laboratory experiments indicating that thallium is toxic to seedlings. On the other hand, Crafts[7] studied the effects of thallium-treated grain under field conditions and concluded that "the possibility of losing agriculturally valuable land through sterilization seems remote."

Experiments were undertaken on a laboratory basis in Denver, Colorado, and on a field scale in Santa Clara County, California. Various amounts of thallium compounds were mixed with loam soil or were applied one or more times to seed beds or to experimental quadrats. The effect of thallium on the growth of vegetables and grasses was followed in the laboratory experiments and on general range vegetation in the field trials. These experiments were conducted over a period of two years. The results obtained in the laboratory and the field studies were harmony and showed that the addition of thallium compounds in amounts up to ten parts per million had no injurious effects, and in many instances appeared to stimulate plant growth. Larger amounts caused some injury, increasing with the quantity applied. Ground squirrels consume thallium-treated grain ("thalgrain") so rapidly that no damage was found o nareas treated nine times. Under the conditions used in the control of rodents by properly trained personnel, no evidence of injury to vegetative growth has been found.

In spite of the various criticisms raised against the use of thallium, these studies under practical conditions have failed to show any decrease in vegetative growth following the use of thalgrain. In fact, large numbers of ranchers have voluntarily advised the writers that the vegetative cover is increased from 10 to 25 per cent. following ground squirrel removal.

E. E. HORN
JUSTUS C. WARD
JAMES C. MUNCH
F. E. GARLOUGH

BUREAU OF BIOLOGICAL SURVEY
U. S. DEPARTMENT OF AGRICULTURE

ON THE DURATION OF SOME IMBIBITION PROCESSES

IN connection with investigations on the time factor in biological problems on penetration, I occasionally determined the length of time during which dry wood absorbs water.

A piece of spruce (*Picea*), 8 cm long, 6 cm broad and 9 mm thick, of a density of .49 (weight: 21.250 gm), cut with its length in the direction of the grain, was held in water, its two large surfaces being horizontal. The two transverse edges were covered with wax so that the liquid could not enter the vessels by their open end but was obliged to penetrate through their walls. To avoid stagnation the water was changed every 3 days.

To determine the rate of imbibition the piece was, at regular intervals, taken from the water, wiped with a towel and weighed. During the 30 to 45 seconds needed for that operation it was possible to observe a diminution of weight amounting to a few milligrams, due to evaporation. Immediately after the measurement the piece of wood was put again into the water. At first the measurements were intervalled at 5 minutes, then at hours, later at days and months.

The intake of water lasted more than 9 months, as is shown in the following table, and the amount of water imbibed was nearly five thirds the weight of the wood.

Time of immersion Min.	Imbibed water gm.	Time of immersion Days	Imbibed water gm.
		2¼	9.44
1	1.16	3¼	11.09
5	1.86	4¼	12.58
10	2.16	10¼	16.78
25	2.49	15	17.30
45	2.92	27	20.11
		43	23.36
Hours		59	24.25
		90	28.86
1¾	3.94	125	31.70
2¾	4.58	161	33.53
3¾	5.10	193	34.69
6¾	6.20	253	35.44
30	8.27	280	35.49

The time factor has been recognized within the last decades as an essential one in problems such as the ascent of sap, but it is probably still underestimated in many problems related to penetration.

BASILE J. LUYET

ST. LOUIS UNIVERSITY

BOOKS RECEIVED

BROWN, HARRY P. and ALEXIS J. PANSHIN. *Identification of the Commercial Timbers of the United States.* Pp. xxvi + 223. 60 plates. McGraw-Hill. $3.00.

CRUM, ROY W., Editor. *Proceedings of the Thirteenth Annual Meeting of the Highway Research Board.* Part I: *Reports of Research Committees and Papers.* Pp. 410. Illustrated. National Research Council.

KRECKER, FREDERICK H. *General Zoology.* Pp. xi + 634. 406 figures. Holt. $3.50.

TOLMAN, RICHARD C. *Relativity Thermodynamics and Cosmology.* Pp. xv + 502. Oxford University Press. $8.50.

Growth of Several Plants and on Nitrification in Soils," *Contrib. Boyce Thompson Inst.*, 5: 289–296, 1933.

[7] A. S. Crafts, "The Effects of Thallium Sulphate upon Soils," SCIENCE, 79: 62, 1934.