A sharp gale from the southward, and heavy sea, now set in, preventing further work; and, after waiting two days for the weather to moderate, the Albatross proceeded on her way, taking several king-fish with trolling-lines as she passed along the Florida reefs. Having taken in coal at Key West, she sailed on the 15th for Havana, where she arrived the next day. Notwithstanding the rough and uneven bottom, several hauls were made with the beam-trawl in 37 fathoms, on the afternoon of the 15th, with excellent results. The next five days were occupied in daily trips out of Havana, and the constant use of the tangles and beam-trawl upon the 'Pentacrinus' ground. Thirty-two hauls, in all, were made, bringing up a large supply of sea-lilies, besides an immense variety of other things, and one specimen of sea-lily supposed to represent a new genus.

Leaving Havana on the 20th, the surface tow-net was put over on two successive evenings just after dark, with poor results, there being very little surface life. On the 21st two hauls (beam-trawl) were made in 426 and 423 fathoms, north of the western end of Cuba, with fair results, notwithstanding coral patches on the bottom. Two wrecks, one a Spanish man-of-war, were seen on Colorado reefs. On the 22d sent down tangles, and afterward small beam-trawl, in 167 fathoms, off the eastern end of Arrowsmith Banks, with excellent results, including many forms unknown to those on board.

After a week spent in studying the fauna of Cozumel Island, off the east coast of Yucatan, the Albatross, on the 29th, visited the south-west end of the island; and, while the gunning and seining parties went ashore, the ship stood off shore, and took two hauls each with the trawl and with tangles in from 137 to 231 fathoms. The tangles brought up many forms new to the party, but the trawls were not successful. Having picked up the shore parties, the ship stood away for the Campeache Banks, and made seven hauls with the beam-trawl, getting many forms new to those on board, besides using the tangles and hand-lines. It had been intended to remain here for several days; but the occurrence of a case of typhoid-fever on board made it desirable to get the sick man into hospital as soon as possible, and Pensacola was headed for as the nearest. There coal was taken aboard, the sick man landed, and the ship sailed again, Feb. 5, to explore the banks off Cape San Blas. On the way out from Pensacola, the three-masted schooner, Fanny Whitman, of Rockland, Me., was discovered ashore in a dangerous position, with distress-signals flying. She was towed off and set afloat; and on the 7th, fishing-lines, tangles, and trawls were put over on the banks (27 fathoms) with satisfactory results. Red groupers were found with ovaries distended, but none fully ripe. Returning to Pensacola on the 9th, the ship sailed again for New Orleans on the 10th, taking soundings every five miles from latitude 29° 27′ north, longitude 87° 44′ west, in a south-south-west direction, to latitude 25° 54′ north, longitude 88° 2′ west (698 fathoms), and running other lines in various directions, east and west, without finding any bank or shoal, and generally confirming the soundings of the coast-survey chart. Three hauls of the beam-trawl, bringing up many specimens unknown to those on board, were made about latitude 29° 10′ north, longitude 88° 15′ west. This locality was found to be so promising, that it will be revisited hereafter.

After running another line of soundings in the direction of New Orleans, the Albatross came to anchor off Algiers on the morning of the 13th of February.

TECHNICAL INSTRUCTION IN AMERICA.

Royal commissioners were appointed in England on Aug. 25, 1882, "to inquire into the instruction of the industrial classes of certain foreign countries in technical and other subjects," and "into the influence of such instruction on manufacturing and other industries at home and abroad." A thin octavo report issued in 1882, and a very voluminous report issued in 1884, contain the results of the investigations of the commission. In vol. ii. of the second report is contained the report on technical education in Canada and the United States, compiled by Mr. William Mather of Salford, Eng., a well-known manufacturer, who has indicated his enthusiasm for technical instruction by the establishment of a well-equipped school for apprentices employed at his works.

Mr. Mather arrived in New York on May 23, 1883, and, after a six-months' tour through the states and the British possessions, returned to England on Nov. 1, in the same year. Special inquiries were made by him upon the subject of technical and industrial education in twenty-two different cities, including San Francisco, Richmond, and the most important intervening cities. Not less than one hundred educational institutions and manufacturing establishments were visited, but reports were made only upon the typical institutions visited. Mr. Mather has divided the results of his inquiries into four parts:—

1°. A general view of the public schools in cities and counties, and a description of the scientific training in the colleges and universities in the various states.

2°. The technical, industrial, and manual training-schools and art-schools.

3°. The effect of these institutions on the industries of the country, through the intelligence of the proprietors, foremen, and work-people.

4°. The influences and institutions, other than schools, tending to the advancement and improvement of the industrial population.

There is also an appendix to the report, containing statistical information, letters from prominent educators, and abstracts of methods of instruction in different places.

Second report of the royal commissioners on technical instruction. Vol. ii. No. 2. Report on technical education in the United States of America and Canada. By William Mather. London, *Eyre & Spottiswoode*, 1884.

A very favorable account is given of the attendance at the schools, the subjects taught, and the methods of administration. The prevalence of illiteracy in certain sections is noted. Attention is called to certain phases of the labor question; in particular, strikes, trades-unions, machinery, wages, and prices. Several pages of the report are devoted to the technical and art schools of Canada.

The most interesting portions of the report are parts ii. and iii., relating to the colleges and institutions devoted to art, science, and technical instruction. Special attention is called to Columbia college, the Cooper union, Workingman's school (Adler's), Steven's institute, Cornell university, Massachusetts institute of technology, Sheffield scientific school, Worcester free school, St. Louis manual training-school, University of California, Girard college, Maryland institute, Johns Hopkins university, Harvard college, Hampton normal institute, and other art and science institutions. The methods of instruction, the plan of government, the resources and special features of each institution, are critically noted; but only that phase of the instruction given which pertains directly or indirectly to technical education is emphasized. Very little space is devoted to the handicraft schools in which the industrial education is made an end, and not a means to foster intellectual development. The definiteness of aim, and the practical character of the instruction given, in the schools of technology, are commended in high terms. The ambition of the student is sustained by a reasonable expectation of entering upon a useful career at the close of his scholastic labors. The employment of manual labor as a part of intellectual training is favorably commented upon. Mr. Mather quotes a familiar expression of employers of labor: 'Our brightest boys come from the country.' Not that he would disparage the mental grasp and acumen of the city-bred boys; but the habit of using a great variety of tools fits the farmer's boy to profit by the instruction given in the workshops and laboratories of polytechnic schools. Professor Brewer's recent lecture on the educational value of the farm may be here cited in confirmation of Mr. Mather's views.

As one example of the great interest taken in technical instruction by a wealthy community, mention is made of the generous endowment of a hundred thousand dollars received by the training-school of Chicago from the 'Commercial club' of that city, — an organization composed of eminent business-men. The munificent gift of Mr. Peter Cooper of New York, resulting in the erection of the 'Cooper union,' is specially noted. The St. Louis manual training-school of the Washington university is commended for its wise adaptation of manual labor to mental culture. The progress made in industrial, decorative, and the fine arts, is regarded as very gratifying.

It is somewhat unfortunate that Mr. Mather did not have time to inspect the results of the industrial art education given by Mr. Leland in the public schools of Philadelphia. The very favorable notices already received by Mr. Leland from European educators leads the writer to believe that a close analysis of his methods by such a well qualified observer as Mr. Mather would have thrown much light upon this phase of the industrial movement in America.

Close attention was paid to the workshop-schools erected by certain great railroad corporations to educate apprentices for resporsible positions in the service of the roads. The Altoona shops of the Pennsylvania railroad are cited, where a high grade of technical instruction is given to employees as a means of securing to the company 'an unbroken succession of officers.'

No comment, however, is made upon the efforts being made in several sections to introduce technical instruction into the public schools. But this phase of the industrial education movement is so recent, that it has hardly advanced beyond the domain of theory. At least three methods have been advocated by well-known educators, in regard to manual training in public schools: viz., 1°, that specific trades should be taught as a part of the present system; 2°, that manual instruction should be limited to a general use of certain tools and machines; 3°, that public workshops should be erected to teach only manual training. Mr. Mather, however, noted the difficulty experienced by boys in securing places in machine-shops, on account of their ignorance of tools and machines; and he suggests that practical instruction in this direction would be very helpful to many boys in our large cities.

Not a single institution was heard of in America, by our Manchester visitor, which aimed to give training in the textile industries. In all manufactures which involve the knowledge of the qualities of fibre, and the process of working raw material, the only safe reliance is upon skilled foreigners. No investigations were made upon the mechanical industries of the southern states; but the enormous resources of this entire section, and the possibility of educating its people to rely upon their own skill and invention, must soon attract attention to the subject of technical and industrial education in that region.

Mr. Mather is of the opinion that the technical schools of America have already accomplished great results; but their high fees often tend to exclude the artisan class. Evidences of the good influences of these schools are indeed discernible in almost all the large shops and manufactories; but the advantages have been reaped almost entirely by the employers and their managers. It is vitally important that the ordinary journeyman should share the advantages of technical training. The importance of schools of pure science is pointed out, and much gratification is expressed at the important scientific discoveries already made in some of the foremost educational institutions. No one can predict, says Mr. Mather, to what practical purposes a new scientific principle may be employed.

The special report on technical education in America was indorsed in most favorable terms by the royal commissioners, and is commended to educators as deserving of most careful perusal.