cussion of the unusual optical phenomena of the atmosphere, of which so much has been written. This part is divided into a number of sections, of which the first describes fully the phenomena, and is illustrated by two magnificent chromolithographs. In the long discussion on the proximate cause of the unusual twilight phenomena, F. A. Rollo Russell arrives at the conclusion that a dry haze at a great altitude was their cause. The physical conditions of this phenomenon were the reflection of sunlight on small vitreous surfaces when the intervening air is darkened. He rejects the theory that condensed vapor caused the unusual twilight phenomena, for a number of reasons, principally because spectrum observations and the nature of the corona do not support this view. Besides this, the structure of the haze resembled more that of smoke than that of the highest clouds; and previous effects seen in years of great eruptions, and in places affected by an excess of dust in the air, are very much like those observed in 1883 and the following years. In the same section of the report the colored appearances of sun and moon, which were confined to the tropics, the sky haze, and the corona, are discussed. E. Douglas Archibald, who is the author of the last-mentioned part of the report, describes the corona, which is generally known as 'Bishop's ring,' very thoroughly, and shows that it was probably formed in the haze stratum, and that it was formed by diffraction. Its great size proves that this haze was composed of exceedingly small particles, the diameter of which is computed at .00159 of a millimetre. The occurrence of a corona at a very high altitude, as well as the general absence of accompanying refractive halos, tends to show that the particles through which the diffraction took place were solids and dust rather than ice. Although the corona was associated with the twilight glows and colored suns in being produced by the same elevated haze, it was physically distinct from either, and probably contributed only very slightly to the glows after the sun sank below the horizon.

A long list of dates of the first appearance of optical phenomena — a result of a careful scrutiny of numerous periodicals, logs, and of an extensive correspondence — serves as the basis of a study of the geographical distribution of the various sky phenomena, which proves that it spread rapidly westward, having a velocity of about seventy-six miles an hour.

The researches of E. Douglas Archibald on the height of the glow stratum are of great interest. We will not enter here upon his discussion of Professor Kiessling's theories, as this was the subject of a letter recently published in *Science* (No. 298). The principal results of his inquiry are the following: In the brilliant glows which began in the tropics after the eruption of Krakatoa on Aug. 26 and 27, there is distinct evidence of a primary glow caused by the direct rays of the sun, and of a secondary glow succeeding this, and due to reflection of the primary glow through the same stratum. These primary and secondary glows correspond to the first and second crepuscular spaces of ordinary twilight, the main difference between the secondary of the present series and the ordinary second crepuscular space being that the former was colored, whereas the ordinary second twilight is white, and seen only from high altitudes or in peculiarly favorable circumstances. The glow-causing material appeared suddenly and at about its greatest height at first near Krakatoa, and on its subsequent spread into the extra-tropics it appeared at a lessened altitude. The height of the upper or middle part of the stratum progressively diminished from 121,000 feet in August, to about 64,000 feet in January, 1884. By April, 1884, a considerable portion of the larger reflecting particles had sifted out by gravitation, causing a minimum duration and brilliancy of the secondary glow. As this occurred simultaneously with a maximum development of the corona, it appears probable that a large portion of the finer material remained in suspension at nearly the same height as at first, and that, having become more homogeneous than at first, it was rendered capable of exerting its maximum diffractive power. In the autumn and winter months of 1884 and 1885 the brilliancy of the glows was partially renewed, and thus it is rendered impossible to arrive at any certain deductions regarding the rate of descent of the stratum as a whole. The final effects of the glow-causing material were produced by the prolonged reflection from the lofty stratum of rays partly deprived of their red component by the action of the stratum itself, and to a much larger extent subsequently deprived of their blue components by the ordinary dust and vapor particles of the lower atmosphere. It was therefore mainly an intensification of ordinary twilight phenomena, consequent on the presence, at a lofty altitude, of solid particles not usually existent there.

The whole volume is full of information of the greatest value, and the mass of material collected, as well as its thorough discussion and the clear mode of its treatment, deserves our fullest admiration.

THE UNITED STATES FISH COMMISSION'S WORK DURING THE PAST SEASON.

THE United States Fish Commission has accomplished more, both of practical work and in the line of original investigation looking to practical work in the immediate future, this year than during any previous season of its history. A brief review of its work in both of these departments is given herewith.

An account of the shad-hatching operations of the commission last spring, and a description of the experiment of shipping lobsters to California, and the planting of them in the Pacific Ocean north and south of San Francisco, were given in *Science* (xi. 246, xii. 27) several months ago. In connection with shad-hatching, Commissioner McDonald has been trying this summer a very important and interesting experiment. It is well known that the young shad-fry hatched at the United States Fish Commission stations are not kept until they become little breathing fishes. No means of accommodating them have heretofore existed. It is also known that the mortality among young shad is far greater in the earlier than in the later periods of their existence. The longer they live, the better the chance they have of continuing to live. It is known that only an infinitesimally small percentage of the shad-fry placed in rivers in the spring survive and come to maturity; but so enormous is the number hatched and planted, that those that do escape the scores of enemies they encounter are sufficient to stock abundantly, in a few years, the stream in which they are placed.

This year Colonel McDonald secured on a government reservation in Washington the use of a pond about six acres in extent. In this he caused to be placed, in June, two million shad-fry, and there are now in the pond eight hundred thousand young breathing shad from three to four inches in length. These will all be turned into the Potomac next spring, when they will be much larger than now; and the result will be that the number of fishes put into the river at the opening of the next season will be three times as great as the number taken out last season. The percentages of survivals is probably some thousands of times greater than if the fry had been placed in the river soon after they were hatched. In connection with the work of stocking other streams, and in view of the success that has attended this first experiment, much attention will hereafter be given to the propagation of shad in ponds.

During the past summer a new and very important branch of work has been taken up. When a freshet occurs in the Lower Mississippi River, it inundates a belt of country of an average width of about sixty miles, and the territory along its tributaries is covered with water to an extent varying with the topography of the country and the sizes of the rivers. These floods carry with them, of course, enormous quantities of the indigenous fishes of the rivers; and when the waters recede, ponds and lakes are left in the frequent depressions of the surface. These often actually swarm with fishes and with the millions of fry that have been naturally hatched in them. But later in the season a majority of these ponds and lakes dry up, and not only the mature fishes, but the millions of young ones perish. Colonel McDonald this year sent to these Western and Southern rivers the cars of the Fish Commission, with a sufficient force to seine these ponds and lakes, gather up the small fishes, and to plant them in the rivers where they naturally belong, many of which have been depleted by over-fishing and by the effects of the floods. More than a hundred thousand young fishes were thus planted during the past season; and it is the intention of Commissioner McDonald, in restocking the rivers of the West and South with indigenous fishes, to utilize in the way described nature's great hatcheries, instead of incurring the much greater risk and expense of artificial propagation.

The rivers operated upon during the past season were the Ohio

and Muskingum in Ohio, the Blue River in Indiana, about twenty rivers and ponds in Illinois, the Barren and Green Rivers in Kentucky, and the Current River in Missouri, besides a number of lakes, Geneva Lake in Wisconsin, and the Blue, Beaver, and Alcorn Rivers in Nebraska. The varieties of edible fishes planted in these rivers include all the common kinds, such as spotted cat, crappie, or fresh-water drum, several species of bass, white perch, and pickerel.

On the Pacific coast the propagation of salmon was renewed, and during the season about five million salmon-fry were placed in the Columbia and McCloud Rivers and in the shorter streams on the coasts of California and Oregon.

On the Great Lakes the propagation of whitefish has been continued, but on a far greater scale than ever before.

In former days the inshore cod and halibut fisheries on the coast of New England were exceedingly valuable, as they still are on the Pacific coast. Thousands of men of small means, and owning little boats and comparatively primitive apparatus, earned comfortable livings by fishing for cod in the Gulf of Maine, Massachusetts and Cape Cod Bays, Vineyard Sound, Long Island Sound, and at many other points along the coast. The fishes were taken in abundance and sold fresh, — the most profitable way to the fisherman. But this source of wealth has been largely destroyed by over-fishing; and in few places along the whole coast of New England, outside of Ipswich Bay, are the cod plentiful enough to pay the fishermen for attempting to take them. To catch cod or halibut in large quantities now, one must go to the offshore banks; and this a majority of these inshore fishermen are too poor to do, or they have domestic ties that keep them at home, or they think the risk too great or the labor too severe to be compensated for by the average 'fares.' The halibut were the first to disappear, and the cod and lobsters have also been caught up; so that now all three are very scarce. These inshore cod never migrate to the offshore banks. During a part of the season they remain quite near the shore, and later move out into deeper water, but never to a great distance from the points where they are found during the fishing-season.

In 1878 it was demonstrated by experiments made by the United States Fish Commission that the eggs of the inshore cod could be artificially hatched, and that the small fishes that survived would return to the shore the next year. A majority of the young cod were, however, killed that year by anchor-ice. Several times subsequently small quantities of inshore codfish-eggs were artificially hatched, but last year the hatching of these codfish-eggs was begun on a large scale. The result was entirely satisfactory. Thousands of the young cod that were hatched during the season of 1887 were seen last spring and summer, and there is no longer any doubt that the inshore fisheries of the New England coast may be restored. This will be as important a result (probably more important) as the work which the Fish Commission has accomplished in regard to stocking rivers with shad; and, according to conservative estimates, the increase in the supply of this valuable food-fish, as a result of the work of the commission, is, in actual value, very much greater than the entire cost of the commission, with all its varied work, from the time of its foundation to the present.

Preparations have now been made for the artificial propagation of inshore cod during the present season on an immense scale. The stations have a capacity for handling four hundred million eggs; and, if the season is favorable, about one-fourth of that number will probably be hatched. The principal obstacles are stormy weather and anchor-ice.

In Maine and upon the Hudson River the work of propagating salmon has been prosecuted during the past season.

During the last twelve months, new fish-commission stations have been established or re-opened, as follows: Clackamas station on the Columbia River, and Baird station on the McCloud River, for salmon-work, put into operation again; an extensive station at Duluth for the propagation of whitefish and trout; a large station at Gloucester, Mass., for the hatching of the eggs of inshore cod. The United States Fish Commission is operating, during the present season, the State station at Sandusky, O., in the propagation of whitefish. Congress, during its late session, provided for a large station at Neosho, Mo., for the propagation of trout and the indigenous fishes of the region. This will be completed by the end of the fiscal year, and is expected to benefit Missouri, Arkansas, Kansas, Texas, and western Louisiana.

The most extensive and important work done by the Fish Commission during the past season, in the way of exploration with a view to future practical results, was that accomplished by the steamer 'Albatross' on the Pacific coast. This steamer, which, since she was built five years ago, had been engaged in work on the Atlantic coast, started around the Horn after the close of last season. She arrived in San Francisco late in the spring, and, July 4, sailed for the Alaskan fishing-grounds. It has been known that the sea-fisheries of the Pacific coast are very extensive and very rich, but they are practically undeveloped except in the vicinity of San Francisco. The purpose of the commissioner in sending the 'Albatross' to the Pacific Ocean was, by a series of careful surveys, to ascertain the locations of the sea-fishing grounds of all kinds, their extent, character, productiveness, their nearness to market, the kinds of bait that might be used, the methods of obtaining it and its abundance, and, in short, to develop the sea-fisheries of the Pacific coast.

Important banks are distributed along the coasts of Washington Territory and Vancouver's Island, at points easily accessible from the ports in Puget Sound. The fishes upon them are very abundant. They swarm with halibut, and also furnish cod in abundance. It was on these grounds that the Gloucester fishing-vessel, 'Mollie Adams,' owned by Capt. Solomon Jacobs, did her successful halibut-fishing during the last summer. She kept her halibut fresh, and shipped it in that condition to the New York and Boston markets, where, in no way inferior to that landed at Gloucester, it was sold at eight cents per pound, while the price of Eastern halibut was twelve cents a pound.

It must not be inferred from this that Pacific coast halibut can compete successfully in New York and Boston with that caught on the Grand Banks. In the first place, the price at which the Eastern halibut was sold was not the natural one, but had been fixed arbitrarily by a 'trust.' Yet the Pacific coast fishermen have some very important advantages. Three or four trips can be made there to one to the great banks of the Eastern coast. These Pacific coast fisheries are also conveniently near ports of shipment. Then Captain Jacobs secured unusually low rates of freight; and, even if he had made no money, he would undoubtedly have sent his fresh halibut East in a spirit of bravado, and to show those people who had laughed at him for taking the 'Mollie Adams' to the Pacific Ocean that he didn't go on so much of a fool's errand, after all.

The permanent markets for fresh halibut caught on the Pacific coast will be San Francisco, and other cities and towns of California that are rapidly growing into importance; the great mountain cities of Salt Lake City, Denver, etc.; and all the Mississippi valley as far east as Chicago, and extending north and south from Duluth to New Orleans. In all this vast territory the reduced expense of catching halibut will enable the Pacific coast fishermen to compete successfully with those who land their fresh halibut at Gloucester.

In Alaska the fishing-banks correspond in their extent, character, kinds, and abundance of fish, with the great offshore fishing-banks of eastern North America. They are inhabited by the same species of cod and halibut that occur on the east coast; and, although the general positions of these Alaskan banks has been known for some years, they have never been surveyed, and the few fishermen who resort to them find the rich spots by trial, and return to them from time to time. The most important of these banks are situated just off the coast from Unalaska to some distance east of Kadiak Island, — an extent of from six hundred to seven hundred nautical miles: that is to say, that, throughout the region whose boundaries have been given approximately, the fishing-banks are as well defined as those on the Atlantic coast; but good fishing occurs both to the north and south throughout the Alaskan coast, while on the north the cod-fishery is limited only by ice.

These banks are a very valuable and important possession. Great quantities of cod are now to be found there, and an industry can be built up that may be made very profitable to the Pacific seaports. Of course, the cod caught on these banks will be salted, and the markets for them will be almost unlimited. They will comprise, besides our own country, the western parts of Mexico,

Central and South America, Japan, China, Australia; in short, the entire populations who live upon or near the Pacific and Indian Oceans.

It is the mission of the 'Albatross' to explore all the fishing-grounds on the Pacific coast. It is expected that she will remain at work the whole year, except during periods occupied in refitting and repairs, and that three or four years will be spent in completing the work. She will spend the summer in the north, working southward as winter approaches. Some of her winter work will be done on the coast of southern California.

The 'Albatross' returned to San Francisco Oct. 21, from her first cruise to the north. She had spent about two and one-half months upon the Alaskan fishing-grounds, and one month in the region off Cape Flattery. A very careful series of soundings was made of the grounds visited; and these, when plotted on charts and represented graphically, will give the contour of a very large fishing-area, to which the attention of fishermen will be called. In addition to this, the regular observations were made to determine the temperatures and densities of the water, the relative abundance of edible fishes on different parts of the banks, the character of the bottom, etc. All kinds of collecting and fishing appliances were constantly and successfully used; and an extensive collection of specimens was secured, which will be studied in the laboratories in Washington, in order to determine the principal natural features of the fishing-grounds. Lieut.-Commander Z. L. Tanner, U.S.N., is in charge of the expedition, having commanded the 'Albatross' ever since her construction in 1883. He has been in active service with the Fish Commission about nine years. Mr. C. H. Townsend is the naturalist, and Mr. A. B. Alexander the fishery expert, of the expedition.

The experimental station at Wood's Holl was kept open during the summer, as usual, from early in July to October. The commissioner himself was present there during most of the time with Prof. John A. Ryder, in charge of the scientific work. From twelve to fifteen volunteer naturalists, including Prof. W. K. Brooks of Johns Hopkins University, were at work at the Wood's Holl station during most of the time. The steamer 'Albatross' having gone to the Pacific coast, and regular explorations on the offshore fishing-banks being therefore suspended, the work of the season consisted mainly in a study of embryology with regard to its bearing upon the fish-cultural branch of the Fish Commission's work. Many studies were also made of fishes and their habits in later stages of development. A quantity of English soles had been brought to this country last spring, and had been kept in a compartment of the laboratory at Wood's Holl. They were planted in Vineyard Sound in October.

The steamer 'Fish Hawk' was employed for about two months in examining the oyster-beds of Providence River, Narragansett Bay, and Long Island Sound near New Haven, with especial reference to the depredations of the star-fish and drill, which are estimated to destroy several hundred thousand dollars' worth of oysters every year. The operations were mainly confined to studies of the temperatures and densities of the water on the oyster-beds upon which these pests thrive, and of the inhabitants of the bottom, with a view of ascertaining the conditions of their existence. It is an interesting fact that the star-fish cannot live in fresh water, nor in water that does not contain a considerable quantity of salt. For this reason, no star-fishes infest the oyster-beds of Chesapeake Bay.

In the early spring of 1886 one of the greatest freshets ever known occurred in Rhode Island. Several inches of snow was on the ground, and beneath this a thick sheet of solid ice. The rain descended as though the flood had come again, carried off the snow, and then, instead of being partially absorbed by the ground, the water all ran down into the streams, converting every one of them into resistless torrents, before which neither dwellings, nor factories, nor bridges, nor railroad-embankments could stand. This immense volume of water all finally found its way into Providence River and Narragansett Bay, and it freshened the water to such an extent that all of the star-fishes perished. In 1887 there were plenty of little star-fishes, but they were too small to do any harm; but this year they are about as destructive as usual.

This examination was not carried as far as was desired, on account of a lack of funds. The people of Connecticut and Rhode Island, interested in the oyster-fisheries, were very anxious to have a thorough investigation made, and Senator Platt introduced a bill to pay the expenses of it. The bill was not passed, and the expedition last summer was paid for out of the regular funds of the Fish Commission. The investigation will be resumed next summer. No practical method of exterminating the star-fish pest has yet been suggested, except the one now practised of dredging them up, which is enormously expensive.

Among the most interesting and important divisions of the scientific work of the Fish Commission during the past season has been the exploration of the interior rivers and lakes of the country for the purpose of ascertaining what indigenous fishes they contain, and obtaining a knowledge of their physical characteristics. Indeed, this work had a twofold object. Besides that already explained, it was desirable to determine the adaptability of these rivers and lakes to the introduction of new fishes of economic value. Illustrative of the importance of this branch of the work, it may be said that requests are frequently received at the Fish Commission office that a certain river or lake be stocked with a particular kind of fish. It cannot be decided whether it will be safe to introduce the fish indicated until it is known what the present inhabitants of the stream or lake are, and whether its physical characteristics are favorable or not. It is useless, of course, to put young and tame fishes into water already inhabited by wild, fierce, predaceous fishes.

The greater part of this work has been conducted under the direction of Pres. David S. Jordan, of the University of Indiana, and one of the most distinguished ichthyologists in the country. His zeal and that of his assistants was not dampened by the fact that they were volunteers, serving without compensation beyond their actual expenses. There are scores of college professors and students advanced in science, who are ambitious to spend the months of their summer vacation in the field, making original investigations. To a majority of such the saving of their expenses is a matter of considerable importance, while the Fish Commission secures the services of men whom it could not afford to hire. The attractiveness of the scientific work of the government, on account of the superior advantages which it offers to those who desire to become specialists, is shown by the eagerness with which positions to which very small salaries are attached, in the United States Geological Survey, are sought, and also by the fact that positions in the National Museum are sought by hundreds of college graduates who are willing to work for salaries that are barely sufficient to pay their board.

President Jordan spent the entire summer in the field with his parties, personally devoting himself mainly to the rivers of Virginia, eastern Tennessee, North Carolina, and parts of South Carolina and Indiana. In North Carolina he found a virgin field of exploration in which he had had no predecessor, and a very interesting one it proved to be. Prof. C. H. Gilbert and Dr. J. A. Henshall of Cincinnati carried on a similar kind of work on the Ohio and other rivers of the Ohio valley, and Mr. C. H. Bollman of Indiana was detailed to accompany the party of Michigan explorers sent out by the Fish Commission of that State. Collections and information of the same kind are expected from Illinois, where the naturalists employed by the State were greatly aided by the use of the fish-commission cars, and in return agreed to give to the latter the results of their observations. The relations between the United States Fish Commission and the various State commissions are very cordial, and they are in many ways helpful to each other.

The schooner 'Grampus' went to the early-mackerel fishing-grounds in the spring for the purpose of observing the arrival of the first shoals of mackerel, and watching their movements as they went north along the coast, and especially the physical changes of the water accompanying those movements. Very important results were obtained. In a general way it may be said that the late arrival of the mackerel last spring was coincident with the lateness in the season, that the temperature of the water remained low, and that the mackerel-food obtained by the use of the towing-net at the surface was less abundant than usual. Observations of the habits of the mackerel were made by the 'Grampus' at intervals throughout the season and as late as the middle of October. These extended from the coast of Maine to Cape Hatteras.

For many years the temperatures of the waters have been recorded by employees of the Lighthouse Board and the Signal Service

at prominent points along both the Atlantic and Pacific coasts, and on the principal rivers and the Great Lakes. The results of these observations are now being plotted graphically upon charts by the Fish Commission, and will be published in an early report. It is expected that they will prove of great importance in explaining the distribution and movements of the fishes.

Altogether the result of the Fish Commission's work has been very satisfactory. Much of the scientific study and digestion of material collected during the summer, of course, still remains to be done, and this will be pushed forward in Washington during the months when, as a rule, field-work is impracticable.

MENTAL SCIENCE.

Notes on Hypnotism.

The Paris and Nancy Schools of Hypnotism. — Dr. Bernheim, the leader of the Nancy school, whose classic work we are soon to have in English, contributes to the *Revue de l'Hypnotisme*, May, 1888, a platform of beliefs. These can be summarized as follows: 1. They do not obtain Charcot's three phases— lethargy, catalepsy, and somnambulism — by any physical manipulation; nor do they find, as Charcot claims, that opening the eyes or rubbing the vertex will cause the patient to pass from one of these stages to another. They do not get the phenomena of *transfert* (of an affection of one side of the body passing to the other) nor the localization of function by pressing different portions of the cranium, nor any purely physiological result. On the other hand, they easily get all these results by a slight suggestion. If the subject has heard of or witnessed the expected results, it is sufficient. Again: the unconsciousness of lethargy is apparent only, the subject being open to suggestions at any stage. 2. *In hysteria magna* the hypnotic phenomena are the same as in normal subjects, the three stages, etc., being equally illusory. 3. Hysterical subjects are not good for the study of hypnotism. They introduce neurotic and other foreign symptoms, and vitiate the purity of the results. 4. The hypnotic state is not a neurotic one. The phenomena are natural, are of a psychological origin, and can be developed from natural sleep. 5. Neurotic patients are not more ready subjects than others, the wards of hospitals representing all types of diseases, furnishing an equal number of good subjects. 6. Not all subjects are purely automata played upon by the operator: more or less resistance is frequent, and the individuality partially remains. 7. All methods of hypnotization depend upon suggestion. Physical methods, especially hypnogenetic zones, do not exist except as the results of suggestion. 8. Suggestion is the key to *all* the phenomena, and careful study with new subjects will prove it so. Moreover, the large percentage (eighty) of subjects among normal persons found at Nancy is not due to a mental contagion, but to a skill in applying the suggestion. This position is rapidly gaining adherence above that of Charcot and the Paris school, which it opposes on all the above points.

A New Hypnotic Phenomenon. — M. Liegois contributes to the August number of the same periodical an article describing a new hypnotic phenomenon, in the field of a 'negative hallucination.' This term describes a state in which the suggestion that a certain person, a certain object in the field of vision, remains unseen, has been obeyed. The state is explained as an annihilation of the perception as it reaches consciousness. The impression is received, but ignored. Having a third party to suggest to one of his subjects that he will be invisible to her, it is found that she does not hear him, see him, or even feel the prick of a pin when he holds the pin, re-acting normally to all other persons. If, however, M. Liegois calls out impersonally, "Camille feels thirsty, Camille will drink a glass of water," she hears and obeys the command; if similarly told to stand at his side, she does so; and so on for every sense. While she does not hear him, she none the less really can hear him. There is a sort of dual personality, one half of which obeys the negative suggestion, while the other is automatically regulated, and obeys any suggestion not directly in conflict with a previous one. The further development of this study promises interesting results.

Hygienic Aspects of Hypnotism. — Upon the hygienic side we find the discussion of the prohibition of public hypnotic performances. The Academy of Medicine of Belgium held a long discussion upon the question, and finally voted to recommend a law abolishing it. The chief advocate in favor of the exhibitions was M. Delboeuf. Belgium thus follows the action of Austria, Italy, Denmark, Germany, and most of the Swiss cantons. The people have been strongly impressed with the dangers of an unskilled use of hypnotism, and a healthy sentiment to have it restricted to experts prevails. At the last session of the French Association for the Advancement of Science, M. Berillon introduced a similar measure, and it was voted as the sentiment of the section of hygiene and public medicine that all public exhibitions of hypnotism should be legally prohibited in France.

Miscellaneous. — Considerable space is taken up in the same periodical with the discussion of phenomena whose genuineness is not recognized, particularly with Dr. Luy's experiments upon the action of drugs at a distance. A committee of the Academy of Medicine was appointed to examine the correctness of Dr. Luy's conclusions, and they find unconscious suggestion to be at the basis of it all. When the contents of the vials containing the drugs were unknown to those present, the subject also failed to be appropriately affected by them. So, again, these pretended mysteries fall to the ground, and exemplify the pitfalls of the subject as well as the uncritical nature of methods often adopted by eminent scientists. Mention should also be made of the fact that the Church has recently entered into relations with hypnotism by a letter from the Bishop of Madrid, warning his brethren against the evils of the new movement, and placing it in line with the forbidden treatment of miracles.

Abnormal Sense-Perceptions.

Sound-Blindness. — Recent observations have emphasized the fact that many persons are defective in the distinctness of their perceptions, while others form peculiar links between perceptions of different senses. An illustration of the former is what has been rather falsely termed 'sound-blindness.' This condition refers to the defective hearing of sounds; so that, in the same way as the color-blind fail to distinguish between to us utterly distinct impressions, the sound-blind fail to make distinctions perfectly evident to ordinary ears. A Boston lady, Sara E. Wiltse, has recently tested the powers of Boston school-children in this direction (*American Journal of Psychology*, No. 4). Standing on the teacher's platform, she repeated the following words as distinctly as possible to 259 boys of the Latin School, aged from twelve to twenty years: 'ultramarine,' 'altruistic,' 'frustrate,' 'ultimatum,' 'ululate,' 'Alcibiades,' 'unaugmented.' The words were repeated as often as required, some as often as five times, and ample time was given for the writing of the words. 84 of the boys made mistakes in the vowel-sounds, such as 'ultruistic,' 'frostrate,' 'altimatum,' 'elulate,' 'olulate,' 'alulate,' 'unolmented.' That these 84 were really defective, was shown by the further test, in which the following words were read to them but once; viz., 'fan,' 'log,' 'long,' 'pen,' 'dog,' 'pod,' 'land,' 'few,' 'cat:' for only 4 of the 84 spelled these monosyllables correctly. For 'fan,' there appeared 'than,' 'thank,' 'fanned,' 'clam,' 'thang,' and 'fam;' for 'log,' 'glove,' 'clog,' 'lug,' 'love,' 'land,' 'long,' 'knob;' for 'long,' 'lung,' 'lown,' 'lone,' 'lawn,' 'land,' 'log,' 'loud,' 'lamp;' for 'pen,' 'penned,' 'pan,' 'paint,' 'hen,' 'ten;' for 'dog,' 'dove,' 'dug,' 'dot;' for 'pod,' 'hour,' 'heart,' 'hog,' 'hod,' 'hard,' 'fod,' 'thod,' 'fog,' 'bog,' 'pug,' 'part,' 'plot,' 'pard,' 'long,' 'bog;' for 'land,' 'lamb,' 'lend,' 'lamp,' 'lambed,' 'blend,' 'hen,' 'can;' for 'few,' 'frew,' 'fuse,' 'pew,' 'pen.' 'Cat' was correctly understood in every case. Of the 80, only 2 were found to be hard of hearing, suggesting that the others were more or less 'sound-blind.' So, again, of 223 boys of the English High School at Boston, 105 misspelled one or more of the polysyllables. In the Comins Grammar School, where the pupils were between the ages of eight and fourteen, only 34 of the 530 spelled all the monosyllables correctly. These pupils were tested under good conditions, and five were found to be deaf to the sound of a tuning-fork, though the teacher was unaware of the defect. For 'fan,' 7 different words and 2 blanks were given (a blank indicating an entire failure to understand the word), the total number of mishearings being 17; for 'log,' 17 different words and 10 blanks, involving 86 mishearings, the word being understood as 'love' 65 times; for 'long,' 14 words and 11 blanks, with 22 errors; for 'pen,' 18 words and 12 blanks, with 135 errors, of which 48 made the word 'hen,'