

of holding a supply of moisture from one rain to the next; or they might send roots deeper into the soil for a supply of water; or they may gradually migrate to a region better suited to their needs. Those that did not migrate or adapt themselves perished.

The object of this paper is to call attention to a few methods plants have adopted to preserve their race. If a climate should become permanently dry, as in our desert regions, plants might resist this condition by decreasing their surface of evaporation. For example, our ordinary plants send off surplus water through their leaves. A reduction of leaf surface would help retain small supplies of water. Therefore, desert plants, such as cacti, have reduced their leaves to practically nothing; and use their stem for assimilation of food. Or, conditions for a favorable supply of moisture may exist during part of the year—as in our summer. In winter, the cold or frozen ground interferes with the absorption of water. Hence, at that season, most of our trees discard their leaves, thus reducing the evaporating surface, or coat them over with a waxy substance. Other plants die down entirely in autumn; but their roots live over winter. Can the reader supply six or eight different examples of provisions made by the plant for retaining moisture?

Or, again, a gradual increase in heat or cold would have its effect on plants. The geologist has discovered that plants now living in our latitude once had their representatives in the far north. Moreover, the Maritime Provinces had a tropical climate in the coal period; and, therefore, tropical vegetation. As the cold of the glacial period moved southward, characteristic vegetation moved southward also. What remained behind died. If the cold had spread suddenly over the whole earth, all vegetation would have died. But a slow change enabled the plants to migrate.

Possibly the ideal place for plant growth is in the tropics. But plants have long ago learned that too much crowding is a bad thing. Therefore, some of them chose to occupy the less crowded temperate regions, where they can gain a good livelihood. To remain in the shade of ranker vegetation meant certain death to them. Just as in human life, the residents of the country have a freer and more independent life than those who live in crowded cities, so plants have learned that

breathing space is necessary. And just as city people who move to the country must modify their mode of living to suit conditions, so plants moving to a colder country must develop means for resisting sudden changes of temperature or sudden drying. The part of a plant most susceptible to drying is the leaf, particularly the under side; for in most of our land plants, the openings through which water passes out are on the under side of the leaf. Therefore, a rolling of the leaf or the development of a woolly or hairy growth would be a protection against drying or sudden cold, rather than against prolonged cold. (See leaf of Labrador Tea.)

Furthermore, soil drainage changes the character of plants. We know the characteristic flora of bogs. If the bog be drained, the vegetation must seek other bogs or die. Similarly if a soil grow one kind of crop too long, that soil really changes in composition; and its vegetation must change in like degree. If a hay field, through change in the course of a stream, becomes swampy, the old crops die out and swamp loving plants appear. These changes as we ordinarily see them are comparatively sudden. Therefore, it is simply death to the plants thus encroached upon. But if the changes should be extremely gradual, the plants may develop means of protection, and survive. The very modifications, however, would change the appearance and structure so much as, in many cases, to warrant our saying a new species has originated.

QUESTIONS.

- (1) The leaf of a live-forever is thick and spongy. Why?
- (2) Are the roots of plants growing in the water usually long or short? Why?
- (3) We are told that alfalfa roots will penetrate twenty to forty feet into the ground. Do they always do this? Why?
- (4) Plants cannot travel as animals do; therefore, how do they migrate?
- (5) What is the difference between fir leaves of this year's growth and last year's growth? Why?

A little girl returned to her humble home with glowing accounts of the new teacher. "She's a perfect lady," exclaimed the enthusiastic youngster, "that's what she is!" The child's mother gave her a doubtful look. "How do you know?" she said. "You've only known her two days." "It's easy enough tellin'," continued the child. "I know she's a perfect lady because she makes you feel polite all the time."