

coast. The surveys are made by means of the plane table, the original or field sheets being on a scale of six inches to a mile. On these maps or charts are represented the outlines of the shore, the irregularities of the surface, the forms and dimensions of the hills, forests, streams, rocks, meadows, towns and villages, with the most perfect accuracy. Incidentally, much valuable information has been obtained with reference to the Gulf Stream, that mighty warm river which marks the approach to our coast, and is so important a feature in the physics of the ocean.

Such progress has been made in the study and observation of the tides, that for some years past tables have been published by the Coast Survey office giving with accuracy the times and heights of the tides for all the principal parts of the country.

A few statistics drawn mainly from the publications of the office will show an amount of work unequalled by any other survey of the kind in the world.

At the close of 1870 the survey of the Atlantic coast had so far advanced as to be nearly completed from the Penobscot to St. Augustine, and Florida Keys and Reef entirely completed, and the Gulf Coast about one half completed, the important localities being first surveyed and the intervening portions filled up afterward. This whole coast line of five thousand miles is accurately represented in a continuous series of one hundred and fourteen charts on a scale of nearly one inch to the mile, besides which all the principal harbors are represented on larger scales, and a series of general charts, embracing the whole in sixteen sheets.

Proportional progress has been made on the Pacific coast, and the whole number of charts now published of the Atlantic, Gulf and Pacific coasts is about two hundred and fifty, unsurpassed by any work of the kind ever executed.

In order to obtain these results, the survey has covered with its triangles sixty thousand square miles, and has determined the geographical position of twelve thousand stations. The topographical branch has mapped twenty one thousand five hundred square miles on a general coast line of forty-eight hundred miles, and delineated a shore line of fifty thousand miles. In the hydrographical branch nine million six hundred and nineteen thousand soundings have been made in lines which, united, make up the round sum of two hundred and twenty five thousand miles. These soundings are not taken nor the lines in which they are run at random, but with the same systematic accuracy that pervades the whole of the work.

THE LAW OF STORMS.

In the fourth meteorological report by Professor S. P. Espy, of Washington D. C. We find the following instructive generalization:—

1. The rain and snow storms, and even the moderate rain and snows, travel from the west toward the east in the United States during the months of November, December, January, February and March, which are the only months to which these generalizations apply.

2. The storms are accompanied with a depression of the barometer near the central line of the storm, and a rise in the barometer in the front and rear.

3. This central line of minimum pressure is generally of great length from north to south and moves side foremost toward the east.

5. The velocity of this line is such that it travels from the Mississippi to the Connecticut River in twenty four hours, and from the

Connecticut to St. John, Newfoundland, in nearly the same time, or about thirty six miles an hour.

6. When the barometer falls suddenly in the western part of New England, it rises at the same time in the valley of the Mississippi and also at St. John, Newfoundland.

7. In the great storms the wind for several hundred miles on both sides of the line of minimum pressure blows toward that line directly or obliquely.

8. The force of this wind is in proportion to the suddenness and greatness of the depression of the barometer.

9. In all great and sudden depressions of the barometer there is much rain or snow; and in all sudden great rains or snows there is a great depression of the barometer next the centre of the storm and rises beyond its borders.

10. Many storms are of great and unknown length from north to south, reaching beyond our observation on the Gulf of Mexico and on the Northern Lakes, while their east and west diameter is comparatively small. These storms therefore move side foremost.

11. Most storms commence in the Far West, beyond our Western observers, but some commence in the United States.

12. When a storm commences in the United States the line of minimum pressure does not come from the Far West, but commences with the storm and travels with it towards the eastward.

13. There is generally a lull of wind at the line of minimum pressure, and sometimes a calm.

14. When this line of minimum pressure passes an observer toward the east, the wind generally soon changes to the west, and the barometer begins to rise.

15. There is generally but little wind near the line of the maximum pressure, and on each side of that line the winds are irregular, but tend outward from that line.

16. The fluctuations of the barometer are generally greater in the northern than in the southern part of the United States.

17. The fluctuations of the thermometer are generally greater in the northern than in the southern part of the United States.

18. In the northern parts of the United States the wind generally sets in from the north of east and terminates from the north of west.

19. In the southern parts of the United States the wind generally sets in from the south of east, and terminates from the south of west.

20. During the passage of storms the wind generally changes from the eastward to the southern part of the United States.

21. The northern part of the storm generally travels most rapidly toward the east than the southern part.

22. During the high barometer on the day preceding the storm, it is generally clear and mild in temperature, especially if very cold weather preceded.

23. The temperature generally falls suddenly on the passage of the centre of great storms, so that sometimes, when a storm is in the middle of the United States, the lowest temperature of the month will be in the West on the same day that the highest temperature is in the East.

Some of the storm, it is true, are contained entirely, for a time, within the bounds of my observers, and in that case the minimum barometer does not exhibit itself in a line of great length, extending from north to south but it is confined to a region near the centre of the storm, and travels with that centre toward the eastward.

From these experiments it may be safely

inferred, contrary to the general belief of scientific men, that vapor permeates the air from a high to a low dew point with extreme slowness, if, indeed, it permeates at all; and in meteorology it will hereafter be known that vapor rises into the regions where clouds are forced only by being carried up by ascending currents of air containing it.

PAYMENT OF TAXES BY THE QUEEN.—In the Manning and Dilke controversy as to the payment of taxes by the Queen the former has decidedly the mastery, and has proved beyond the reach of contradiction from his own department and position that Her Gracious Majesty Queen Victoria pays income tax as levied upon the subjects of this realm which in amount will perhaps balance the amount made by all the admirers of the latter. But go a step further than the Controller, and refer to a document which neither plebeian nor baronet can gainsay—viz, an Act of Parliament—that the Queen pays the same stamp duties as the meanest of her subject (33 and 34 Vict., chap. 97, sec. 5), which received the Sign Manual on the 10th August 1871, is in these plain terms, which even a Dilke cannot misconstrue before the most extremely Radical assembly that can be gathered from the most Democratic population in or out of Chelsea “Except where express provision to the contrary is made by this or any other Act, an instrument relating to property belonging to the Crown, or being the private property of the Sovereign, is to be charged with the same duty as an instrument of the same kind relating to property belonging to a subject.” When this Act was first mooted as a bill in the spring of 1870, the *Court Journal* was the only public print that called early attention to that provision contained in clause 5, and recommended several modifications that were adopted. It is a self denying law not generally known to stand on the Statute Book and one which persons in the lower ranks of life cannot well appreciate as the heavier duties only affect the rich aristocracy of the land. When an estate of £30,000 changes hands the purchaser pays to Revenue one hundred and fifty pounds of stamp duty on the conveyance. A mortgage for the half of the price yields £18 15s. of duty to the Revenue, a settlement for £15,000 implies a duty of £37 10s., a bond of annuity for \$15,000 yields £300 of duty; a lease for £7,000 pays £55. An appointment, to an office yielding £4,100 per annum to the holder must be granted upon a £500 stamp. How can those who shout approval to stamp orators know anything about that world of bias above them where such exactions must be met as well as levied when they are told by angles from that region, girded with the hereditary belt and glittering sword of honor, that taxation is a pressing weight on them, while the highest lady of the land is free from the burden of its weight?—*Court Journal*.

The Russian *Intalide* publishes a detailed report of the armaments of the Russian army. It appears that a sufficient number of breech-loaders now have been manufactured to supply the established number of troops for the army when on a war footing. Metallic cartridges are being constructed to an amount proportionate to the number of rifles. By the 1st of January next, the war office will possess 1,001,188 breech loading rifles. Last November, the numbers ready for issue were 213,927 infantry rifles according to the Carl system, 704,489 infantry rifles according to the Kruk system, and 31,791 cavalry rifles of the same system; total, 950,207. The number of metallic cartridges ready for issue last Nov. was 213,801,000.