form of a committee, it should be placed on the same footing as the Meteorological council. The person or persons so appointed should be responsible for all the operations of the department, and of such scientific training and capacity as to be likely to devise the most useful lines of inquiry and administration.

The 'naturalist-inspectors' should be six in number, but operations might be commenced with a smaller staff. They should be thoroughly competent observers, and, under the direction of the chief scientific authority, they would be variously employed, either on the surveying-ship, at the chief laboratory, or in local laboratories, hatching-stations, or in the London office and museum.

The naturalists thus employed would become specialists in all matters relating to the life-history of fishes and their food : they would acquire a skill and knowledge far beyond that which it is possible to find among existing naturalists, who occasionally are requested to make hurried reports on such matters as salmon-disease, or the supposed injury of the herring-fisheries by trawlers.

One of the naturalist-inspectors should be a chemist and physicist, in order to report on the composition of the water and the nature of the bottom in the areas investigated.

'Clerks' would be required in the London office to tabulate statistics and carry on correspondence. These gentlemen need not necessarily have any scientific knowledge. It would probably be necessary to have a correspondent or agent of the department in every large fishing-centre. Probably the coast-guard officials might be taken into this service.

With regard to material equipment, it appears to be necessary that a scientific fisheries department should have at its London office a museum of fishing-apparatus for reference and instruction, and also complete collections illustrative of the fishes, their food, enemies, and other surroundings. In the same building would be exhibited maps showing the distribution and migrations of food-fishes, the coast temperature and its variations, the varying character of the sea-bottom, sea-water, etc.

The surveying ship or ships would be provided by the admiralty.

A central laboratory is in course of erection upon Plymouth Sound by the Marine biological association. Her Majesty's government has promised to contribute £5,000, and £500 a year, to this institution, on condition that its resources are available for the purpose here indicated. Certain of the 'naturalist-inspectors' (probably three at any one time) would be stationed at the Plymouth laboratory in order to carry on special studies of the development and food of particular species of fish.

The smaller movable laboratories, steam-yacht, and other appliances would not be costly.

RAY LANKESTER.

NOTES AND NEWS.

WE learn from a letter of Professor Holden's, in the last number (2724–25) of the *Astronomische nachrichten*, just received, that the Lick trustees have decided to purchase from Messrs. Feil & Mantois a 36-inch crown disk, which was made by them at the same time with the crown disk of the objective now in the hands of the Clarks. The Clarks "have received the order to figure this disk as a third (photographic) lens for the large objective."

— The work of the U. S. fish commission shows most gratifying results in the artificial propagation of shad. An unprecedented abundance of these fish is noticed this season in all the rivers which have been supplied with young fish by the commission. This increase is noticed especially in the waters of the Pacific coast, where shad were unknown previous to their introduction by the U. S. fish commission.

— The New York assembly has passed the bill providing for the appropriation of twenty thousand dollars annually to the Metropolitan museum of art and the American museum of natural history, in order that they may be kept open to the public, free of charge, on Sundays. It is expected that it will soon be favorably reported by the senate committee, and become a law.

— The house committee on agriculture has reported favorably the bill to establish agricultural experimental stations in connection with the colleges established in the several states ; also the bill to enlarge the powers and duties of the department of agriculture, making it an executive department.

— The U. S. coast survey has issued the following charts, which are now ready for the public : Topographical sheets of the re-survey of the harbors of New York, Brooklyn, and Jersey City. It is intended to combine these sheets with the hydrographic work already executed, and thus to give an extended and accurate map of all the waters lying around New York City.

— An international maritime exhibition will be held in Havre, May 1 of next year, to be devoted to all kinds of sailing or steam ships, engines, life-saving contrivances, fisheries, and the products of the French colonies. Applications to

exhibit may be made to the Direction de l'exposition maritime internationale, 118 Rue de Paris, Havre.

— A Japanese invention for making paper of seaweed, says *Engineering*, is announced. It is thick in texture, yet sufficiently transparent to be used as a substitute for glass in windows.

— The total output of coal in France for 1885 was 19,534,341 tons.

— The total annual production of naphtha in Russia during the past year reached 1,800,000 tons, — a very great increase over that of preceding years; and already a foreign market, especially England, is sought for its consumption.

— On March 17 the Smith college branch of the Audubon society was organized. The society now numbers ninety members, and is thoroughly interested in the theoretical and practical work connected with ornithology. Meetings are to be held once a month, when the members will read papers embodying the results of original research, or will listen to lectures from well-known ornithologists. Field-work has been begun under the guidance of Mr. John Burroughs, who took parties of observers out into the woods and meadows to study the birds in their homes, and to learn their notes. For regular field-work, the society is divided into groups of ten, under the direction of some experienced member, who teaches them the art of intelligent and accurate observation. Each party goes out for observation at a stated hour in the day, twice a week.

— Statistics of Saxony, with its three million inhabitants, show a very large number of professional and industrial schools and students. There are 235, with 17,000 students in attendance. They are devoted to a great variety of branches of special and technical education. Three, with 270 students, are for instruction in the manufacture of toys; a like number, with 60 students, are devoted to spinning; 35 teach the art of ribbon-manufacture to 1,500 apprentices; and at Dresden there are 100 pupils at the German academy of weaving. There are 25 commercial schools, with 2,800 in attendance upon them. Of the industrial schools proper, there are three, — at Mitweida, Leipsic, and Chemnitz, — having nearly 1,000 students altogether.

— Dr. Werner Siemens has placed at the disposal of the German government the sum of $115,000, to establish an institute for carrying on experiments in natural science. It is proposed to erect a building in which studies in exact science may be prosecuted.

— The following field assignments of coast-survey assistants have been made: Assistant Dennis is now engaged on the re-survey of Long Island; Assistant Jardella has the district from Ward's Island east to Throg's Neck; Assistant Hosmer will take up the re-survey of the north shore of Long Island Sound on the 1st of June.

— An effort is being made in Washington to obtain some suitable position for Lieutenant Greely, who is unable to perform active army service on account of his health. To this end Senator Harrison of Indiana is urging the passage of a bill for the appointment of an assistant adjutant-general, which office is intended for Lieutenant Greely. It seems most fitting that this gallant officer should receive some recognition from his government for his heroic services.

— The fish-commission steamer Albatross arrived at Washington on Tuesday last.

— *Science observer* circular No. 66 contains the announcement of the discovery by Dr. Luther, apparently on May 4, of an eleventh magnitude asteroid. This becomes number 258.

— The new science hall at Smith college, which was begun last summer, is rapidly approaching completion, and will be formally opened and dedicated on Tuesday of commencement week (June 20). The principal address on this occasion will be given by Prof. J. P. Lesley of Philadelphia. The building is the gift of a friend of the college, whose name will be announced at the opening. It is of brick, with brown stone trimmings, three stories in height and about ninety feet long and fifty wide, with an ell thirty feet wide and some twenty-three feet in length. The well-lighted basement and the ground-floor are to be occupied by the departments of chemistry and physics, while the first and second floors are for the work in biology and geology and the collections belonging to these departments.

— The spring meeting of the Indiana academy of sciences will be held at Brookville, Ind., May 20 and 21. This will be the first meeting of the academy since its organization, and an invitation is extended to all those interested, to attend it.

— M. Bender, in the *Moniteur scientifique*, describes a new system of lighting. He employs the fatty residues obtained from the rectification of crude mineral oils, through which he passes a current of air. The air takes up a definite quantity of this hydrocarbon, and the flame produced is very brilliant, giving off no smoke.

— The outbreak of cholera in Europe at Brindisi, from which much was feared, appears from late news to be rapidly diminishing. There have been but few deaths; and intelligence from other parts

of Italy indicates, that, with the exception of the northern part of the Adriatic, the peninsula is quite free from the disease.

— Fish-commission car No. 1 left Havre de Grace, Md., on Sunday last, with 1,500,000 young shad for Broad and Saluda Rivers, South Carolina. On its return it will take the same number of shad fry to Portland, Ore., for stocking the Columbia River basin.

— The Hibbert lectures for 1886 are now being delivered in London on Mondays, Wednesdays, and Fridays, and are repeated at Oxford on Thursdays and Saturdays. The lecturer this year is Professor Rhys of Oxford, and his subject is 'The origin and growth of religion as illustrated by Celtic Heathendom.'

— Mr. D. P. Wainright of the coast survey has completed the trigonometrical work in the vicinity of Cape Fear River, North Carolina. The field-parties from the south will begin to arrive in Washington about the middle of June. Parties will be sent east and north for field-work about the first of June.

— The ethnological collections of the British museum are now said to be for the first time adequately displayed. New rooms, formerly occupied for zoölogy, have been devoted to them, and recently thrown open to the public. The collection is now thought to be the best and most representative in the world.

— Messrs. James Pott & Co. have brought out an edition of Pressensé's 'Study of origins,' which first appeared in its English version in December, 1882. The author is a learned and accomplished Protestant minister of Paris. His position is that of a Kantian who firmly believes in God, the soul, and the future life; but he is liberal and broad, vindicating the complete independence of science, and saying unequivocally that neither the Bible nor the councils have any prescriptive right to control science. He is convinced that experimental science is not hostile to the principles of theism; and that, if 'the possibility' of a divine and moral world be conceded, there are processes of experiment which will supply the demonstration. From this basis the author discusses the problems of knowledge, being, and duty in the light of modern German, French, and English philosophical writings.

— The publishing-house of Justus Perthes has recently begun a new edition of Berghaus's 'Physikalischer atlas,' which will contain seventy-five maps. The first *lieferung* contains a map showing the distribution of the flora of Europe; another, the isotherms of the world; and a third, the soundings in the Mediterranean and Black seas, and also the character of various portions of the shore, which is undergoing rapid changes.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

A thunder-squall in New England.

THE study of thunder-storms that was undertaken as a special investigation by the New England meteorological society in the summer of 1885 was successful in gathering records from a good number of volunteer observers, on which a tolerably complete statistical account of the storms may be based: thus there appears a distinctly earlier afternoon maximum of storm-frequency in western than in eastern Massachusetts, implying that distance from some at present unknown district of origin, as well as high temperature, exerts a control on the time of the storm's arrival east of the Hudson. In several of the better-developed storms the data accumulated were sufficient to define the more prominent physical features of the storm with considerable accuracy: this was especially the case with the small but violent thunder-squall that crossed New England about noon on July 21, 1885. The storm belongs to a class first clearly defined by Dr. Hinrichs, director of the Iowa weather-service, several years ago, and differs distinctly from the tornado in having a blast of outrushing air in front of its rain. The example here described came to us from western New York, where certain observations furnished by Prof. H. A. Hazen of the signal service reported it about six or seven o'clock in the morning: two of our observers in central and eastern New York recorded it at later hours; and at a little after ten o'clock it entered New England near the notorious Boston Corners, the former south-western angle of Massachusetts; thence it followed an almost due-east path, gradually broadening its rain-area, as it advanced, until it ran out to sea a little after noon, its average hourly velocity being forty-eight miles. All observers agree in giving it a rapid approach, a short, violent passage, and a quick disappearance. Very soon after its clouds were seen and thunder heard, the brief wind-squall came rushing in advance of the pouring rain; and an hour or so later the whole storm was out of sight in the east. With the wind came a rapid fall of temperature and a distinct increase of pressure. The thermograph, barograph, and anemograph curves, furnished from the city engineer's office in Providence, are here particularly interesting, as they record fluctuations produced by the nearly central passage of the storm. The temperature fell 13° in half an hour as the storm came overhead, and soon rose again to a high afternoon maximum as the clouds cleared away. The barometer quickly rose four-hundredths of an inch at the arrival of the storm, and the wind increased from a gentle breeze to a rate of about forty miles an hour.

The persistent individuality of this storm, maintaining a constant association of its several features over the greater part of its observed path, justifies the construction of a 'composite portrait,' by means of which all the observations are thrown into their proper position with respect to two governing lines, — the rain-front and the storm-axis. In this figure, the curved lines, convex to the east, measure fifteen