best be appreciated when it is remembered that Minot's well-known "Bibliography of Vertebrate Embryology," covering the literature up to 1892, contains only 3,555 references.

The abstracts summarized in Table 1 came from 594 sources, illustrating the difficulties of covering the literature encountered by the section editors concerned. We have listed in order the ten journals most frequently abstracted during this period, and it is of interest to note that these ten provided about one third of the total number of abstracts.

A similar table (2) contains the summaries of our

TABLE 2

SOURCES AND NUMBERS OF ABSTRACTS CONCERNING ANIMAL CYTOLOGY FOUND IN "BIOLOGICAL ABSTRACTS" 1927–1936

Sources	251
Number of abstracts	1,518
Ten journals most frequently abstracted:	
Journal of Morphology and Physiology (Baltimore)	84
Zeitschrift für wissenschaftliche Biologie (Berlin)	76
Comptes rendus de séances, Société de Biologie (Paris)	62
Anatomical Record (Baltimore)	55
Biological Bulletin (Woods Hole, Mass.)	53
Quarterly Journal of Microscopical Science (London)	45
Cytologia (Tokyo)	38
Protoplasma (Leipzig)	37
Archiv für experimentelle Zellforschung (Jena)	31
SCIENCE (New York)	31
Subtotal	512
Per cent. of total	34

tabulation of cytological literature, which is roughly about half as large; 251 sources were abstracted with a total of 1,518 abstracts, an average of 152 per annum. The ten journals listed were the source of approximately one third of the abstracts. It should be noted that the relative position of *Cytologia* and *Protoplasma* in the list of journals is due to the fact that they were founded during the period under consideration. For purpose of comparison the bibliography of E. B. Wilson's "The Cell in Development and Heredity" (1925 edition) was selected. This contains approximately 3,000 titles.

The original list of sources from which abstracts of embryological articles had been prepared was checked against the Union List of Serials in Libraries of the United States and Canada. We were able to verify the correct title of 410 serials. A professional bibliographer might well have tracked down some additional titles, but many of our first list were of books and irregular publications not listed as serials. In Table 3 we present the distribution of these serials according to the language (or principal language) employed. While English appears to be the most widely used language in current embryological literature, the student who knows English only finds himself blocked from direct access to almost two thirds of the original sources. After German and French, in the order named, Italian seems to be the language most frequently employed.

TABLE 3

DISTRIBUTION BY LANGUAGES OF SERIALS CONTAINING ARTICLES ON VERTEBRATE EMBRYOLOGY ABSTRACTED IN "BIOLOGICAL ABSTRACTS" 1927–1936

Language of serial	Serials abstracted	Number of abstracts
English	131	1,217
German	85	958
French	70	422
Italian	42	244
Japanese[1]	26	108
Spanish	16	25
Russian[1]	10	25
All others	30	90
Total	**410**	**3,089**

[1] Usually with summaries in English, German or French.

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DIPLODIA STEM-END ROT OF LEMONS CONTROLLED WITH SODIUM ETHYL MERCURI THIOSALICYLATE

THAT the utilization of modern developments in the field of medical therapeutics may perhaps be worthy of more extensive trial in the field of plant pathology is indicated by recent experimental work on citrus fruit stem-end rot control. The efficiency of merthiolate (Lilly) or sodium ethyl mercuri thiosalicylate as a control for fungi affecting the animal body has suggested it for use against plant pathogens. In several successive tests during the fall of 1939, this antiseptic in the regular 1 to 1,000 tincture form, applied as a local stem-end treatment on lemons, has given practically perfect stem-end rot control after two-weeks incubation, during which controls rotted to the extent of 60 to 72 per cent. In one test, after three-weeks incubation, there was no loss in the treated fruits, while decay increased to 84 per cent. in the controls. Later tests showed that 1 to 5,000 dilutions were practically as efficient as the 1 to 1,000. Sulfo-merthiolate (Lilly) or sodium *p*-ethyl mercuri thiophenylsulfonate has likewise given almost complete control by the same method.

The stem-end treatments were applied by a "stamp pad" method, improvised during the tests, whereby a piece of heavy felt in a non-corrosive holder was kept moistened with the antiseptic solution. The individual fruits were presented with their stem ends against the felt, with a slight twisting motion (through about 60 degrees). This resulted in complete wetting of the "button" and the adjacent rind. The control recorded was undoubtedly due to both the high disinfectant properties of the chemicals and their excellent penetrating powers. Complete fruit-dip treatments for two minutes in 1 to 10,000 dilutions of both merthiolate and sulfomerthiolate gave 99 to 100 per cent. control in late season tests while controls were showing 27 and 35 per cent. decayed after a three-week incubation period.

While these promising chemicals appear to be rather expensive, records have shown that during a

period of high incidence of stem-end decay in citrus fruits, costs of treatments by the "stamp pad" method are almost negligible in comparison with losses that are frequently encountered in shipments of non-treated or improperly treated fruit. Shipments of fruits showing excessive decay cause indirect damage to grower and shipper alike in that consumer ill-will is often difficult to overcome.

This preliminary report is made with the thought that it may stimulate practical research leading to better control of plant diseases from the use of these chemicals and others like them. At the concentrations used, the manufacturers state that there is no danger from toxic residues.

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THE EXPERIMENTAL PRODUCTION OF HEPATIC CIRRHOSIS BY THE SEED OF AMSINCKIA INTERMEDIA[1]

FEEDING trials have demonstrated the seed of *Amsinckia intermedia,* Fisch. and Mey., also variously known as fiddle-neck, yellow burweed, yellow tarweed and tarweed, to cause necrosis of the liver parenchyma of swine, horses and cattle. The hepatic cells are replaced by connective tissue producing an extremely hard, cirrhotic liver. Similar changes also occur in the spleen, although to a lesser degree. In swine, which are most susceptible, and in cattle, which appear to be more resistant, the condition is known as "hard liver disease." In horses, in which any extensive destruction of the hepatic parenchyma is followed by cerebral disturbances, the condition is known as "walking disease" because of the tendency of affected horses to wander aimlessly.

Amsinckia intermedia grows profusely in the grain fields in certain semi-arid regions in Washington, Oregon, Idaho and California. Because of its irritant character the plant is not grazed by live stock. The seeds are heavy and are harvested with the grain. They are non-irritant and possess a pleasant nut-like flavor and at first are readily eaten by live stock. After animals have been made acutely ill, they tend to avoid the seed.

All of nine pigs, all of three horses and one of three calves fed wheat screenings rich in the seed of *Amsinckia intermedia* developed hepatic cirrhosis with symptoms characteristic of those observed in animals on farms where the plant grows abundantly. An alcoholic extract, representing approximately one pound of the seed, killed a 30-pound pig in less than 12 hours. The liver parenchyma was badly damaged. Further feeding trials have shown the toxic principle to be contained in the petroleum ether insoluble fraction of such extracts.

While *Amsinckia intermedia* has been known to produce mechanical injuries,[2] and other members of the Borage family have been described as urticarious,[3] no member of this family previously has been shown to be toxic.

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AN EFFECT OF BENZEDRINE SULFATE ON CHICKS

MANY of the effects of the synthetic drug benzedrine sulfate (benzyl methyl carbinamine sulfate) are similar to those of epinephrine. It is used in inhalers to shrink the nasal mucosa, and has been used in the treatment of narcolepsy. When day-old Rhode Island Red chicks are given 1 mg of benzedrine sulfate subcutaneously they show visible effects of the drug in seven to nine minutes; mouths open, legs become unsteady so that the body falls forward, and the wings droop and spread. The most remarkable reaction is the incessant twitter or "singing," roughly 220 notes per minute, which continues for fifteen minutes to half an hour. All the visible effects disappear in about forty-five minutes.

When larger doses (3.5 mgs) are used the effects appear in two or three minutes and the rate of twittering is increased up to 300–330 notes per minute. Apparently the drug is eliminated rapidly as the chicks return to normal inside of an hour.

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ARE PECTIC SUBSTANCES PRECURSORS TO LIGNIN?

RED clover (*Trifolium pratense*), a lignified tissue, may contain pectic substances and lignin in practically equal amounts. In general, lignified tissues contain very small percentages of pectic substances and considerable lignin, while in non-lignified tissues the opposite is true. For these reasons, it has been thought that lignin is formed from pectic substances in the plant. In red clover, however, the proportion of these two substances does not indicate that one is the precursor of the other; however, it does support Bailey's[1] contention that, because of the difference in cell structure, it is not essential to account for the various proportions of these substances in different plants on the basis of transformations. Table 1 illustrates the percentages of pectic substances and lignin

[1] Published as Scientific Paper No. 427, Agricultural Experiment Station, State College of Washington.

[2] L. H. Pammel, *Vet. Med.*, 21: 220, 1926.

[3] Walter Conrad Muenscher, "Poisonous Plants of the United States," New York: Macmillan Company, 1939.

[1] I. W. Bailey, *Ind. Eng. Chem., Ind. Ed.*, 30: 40–47, 1938.