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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 360,

For the Week ending November 25, 1882.

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TRANSITS OF VENUS.

Astronomical annals record the observation of only four transits of Venus: those of 1639, 1761, 1769, and 1874. Kepler was the first astronomer to predict that a transit would occur in 1631. But it passed unobserved, and his tables were so inaccurate that he failed to detect the transit that would take place in 1639. This too would have passed unobserved had it not been for the enterprise and enthusiasm of a young Englishman, the curate of a church in the north of England. Jeremiah Horrox, though only eighteen years of age, had mastered all known astronomical problems. He discovered that Kepler's tables indicated a near approach of a transit of Venus. The hope that he might witness the wonderful sight took possession of his imagination, and day and night he studied the tables of Kepler until he discovered an inaccuracy in the calculations. He worked out a table for himself, and predicted a transit for 1639. He revealed the secret to an intimate friend, and they, keeping their own counsel, patiently waited for the advent of the time that would verify the prediction. At last the great day arrived. It was Sunday, and bright, cool, and clear. The young astronomer sat in a darkened room, with the sun's image reflected through a small telescope upon a white screen, over which the planet must pass as a round dark spot if his calculations were correct.

Such was his extreme conscientiousness, that he left his watch when the church bell rang, to fulfill what he considered a higher duty. But his patient labor was rewarded. On his return from service, he discovered on the luminous image of the sun, the tiny black sphere that marked the passage of Venus across his disk, and thus won the honor of being the observer of the first transit ever seen by mortal eye.

A new interest was roused in astronomy by the report of the great event. During the interval between this and the next transit of 1761, science made rapid progress. Transits of Venus were, however, considered only as astronomical curiosities, until in 1677, Halley, while observing a transit of Mercury, discovered their scientific import as a means of determining the sun's distance.

Extensive preparations were made in prospect of the transits of 1761 and 1769. That of 1761 was visible in Europe, and was watched by nearly two hundred observers, but the results were unimportant. That of 1769 was more extensively observed, but the instruments of those days were far from being accurate. When the astronomers returned from distant lands with the results of their labor, and proceeded to make comparisons in order to deduce the sun's parallax, great discordance was found in the measurements of the different observers. More than half a century elapsed before the results were worked up in a satisfactory manner. This was done by Encke in 1824, and 8·57″ was fixed as the solar parallax, corresponding to about 95,000,000 miles. This distance of the sun was for many years accepted by astronomers, and adopted by all works on astronomy.

It is now well known that the parallax was too small, and the distance too great, including an error of nearly 3,000,000 miles. The world-wide interest taken in the transit of 1874 and its extensive observance is a matter too near the occurrence of the present transit to have become a matter of history. The work of reducing the observations has not yet reached a final result, for an immense amount of calculations and much tedious investigation are involved. The indications are, from portions of the work accomplished, that the sun's parallax lies somewhere between 8·79″ and 8·88″. The sole purpose for which the transit expeditions of 1882 are sent to the most available localities for witnessing the phenomenon is to determine more accurately this most important base line of celestial measurement. The whole scientific world will watch for the result, while approximation, not certainty, is all that is anticipated.

SHIPWRECKS ON THE BRITISH COASTS.

During the past twenty-five years about fifty-five thousand wrecks, casualties, and collisions have occurred on the British coasts, involving the loss of nearly twenty thousand lives. But once since the season of 1874–5 has the number of marine disasters in a twelvemonth fallen below three thousand, the most disastrous year being that of 1876–7, when the casualties numbered 4,164. Last year the number was 3,575, involving the loss of 984 lives. Only 705 cases involved total loss, and lives were lost in 238.

Since in cases of collision two or more vessels are involved in one casualty, the number of vessels more or less hurt (4,297) considerably exceeds the number of casualties.

The collisions numbered 713, and the other wrecks and casualties 2,862. Of the latter 636 were wrecks, etc., resulting in total loss, and serious damage was experienced in 670 cases. The heaviest losses were encountered on the east coast of England and Scotland.

Out of the 2,862 casualties other than collisions 2,569 occurred to vessels belonging to Great Britain and its dependencies, and 293 to foreign ships. Of these 2,569 British vessels, 1,732 were employed in the coasting trade, 667 in the foreign and home trade, and 170 as fishing vessels.

Of the 2,569 British ships which met with disaster, 1,341 did not exceed 100 tons burden, 791 were from 100 to 300 tons, 170 were from 300 to 500 tons, and 267 were above 500 tons burden. Of the 540 British vessels totally lost irrespective of collisions, 44 are known to have been built of iron, and of these 30 were steamships and 10 sailing vessels.

A most remarkable showing appears in connection with the ages of the vessels that were wrecked or otherwise injured, some three-fifths of these having been over fifteen years old. Excluding collisions, 495 steamships and 2,367 sailing vessels were lost, or damaged, on the British Coasts during the year. Of these disasters 146 happened to nearly new ships, 322 to ships from three to seven years of age, 506 to ships from seven to fourteen years old, 932 to ships from fifteen to thirty years old, 463 to ships from thirty to fifty years old, 59 to ships from fifty to sixty years old, 34 from sixty to seventy years old, 6 from seventy to eighty, 7 from eighty to ninety, 5 from ninety to one hundred, and 6 to vessels upward of one hundred years old; while the ages of 83 are unknown. It would be interesting to know more of the history of those ancient vessels, the circumstances under which they met with disaster, and for how much they were insured.

In the course of the year the entrances and clearances of vessels at all the ports of the United kingdom numbered 668,000, and the number of persons carried on all occasions was probably between three and four millions. The loss of a thousand lives may seem by comparison a small number; but its actual magnitude is not to be so rated. And when we consider how many thousands of vessels, and hundreds of thousands of passengers and seamen (not around the British islands only, but on all the seas and along all the coasts of the whole world), are constantly exposed to the hazards of storm and sea, we begin to see how large is the need of improved devices for saving life and property when subjected to such hazards. The lifeboats of the National Lifeboat Institution are credited with saving something like twelve thousand lives during the past quarter century—evidence enough of the value of one line of invention and effort in that small part of the world. Equally valuable inventions doubtless remain to be made.

THE RABBIT PLAGUE IN AUSTRALIA.—A BIG CHANCE FOR A PAYING INVENTION.

The ancient saying that the race is not always to the swift nor the battle to the strong is receiving a new illustration in Australia. Of all animals the timid rabbit would seem to be the last that would ever wage a war of extermination against man; and yet that is precisely what it is doing in Australia. One colony has already lost two millions of sheep by them; the plague is spreading northward at the rate of 100 miles or more a year; and the *Federal Australian* says that the rabbit invasion threatens the great industry of the colony with ruin. "The impossibility of feeding large flocks of sheep and innumerable rabbits at the same time on the same breadth of pasturage, is just as great as would be that of growing wheat and hay on the same soil. There is only one alternative in this case: either the flock owners must expel the rabbits, or the rabbits will expel the flock owners." The conviction is that the evil has attained a magnitude which puts it beyond the hope of control by local efforts, or even by any one colony. The movement for the extermination of the rabbits must be simultaneous and universal to be of any avail.

The proposition now is for a general act of the colonial assemblies levying a tax on all lands, whether stocked or not, to meet the cost of a general war upon the invaders by the colonial governments. It is proposed that each colony shall appoint a staff of rabbit inspectors to enforce repressive legislation, each colony undertaking to keep its own borders free from the plague.

"The flock owners over the entire area of the continent," says the *Australian*, "must make common cause in the endeavor to exterminate the plague, and to that end must aid their respective governments by every means in their power. War to the knife must be declared by every individual interested in station property in Australia against a pestilence which positively threatens nothing less than the gradual destruction of the wealthiest interest that has yet grown into flourishing existence in this part of the world."

Having declared general war upon the rabbits, the great question would appear to be the devising of modes of attack that will be at once efficient and economical. One flock-owner is mentioned as having trapped 5,000 of the little pests in a space of four months; others have tried general poisoning, and yet no perceptible check has been put upon the rapid multiplication of the prolific and all-devouring vermin. Shooting the rabbits is out of the question, there are so many of them, their wariness and burrowing habits adding to the hopelessness of meeting the invasion by individual destruction. They must be killed by the million, and at a cost that will not exceed the value of the land reclaimed from their ravages.

Probably the most welcome guest in Australia to-day would be the inventor of a solution for this pressing and all important problem. The money values at stake are enormous; and the successful inventor of a cure for the evil, which so gravely threatens the prosperity and future progress of the Australian colonies, would doubtless make as good a thing for himself as his invention would be for the sheep raisers.

Solidified Tea.

One hundred grms. of ground sugar and 10 grms. starch sugar are boiled with the quantity of water required for solution, until the mass becomes tenacious, but yet remains transparent. After cooling, 50 grms. of tea previously mixed with 50 grms. of dry sugar, are added. The plastic mass is pressed into moulds, and when solidified forms the preserved tea.