger quantities of roses could be handled in a given time by extracting these in five-gallon milk cans by maceration with several subsequent washings and using the apparatus for concentrating the extract. It is expected, however, that it will prove most useful in the usual way in the extraction of botanical drugs, oil seeds, oleoresins, etc., where continuous percolation with fresh solvent is desired.

AMMI VISNAGA.*

BY F. A. UPSHER SMITH, PH.C. (GT. BRIT.).

A PRELIMINARY REPORT.

The fruits of *Ammi visnaga* have been used in Egypt to relieve spasms of the ureter and for the removal of calculi. The author visited Cairo for the purpose of investigating this drug, and now submits a preliminary report with a complete bibliography showing what is known to date as to the pharmacognosy, pharmacology, therapy, pharmacy and chemistry of the drug, which is commonly known as *Khella*.

Most of the information that I have so far gathered is due to Dr. Karam Samaan, professor in the Department of Pharmacology in the University of Cairo. During the three weeks that I spent in Cairo, in the Spring of 1931, I had many interviews with Dr. Samaan, and he discussed with me what was then known as to the chemistry and pharmacology of *Khella*. As his results have been recorded in the literature there is no need for me to more than summarize them.

PHARMACOLOGY.

Khella appears to relax all smooth muscle, including that of the ureter. This explains the value claimed for the drug in allowing the passage of stone through the ureter.

The experiments leading to this conclusion were performed with a 10% tincture of the fruits of *Ammi visnaga* and 70% alcohol. The animals used included the pig, bull, cow, camel, sheep and dog. The relaxation of the ureter was greater in the case of the cow and bull, and poorest in the dog and camel. The drug lowers the tonicity of the ureter. Clinically, it relieves spasm of the ureter. The low toxicity of the drug suggests its usefulness in ureteral calculi and spasm of the ureter. *Khella* was found to possess a fairly strong diuretic action.

PHARMACOGNOSY.

I had the pleasure of meeting Dr. Ibrahim Ragab Fahmy, professor of Pharmacognosy in the University of Cairo. We made excursions into the Valley of the Nile, and he showed me *Khella* in its wild state, as well as another plant which was liable to be used in mistake for *Khella*, viz., *Ammi majus*.

Dr. Ragab Fahmy has contributed to the "Report of the Pharmaceutical Society of Egypt," Vol. III, 1931, illustrated descriptions not only of *Khella*, but

* Scientific Section, A. PH. A., Toronto meeting, 1932.

also of *Ammi majus*. He states that Khella has been used as a medicine by the general public in Egypt under the name of *Bisr-El-Khelle*, and has established a reputation as a diuretic, in renal colic, and in promoting the passage of small kidney stones through the ureter. In the neighborhood of Kalioub, a few miles from Cairo, he showed me large patches of Khella, as well as of *Ammi majus*. The latter species is known as *Khelle Sheytaniya*. Its fruits so closely resemble those of *Ammi visnaga* that substitution or admixture of the two fruits could be distinguished only with difficulty.

In the Report referred to, Dr. Fahmy thoroughly discusses the anatomical differences between *A. visnaga* and *A. majus*.

CHEMISTRY.

The earliest reference to the chemistry of Khella is that of Ibrahim Mostapha who isolated a crystalline substance with glucosidal properties. Later Malosse



Fig. 1.—Field of *Ammi visnaga*, Foxglove Farm, August 1931.

continued these researches and named the crystalline principles: *Alpha-, beta- and gamma- Visnagin*.

More recently Dr. Samaan has published two papers on the chemistry of Khella. He finds that the genuine fruit contains six crystalline principles: Visammin 0.31 per cent, visammidin 0.02 per cent, visnagin 0.02 per cent, visnagidin 0.06 per cent, khellinin 0.38 per cent, khellidin 0.03 per cent, also a liquid oily principle, visnagan 2.15 per cent, and fixed oil 19.4 per cent were isolated. Of these he selects visammin as the important one. It is isolated by concentrating and cooling an ethereal solution of the fruits, yielding a white residue, which by fractional crystallization from water yields separately visammin, visammidin, visnagin and visnagidin.

Visammin, $C_{14}H_{12}O_6$, m. p. $153^{\circ} C$. has the m. l. d. 105 mg. per Kg. of toad, intralymphatically in three hours. In a concentration of 1:20,000 visammin

increases the height of contraction of the voluntary muscle of the toad. It relaxes all the smooth muscle investigated by direct action on the muscle fibres—toad's blood vessels, mesenteric vein of sheep, rabbit's intestine, guinea-pig and rabbit's uteri, bronchial muscle of the pig and of the dog, and the ureters of the pig, bull, cow and man. The drug lowers the tonicity of the ureter and, if not too concentrated, does not arrest the peristaltic contractions, while the period of relaxation is prolonged.

The drug possesses a mild diuretic effect.

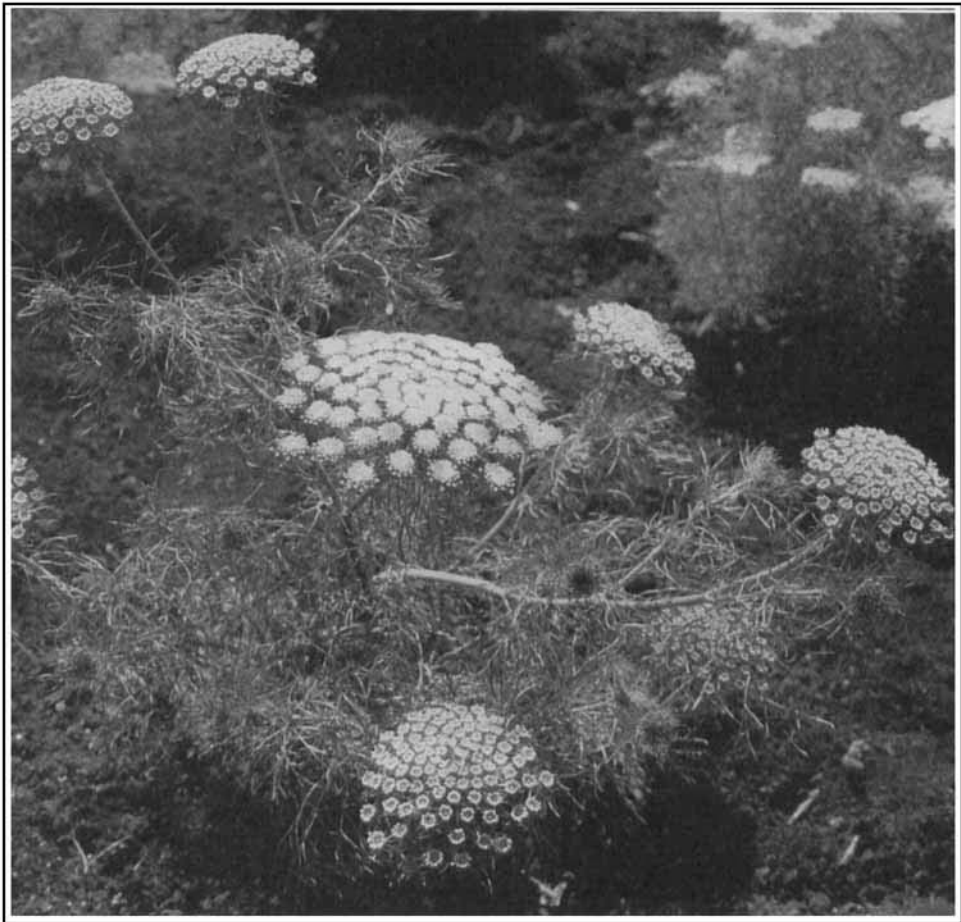


Fig. 2.—A Foxglove Farm Close-up, typical of *Ammi visnaga*.

Visammin is non-irritant and does not hemolyze the red blood corpuscles of the rabbit.

CLINICAL NOTES.

I was fortunate in meeting the dean of the Medical School of the University of Egypt, Dr. Aly Pasha Ibrahim, who has used Khella for over twenty-five years in his practice, first at Assiout and later in Cairo. He said that he could safely say that he had used Khella in thousands of cases, and had confidence in its value

in the removal of stone. Khella has long been used in Egypt as a native home remedy, but now it is used by most Egyptian doctors in stone, pain in the kidney, as a diuretic, and in spasm of the ureter. There is a limit, of course, to the size of stone that it can get rid of.

The adult doses recommended are 1 to 3 fl. dr. of tincture *Ammi visnaga* (1:10) diluted with water, or 1/2 to 2 fl. ozs. of decoction *Ammi visnaga* (1:40 in water), to be taken three times a day before meals. In these doses the drug also acts as a diuretic.

I have potted a plant of Khella, grown in Minnesota from the Egyptian seed, in order to show its characteristics. I am afraid, however, that it will have wilted before it could have been shown in this meeting. I grew an acre of Khella in the summer of 1931, at Foxglove Farm, Lake Minnetonka. It did very well up to the flowering stage late in July and early in August. At this time the roots were suddenly attacked by white grub worms and the plants died before the development of the fruits. The accompanying film and photographs illustrate very nicely the habit of the plant and its striking flat umbels, of which each plant bears so many.

It is my purpose to investigate further the properties and uses of Khella in the hope that it may add a useful drug to our *Materia Medica*.

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"Public sentiment is everything. With public sentiment nothing can fail; without it nothing can succeed."