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The first section of the cable is about a thousand miles longer than any that had been laid before. This necessitated a considerable increase in copper for the conductor and in gutta percha for the dielectric. The working speed of a submarine telegraph cable depends on, and is inversely proportional to, the product of the total resistance of the conductor multiplied by the total electro-static capacity of the core, so that, other things being equal, the speed varies inversely as the square of the length of the cable. In the long section there were used 600 lbs. of copper and 340 lbs. of gutta percha per nautical mile. On the Fanning-Suva section 220 lbs. of copper and 180 lbs. of gutta percha; and on the remaining three sections the copper and dielectric were in equal proportions of 130 lbs. each.

In the neighbourhood of Fiji at a depth of 2,500 fathoms, a temperature of $31^{\circ} \cdot 4$ Fahrenheit was noted, being the lowest temperature taken during the survey. There is very little difference in the temperature of the ocean at great depths, say below 3,000 fathoms, over a great extent of the earth's surface, the temperature being only a few degrees above freezing point, or 32° Fahrenheit. The greatest depth, 3,070 fathoms, about three and a half miles, was found on the Fiji-Fanning section, where the bottom specimens consisted principally of radiolarian ooze. This ooze is found at the greatest depths, and was obtained by the *Challenger's* deepest sounding in 4,175 fathoms. The United States steamer *Vero* sounded in 5,269 fathoms, 6 miles (this last being the deepest sounding recorded in the ocean), and the material brought from the bottom was radiolarian ooze.

Of the 597 samples of sea bottom obtained on the Pacific Cable survey, 497 were such that they could be divided into distinct types of deposits. It was found that:—

294	samples	referred to	globigerina ooze,
65	"	"	red clay,
43	"	"	radiolarian ooze,
15	"	"	coral mud or sand,
27	"	"	pteropod ooze,
12	"	"	blue or green muds,
11	"	"	organic mud or clay,

The pressure at a depth of 3,000 fathoms, in which a considerable portion of the Pacific Cable is laid, is about four tons to the square inch. When the cable is being laid at such depths, it will be approximately twenty miles astern of the ship before it touches the bottom.

Deep sea cables last longer in the tropics than in the northern oceans. The reason is to be found in the fact that in the tropics marine life, from which globigerina ooze is derived, is more abundant than in the more northerly or southerly waters. It is the sun and the warm surface water that call into life these countless globigerina, which live for a short space, then die and fall to the bottom like dust, making such a good bed for the cable to rest in. In the Arctic currents, where the surface is cold the water does not teem with life in the same way as it does in the tropics, and consequently there is less deposit on the bottom of the ocean.

A submarine cable consists, first of a core, which comprises the conductor, made of a strand of copper wires, or of a central heavy wire surrounded by copper strips as in the Pacific Cable, and the insulating covering, generally made of gutta percha, occasionally of india rubber, to prevent the escape of electricity. As far as cabling is concerned, this is really all that is necessary, an insulated conductor. This, however, would not, in the first place, be sufficiently heavy to lay in the ocean, and secondly, would be too easily injured and destroyed by the many vicissitudes to which it would be subjected. For this reason, a protection in the form of a sheathing of iron or steel wires surrounds the core; the nature, size and weight of the sheathing being dependent upon the depth of the water and kind of ground over which it has to be laid. The deep sea section, being the best protected from all disturbing influences outside of displacement of the earth's crust by earthquakes or volcanic action, is naturally the one of smallest dimensions; and for the shore end, which is exposed to the action of