'binary spheroids' of *Helix* (Thomas[6]). It has been observed that in this material there is generally a granule or a crescent attached to a vacuole. The granule or the crescent appears as a dark, highly refractile component attached to the vacuole in the living neurones examined under phase-contrast, whereas the vacuoles are seen as colourless bodies (Fig. 2). The granular or crescent-shaped component of the Golgi body appears to be lipoidal in constitution, as it is stained by sudan black. It also reduces osmium and silver. It is darkly stained by hæmatoxylin preceded by chrome–osmium fixatives. The vacuole can be stained with the vital dye, neutral red. When the vacuoles are homogeneously stained with this dye, it becomes difficult to see the lipoidal component. The optimum impregnations of osmium or silver do not impregnate the vacuoles; and they are also not stained by sudan black. It is thus clear that the lipoidal cortical component of the 'binary spheroids' of Thomas[6] represents the Golgi material, and the vacuolar part of the spheroid the vacuome of Parat.

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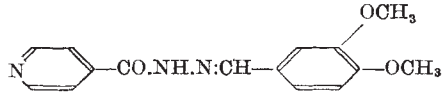
Anti-Tuberculous Activity of Verazide (1-*iso*Nicotinoyl-2-veratrylidene Hydrazine)

The high *in vitro* activity of 1-*iso*nicotinoyl-2-veratrylidene hydrazine (0·06 μgm. per ml.), henceforth referred to as verazide, has been previously reported by us[1] and others[2,3]. Fox and Gibas[4] report that 2 : 2-alkylidene derivatives of isoniazid (among which was included verazide) were markedly tuberculostatic in mouse tuberculosis. There is no reference, however, to the degree of activity of verazide or to its activity when given by intermittent dosage.

This report deals with the *in vivo* action of verazide and directs attention to its prolonged action and potential value in the treatment of tuberculosis. As verazide:



1-*iso*Nicotinoyl-2-veratrylidene hydrazine

is an insoluble derivative of isoniazid, it was decided to test its *in vivo* action by intermittent dosing at weekly, fortnightly and monthly intervals, using the healing ulcer technique previously described by one of us[5]. In addition, isoniazid was included for comparison. The results are shown in Table 1.

We have already shown[5] that a chemotherapeutically interesting anti-tuberculous agent is capable of scoring a healing ulcer value of 50 after 28 days treatment. Thus, verazide given in doses as low as 10 mgm./kgm. at weekly intervals exhibits a fair degree of activity, and at 30 mgm./kgm. is capable of effecting an almost complete healing of tuberculous ulcers with only three injections. At higher doses more widely spaced, for example, at 14–28-day intervals, the high degree of activity is maintained. Interestingly enough isoniazid, which is completely excreted in 24 hr. in animals[6] and man[7], is highly active (healing ulcer value 95) when 30 mgm./kgm. is given at weekly intervals. In the treatment of human tuberculosis, however, isoniazid is not given in doses exceeding 5–8 mgm./kgm. because of its toxicity.

Table 1. Anti-tuberculous Activity of Verazide *in vivo*

Drug	Dosage (mgm./kgm. body-weight)	Route	No. of doses	No. of animals	H.R. value* after 28 days treatment
Verazide	5 mgm. weekly	Intramus. inject.	4	4	15 (inactive)
Verazide	10 mgm. weekly	Intramus. inject.	4	4	58 (fair activity)
Verazide	15 mgm. weekly	Intramus. inject.	4	4	61 (fair activity)
Verazide	30 mgm. weekly	Intramus. inject.	3	4	98 (high activity)
Verazide	30 mgm. weekly	*Per os*	4	4	78 (moderate activity)
Verazide	30 mgm. fortnightly	Intramus. inject.	2	4	73 (moderate activity)
Verazide	45 mgm. fortnightly	Intramus. inject.	2	4	92 (high activity)
Verazide	60 mgm. monthly	Intramus. inject.	1	4	77 (moderate activity)
Isoniazid	30 mgm. weekly	Intramus. inject.	4	4	95 (high activity)

* H.R. value = percentage cure of tuberculous lesions as measured by the healing ulcer technique (ref. 5).

Determination of acute toxicity by intraperitoneal injection of mice showed that the LD_{50} of isoniazid was 200 mgm./kgm. body-weight, whereas the LD_{50} of verazide was 700 mgm./kgm.

To summarize these results, verazide is highly active in the treatment of established tuberculosis in the guinea pig when given in intermittent doses either at 7-, 14- or 28-day intervals. It is active when given by mouth, but to a lesser degree than by injection. Finally, verazide is only one-third as toxic as isoniazid when measured by acute toxicity for mice. These findings will be reported and extended elsewhere.

We wish to thank Miss Janice Edgar and Mr. J. Buttifant for their assistance.

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Aug. 17.

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Overcoming Cross-Incompatibility among some Mexican Diploid Species of *Solanum*

Species of *Solanum* belonging to the section *Tuberarium* and occurring in Mexico have long been of interest to potato breeders, as several of them possess resistance to the late-blight caused by *Phytophthora infestans* de Bary. Like the tuber-bearing species of *Solanum* found in South America, the Mexican species also form a polyploid series comprising diploids ($2n = 24$), triploids ($2n = 36$), tetraploids ($2n = 48$), pentaploids ($2n = 60$) and hexaploids ($2n = 72$). These species have been classified

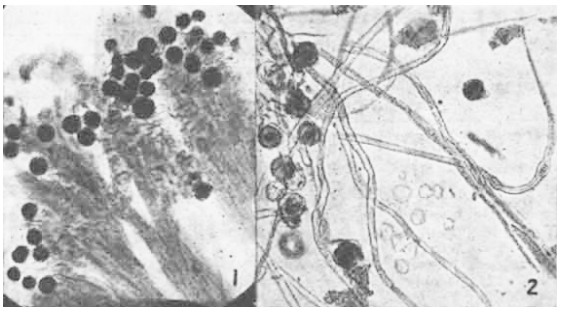

Fig. 1. Stigma and part of style of *S. pinnatisectum*, 72 hr. after pollination with *S. lanciforme* pollen. There is practically no germination of pollen

Fig. 2. Pollen of *S. bulbocastanum* germinated on an agar–sucrose–gelatin medium

in eight distinct taxonomic series, and our information concerning the cytogenetic affinities among them is still very fragmentary. As a preliminary towards gathering such data, a systematic survey of ability to cross among the diploid species occurring in Mexico was undertaken by me, during the summer of 1953, at the Inter-regional Potato Introduction Station, Sturgeon Bay, Wisconsin.

The following diploid species were used in the study: *S. pinnatisectum* (series *Pinnatisecta*), *S. bulbocastanum* (series *Bulbocastana*), *S. lanciforme* (series *Cardiophylla*) and *S. polyadenium* (series *Polyadenia*). In the first set of crosses made in the usual way (emasculation followed by controlled pollination), only the cross *S. pinnatisectum* × *S. polyadenium* succeeded. A study was then made of the causes for the failure of seed-setting in the crosses *S. pinnatisectum* × *S. bulbocastanum* and *S. pinnatisectum* × *S. lanciforme*. For this purpose, the ovaries with style and stigma were fixed in Carnoy's solution (alcohol, acetic acid, chloroform, 6 : 1 : 3), 24, 36, 48, 72 and 120 hr. after pollination, sectioned and stained with acid fuchsin and light-green. Examination of the slides revealed that in both crosses there was little or no germination of the respective pollen on the stigma even after 72 hr. from the time of pollination (Fig. 1). This duration is usually found to be sufficient to allow fertilization in compatible crosses. In the few germinated pollen grains the length of the tubes was only about three times the diameter of the pollen.

To overcome the pollen-stigma incompatibility, two techniques were tried, namely, smearing the stigmatic exudation from the pollen parent on the stigma of the pistillate parent, before pollination, and applying a suitable artificial medium for pollen germination on the cut surface of the style after removal of the stigma. An intermediate method described below led to the formation of berries and seeds in both crosses. The stigma, with a small portion of the style, was removed with a pair of fine scissors from the flowers of *S. pinnatisectum*, and a drop of an agar–sucrose–gelatin medium was applied to the decapitated surface of the style. This medium was prepared by dissolving 0·5 gm. of agar and 2·5 gm. of sucrose in 25 c.c. of distilled water to which 0·5 gm. of gelatin was added. The pollen grains of many species of *Solanum* were found to grow well in this medium (Fig. 2). After applying pollen to this medium on the cut surface of the style, the cut style was covered with a piece of moist cotton wool. From the crosses *S. pinnatisectum* × *S. lanciforme* and *S. pinnatisectum* × *S. bulbocastanum* thus made, four and three berries containing on an average thirty-nine and eight seeds respectively were obtained. Seeds from these crosses were grown at the Inter-regional Potato Introduction Station, Sturgeon Bay, in the summer of 1954 by Dr. R. W. Hougas, who found that the plants were real hybrids.

Such crosses have been attempted previously by several workers in different countries but without success[1]. The hybrid between *S. pinnatisectum* and *S. bulbocastanum* may be of particular interest to potato breeders as a valuable breeding stock, since Niederhauser and Mills[2] have recently reported that *S. bulbocastanum* is not only resistant to late blight but is also probably the only species immune to it.

This investigation was supported by a grant from the Research Committee of the Graduate School with funds provided by the Wisconsin Alumni Research Foundation. I thank Drs. D. C. Cooper, G. H. Rieman and R. W. Hougas for advice and help during the course of the study.

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The Pogonophora

A REPORT has recently been published in the daily Press alleging that Russian zoologists have lately discovered a new phylum of animals, the Pogonophora. This is, of course, a mistake, and in the paper by A. V. Ivanov, published in *Systematic Zoology*, **3**, 69 (1954), and in *Dokl. Akad. Nauk S.S.S.R.*, **100**, 175, 381, 595 (1955), acknowledgment is generously made to all previous workers on this interesting group. The animals have been known for some time; but Ivanov has created a new phylum for them, and this may have caused the misunderstanding.

Pogonophora are elongated tubicolous animals the body of which is composed of a short anterior portion bearing tentacles and a very long trunk. The anterior portion contains two pairs of cœlomic cavities of which the first contain so-called nephridia and the second are continuous with the cavities of the tentacles. The trunk contains a third pair of cœlomic cavities in which lie the gonads. The hinder part of the trunk shows repeated ring-shaped papillæ of chitinous platelets serving as adhesive organs. A dorsal nerve centre is present; but no trace has hitherto been found of gut, mouth or anus.

Although so much remains to be discovered in these animals, it is quite possible that Caullery and Ivanov are right in looking for their affinities among those groups which include the Enteropneusta. The tripartite arrangement of the cœlom and the dorsal nerve centre immediately suggest this. Details will be eagerly awaited regarding the structure of the so-called nephridium before it will be possible to compare it with the nephridium of the actinotrocha larva of *Phoronis*. Altogether, enough is known of these organisms to whet the appetite for more, and the results of Prof. Ivanov's further investigations will be awaited with interest.

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