a few years of rising prices turned thousands of people to gathering rubber "nearly throughout the Amazon and its principal tributaries." Spruce learned of an earlier period when the rubber trees had been cut down, and supposed that a discovery had been made, of obtaining more rubber "by successive tappings of the same tree," but a recent transition from Castilla is indicated, and some of the up-river tribes still did not know of rubber being obtained from Hevea. Exports of Castilla rubber from eastern Peru, previously carried over the Andes, began to move down the Amazon in 1853, as Schurz has recognized, and "caucho" still comes in commercial quantities from many outlying districts in Brazil.

The discovery of Hevea often is dated from 1736 when the French astronomer La Condamine landed at Manta and traveled to Quito through the Pacific coast province of Esmeraldas where the elastic resin called "caoutchouc" was obtained, but from the methods of collecting the latex and forming long rolls of rubber to burn as candles or torches, the trees could not have been Hevea. West of the Andes no Hevea has been found, but Castilla still grows in Esmeraldas and in the upper Amazon valley, where rubber-gathering apparently was in progress in 1743, when La Condamine went down from Quito. The early Castilla industry carried the Peruvian name *caucho* eastward across Brazil, and later the Portuguese name for Hevea rubber, *borracha,* spread westward from Para. Even in Brazil it appears that Castilla was the principal source of rubber to the middle of the last century, only a few decades before Hevea was carried to the East Indies.

Pioneer plantings of Castilla in southern Mexico were dated as far back as 1867 by Olsson-Seffer, and still older planted trees were found around Pichucalco by Collins and Doyle. Larger Castilla projects were stimulated by developments with Hevea in the East Indies, before the radical differences in the latex systems of the two trees were appreciated. By 1908 more than a hundred thousand acres of Castilla had been planted in Mexico and Central America, which soon became a total loss, estimated at thirty to fifty million dollars. Interest in Castilla lapsed completely, leaving many plantations to grow up as forests, though some of these may yet serve in working out mechanical methods of separating the rubber from the bark and making the wood into paper or other by-products. Lumbering the logs to the mill may be the only labor required in Castilla forests, volunteer replacement being indicated by abundant undergrowth of seedling trees.

Planting of rubber reserves has been urged for economic and military reasons, and large denuded areas in southern Florida need to be reforested to reduce the fire and frost hazards. Castilla is an ornamental tree, better adapted than Hevea for growing in open places, shading out grass and mulching the soil surface. Even as a nurse-crop for Hevea, the planting of Castilla might prove worth while. Cuttings and seedlings grow rapidly, and hurricane hazards would be less than with Hevea, since the rubber of broken or uprooted trees could still be extracted.

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ROOF FALLS IN MINES

AN investigation into the number of accidents resulting from roof falls in Pennsylvanian coal mines showed an annual distribution with maxima in the early spring and in the summer. The first maximum coincides with a high ground-water table in the overlying strata. The summer maximum occurs during those months in which the moisture contained in the ventilating air condenses in the mine because of lower temperature underground. The roof rocks expand under the influence of moisture, and it is suggested that this expansion gives rise to an increased number of roof falls, with the consequence of higher accident rates. The moisture expansion of rocks corresponds closely to the dangerousness of various types of roof rocks. Preliminary measurements gave the following linear expansions for rocks when wetted to saturation with water:

Brittle shale	3×10^{0} per cent.
Solid shale	5×10^{-2} " "
Sandy shale	1.2×10^{-2} " "
Sandstone	9.7×10^{-3} " "
Limestone	$< 1 \times 10^{-4}$ " "

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THE OLDEST AMERICAN FOSSIL ECHINOID

PROFESSOR HERMAN L. FAIRCHILD, of Rochester, N. Y., has brought to my attention a notice in the *Cornell Alumni News* (Vol. 37, No. 28, p. 2, May, 1935) concerning two specimens of *Lepidechinoides ithacensis,* purported to be the oldest fossil echinoids ever found in America. These were found in Devonian rocks in the vicinity of Ithaca, N. Y. An older specimen, *Koninckocidaris silurica* Jackson, dates from the Silurian. This fossil was found in 1908 by Professor A. W. Giles, who was at that time studying under Professor Fairchild. It was collected from the Rochester shale about 10 feet above the Irondequoit Limestone, in the Genesee ravine at Rochester, N. Y. The specimen shows an internal view of the dorsal portion