that has never been under the plow. Most of them were here as larger areas of smaller trees and bushes when the first white people came.

It is well known that soil scientists (Department of Soils, Oregon State College, in consultation) are able to distinguish between forest soils and grassland soils from the characteristics imparted to each by its former vegetative cover. They find here that most of the soils on relatively high elevations on the valley floor are forest soils and that most of those relatively lower and not so well drained have not been covered with timber, thus substantiating the recorded observations of the pioneers. Hence, a map of the natural vegetation of the Willamette Valley should show it as a grassland with a timber cover of less than one-half—probably about one-third or more—of the area of the valley floor.

JOHN E. SMITH

2751 Orchard Street, Corvallis, Oregon

A Tree-Trunk Squeeze-Up in Lava

A squeeze-up is a lava mass which was forced upward, while still of semiliquid consistency, through an opening in the hardened surface crust of the flow. Several types of squeeze-ups have been reported by Nichols (*J. Geol.*, 1939, **47**, 421–425) for the 220-square mile basalt flow of Recent origin south of Grants, Valencia County, New Mexico, which different authors have termed the Grants or McCarty's Lava Bed or the Aqua Fria Malpais.

An apparently undescribed type of squeeze-up is found in the eastern edge of the northwest lobe of this flow near the Ice Caves Resort, in Section 20 of the township which includes Paxton Springs. A few yards behind the resort headquarters building, near the southeast base of Flagpole Cone, are five or six vertical cylindrical holes in the lava, the largest 18″ in diameter and at least 5′ deep, the exact depth being obscured by accumulated rock fragments. These are popularly known as "devil's smokestacks." The tubes were produced by the flow of magma around standing tree trunks near the edge of the bed where the depth and pressure were relatively limited. No organic material remains, but one of the tubes has markings inside which strongly suggest a mold of the bark of yellow pine (*Pinus ponderosa*). Most of the tree tubes end flush with the rather smooth surface of the pahoehoe lava, but some show a low, weathered rim around the top of the tube, several inches above the general surface. The nature of the rim will be clearer from the following account.

One-tenth mile farther north along the flow's edge is found the best example of a tree tube, combined with an excellent example of a tree-trunk squeeze-up. The cavity is 110″ deep to the present bottom. The inside diameter of the tube averages 17″. A rock chimney readily seen from the Ice Caves branch road, projects 23″ above the horizontal lava surface. The diameter of the tube within the chimney is the same as that below the general surface. The thickness of chimney's wall ranges at different points from 7″ to 10″; the average is about 8″. The inside of the chimney is circular in cross section; the outside, of subcircular form. Close examination of the vertical wall and base of the chimney reveals parallel striations running vertically on the unweathered surface, which extends upward for a maximum distance of 10″. Above this basal portion, the chimney surface is weathered and irregular, and the broken top indicates that this peculiar hollow cylinder of lava once had a greater height. The external basal striations provide proof that the chimney originated as a squeeze-up. As the surface crust cooled and hardened, its shrinkage, in combination with the charring of the tree trunk's outer tissues, may have been sufficient to permit the soft viscous magma beneath to be squeezed between the remaining wood and the hard circular edge of the cooled crust. Irregularities in the latter left their marks formed as vertical striations during upward movement of the semiliquid ring. It is probable that for a chimney wall of such thickness to result, an additional factor was necessary—the removal of fragments from the edges of the crust by the pressure from beneath, widening the gap between the tree trunk and the firm crust.

Vertical ridges as much as ⅜ of an inch high occur sparsely on the inner surface of the tube proper below the chimney. These are connected by horizontal ridges, in lower relief, to form square markings. The latter are too regular in size and shape to be interpreted as the mold of tree bark. If it were not for a smaller secondary system of squares within the major system, there would be a superficial resemblance to the distinctive bark of alligator juniper (*Juniperus pachyphloea*) which grows in the immediate vicinity. The markings strongly suggest the "boxwork" found on the walls of certain caves, but with much lower relief than typical "boxwork." No explanation for the pseudo-bark markings can be offered. The Recent date of the flow, aridity of the climate, fissured and permeable character of the lava, and topography make it highly unlikely that this tube ever filled with water up to the level of the markings, 80″ from the bottom.

ALTON A. LINDSEY

Division of Botany,
Department of Biological Sciences,
Purdue University

Climatic Changes and Dark Nebulae

In the abstract of Donald H. Menzel's centennial symposium paper, "The Sun and the Earth," (*Science*, November 26, p. 590) there is a discussion of the possibility of climatic change being due to the passage of the solar system through dark nebulae or clouds of dust. The following statement is made: ". . . there is one other possibility to consider—a possibility that has not been previously suggested, to my knowledge." I wonder if Huntington and Visher did not discuss something similar to the above idea of climatic change in their book *Climatic changes* (Yale University Press, 1922, pp. 247–249).

WALDO S. GLOCK

Macalester College, St. Paul, Minnesota