do the work better. And what has been done there, and the manner of doing it, serves as an example of what we may do, and our manner of doing it at such time when the colony grows older and can spare the cost. Very willingly would many of our officers join such a service in New Zealand, for they would be relieved from the irksomeness of tending on the continuously urgent work of pioneer settlement, to be placed in the privileged position, above the people, of purely scientific observation.

To proceed. After a lapse of a quarter of a century, primary triangulation has only been yet partially cast over the Eastern States from Portland eastwards to Passamaquoddy Bay, and between Long Island and Blue Ridge, Virginia. In all the less populated or less educated States secondary triangulation is had recourse to—such as in Virginia, North Carolina, Mississipi, Washington, and Oregon, and in the more remote parts tertiary triangulation is the governing principle, advancing beyond the two former, such as in North and South Carolina, Florida, Alabama and Texas, in the harbours, gulfs, and estuaries of the Pacific Coast.

Thus even in this department, whose basis was originally intended to be purely geodetic, the operations subordinate themselves to the wants of the public by advancing the practical first.

The concurrent investigations of the American Coast Survey are—deep sea explorations, laws of tides, distribution of magnetism, geodetic connection with primary stations, special hydrographic operations, azimuth and magnetic observations combined, tests of coin weights, longitude by telegraphic signals, characteristics of Gulf Stream, &c., &c.

Such are the labours of a national surveyor when relieved from the more pressing cares of settlement survey, and such will be ours in due time. But if prematurely pressed on the work here must be done in a perfunctory manner, and at the same time retard the occupation of the waste lands.

Having arrived at this conclusion, then, it is clearly in the interests of the settling public, that the General Survey proceed on a practical system, unclogged with *finical elaboration* *—rapid, plain, and unmistakeable—imitating as far as our conditions will permit the great examples that I have cited. But who is to guarantee its continuation in this manner? The necessary limited efforts of one man, such as myself, the proposer, cannot do this. As in the United States and Canada, the Legislature alone can compass the end. Once the present or any other system of State Survey has but the support and approval of the representatives of the people, it may then be pursued with confidence that it will not be overturned, and so that it will complete its task. If this be not done the past history of the survey must be perforce repeated—bad work, doing and undoing, being the rule, not the exception.

Our primary principle of survey being astronomical as contradistinguished from the geodetic, it will be of interest to give an example from many that I might select for the information of Government, in order that it may be clearly shown how far dependence may be placed on the same.

The measurement of longitude between Greenwich and Harvard Observatories have been found by three submarine telegraph routes, with a greatest error of 0″06 of time or 0″9 of arc, equal to 64·8 feet.†

I now adduce an overland galvanic determination across the Continent of North America, between San Francisco, California, and Cambridge, Massachussets.‡

		h. m. s.	s.	h. m. s.	s.
1.	Cambridge to San Francisco direct			3 25 07·370	± 0·007
2.	Cambridge to Omaha	1 39 15·069	± 0·008		
	Omaha to San Francisco	1 45 52·294	± 0·010		
				3 25 07·363	± 0·013
3.	Cambridge to Salt Lake	2 43 04·187	± 0·008		
	Salt Lake to San Francisco	0 42 03·204	± 0·008		
				3 25 07·391	± 0·011
4.	Cambridge to Omaha	1 39 15·069	+ 0·008		
	Omaha to Salt Lake	1 03 49·101	± 0·008		
	Salt Lake to San Francisco	0 42 03·204	± 0·008	3 25 07·374	± 0·014
			Mean value	3 25 07·375	± 0·006

Differences—1st and mean − ·005 = 6·00 feet.
2nd ,, ,, − ·012 = 14·40 ,,
3rd ,, ,, + ·016 = 19.20 ,,
4th ,, ,, − ·001 = 1.20 ,,

Thus, at worst telegraphic signal for longitude, is superior in correctness to primary triangulation of 2nd class at 422·4 miles, and of 1st class at 844·8 miles.

With the approval of the Government it is my intention, at an early date, or as soon as the Standard Survey is sufficiently far advanced, to connect the various initial points of circuits by galvanic signal, using the instruments of most recent construction, so that our geography will rest on the accurate basis which these afford—which I anticipate will be admitted to be unquestionable.

V.—Spotting Surveys.

Figs. 5 and 6 give specimens of the forms which "spotting" and "gridironing" surveys take "under free selection before survey," a system which has had higher development in the Provincial District of Canterbury than in any other—though all possess it more or less—but none to such refinement and intricacy.

It would be out of place in me to venture on any remarks as to the policy of the same; for the policy must be adapted to the wants of the people; and what suits at one period of their progress does not suit at another. The attention of the Government is therefore solicited by me only to the aspects which affect the survey, marking, and record of the system.

* The term "finical elaboration" becomes applicable when high science is affected, where good practice alone is required, or is admissible by the public convenience.

† "Electric Telegraph Journal," London, October 15th, 1873.

‡ United States Survey, 1870-71. Page 100.