action. There is no nation in the world that possesses such a fleet, not even England, and the fact that the ships are all built to carry the large normal coal supply of 1,200 tons would seem to indicate that they were built for just such an emergency as now confronts them.

The most important and largest of these ships is the "Carlos V.," of 9,235 tons and 20 knots speed. Her curved deck plating is 6½ inches thick, and her secondary battery is protected by a continuous belt of 2 inches of steel. She carries two 11-inch guns disposed in two barbettes of 10-inch steel, and a secondary battery of eight 5½-inch and four 3·9-inch rapid-fire guns. Against her we could oppose the "Brooklyn," which closely resembles her in many points. She is of 9,250 tons displacement, 21·9 knots speed and is protected by a steel deck 6 inches thick on the slopes, to which is added a belt of 3-inch steel extending in the wake of the engine rooms and boilers. She carries an exceptionally heavy battery of eight 8-inch guns, protected by 5½ and 8 inches of steel, and a secondary battery of twelve 5-inch rapid-fire guns. Unless a lucky shell from the great 11-inch guns of the "Carlos V." should find its way into her engine or boiler room, she should prove more than a match for the Spaniard.

Following the "Carlos V." in importance is the "Cristobal Colon," built in Italy, whose sister ship, the "Varese," the Spaniards were very anxious to purchase from Italy. This is a most interesting ship, and it is a question whether, in spite of her smaller size—6,840 tons—she is not more formidable than the "Carlos V." The remarkable feature in this ship is the extensive armor protection, which is so complete as to entitle her to be called a battleship rather than a cruiser. A 6-inch steel belt encircles the whole waterline. Above this is a redoubt of continuous 6-inch steel which completely protects a battery of ten 6-inch rapid-fire guns, and above this is another battery of six 4·7-inch rapid-firing guns. The main battery consists of two 10-inch armor-piercing guns in 6-inch barbettes. The speed is the same as that of the other cruisers—20 knots. Against this boat we could oppose the "New York," a smaller edition of the "Brooklyn." She is of 8,200 tons displacement, 21 knots speed, and is protected by a 4-inch belt and a curved deck 6 inches on the slopes. The armament consists of six 8-inch guns and twelve 4-inch rapid-fire guns, the gun positions being protected with casements and turrets of from 7 to 10 inches of steel. The superior protection and heavier secondary battery of the "Cristobal Colon" should render her a fair match for the "New York."

Following these two ships in importance is a group of six sister ships, two of which are already very familiar to the people of New York. They are the "Almirante Oquendo," the "Cardinal Cisneros," the "Cataluna," the "Princesa de Asturias," the "Infanta Maria Teresa" and the "Vizcaya." The "Maria Teresa" represented Spain at the Grant Memorial services last year and lay for some time off Riverside Drive in the Hudson River, and the "Vizcaya" visited this port immediately after the Maine disaster.

Each of these six ships is of 7,000 tons displacement and 20 knots speed. They are provided with a belt of 12-inch steel, at the top of which is a 3 inch protective deck. At each end of this belt an armored tube rises to connect with a barbette of 10½-inch steel, and in each barbette is an 11-inch armor-piercing gun. Between these guns is a battery of 5·5-inch quick-firing guns.

Against these speedy ships we could oppose two powerful first-class battleships, the "Indiana" and "Massachusetts," the armored cruiser "Texas" and four powerful monitors, the "Puritan," "Terror," "Amphitrite" and "Miantonomoh." In point of guns and armor the advantage would be vastly in favor of the battleships and monitors, though this would be offset by the speed, handiness and ability to use the ram of the Spanish cruisers. In an artillery duel there could be little doubt of the issue. In heavy guns the seven American ships have eight 13-inch, ten 12-inch, twelve 10-inch and sixteen 8-inch, a total of 46 armor-piercing guns against a total of twelve 11-inch guns on the six Spanish ships. This superiority however would be greatly offset by the murderous discharge of the secondary rapid-fire batteries of the Spaniards, which would comprise sixty 5½-inch guns, against which we could only make reply with fourteen 6-inch and eight 4-inch guns. The result of such a duel would be that the unarmored ends and the central secondary batteries of the "Indiana," "Massachusetts" and "Texas" would be blown away, while the armor belts of the Spanish ships would be pierced and the ships either sunk or disabled.

Thus far, however, we have taken no note of two other novel and hitherto untried elements, which would at least figure prominently in such a battle, if they did not prove to be its deciding factor. We refer to the armored ram "Katahdin," of the American fleet, and the deadly torpedo boat destroyers of the enemy. The "Katahdin" is a vessel of 2,150 tons and 16 knots speed, whose sole duty is to ram. For this purpose she presents but little of her bulk above the water, and that which is visible is curved and armor-plated with a view to deflecting the shells of the enemy. She is quick in turning, and it would be an extremely difficult task for a warship to elude or sink her before the fatal blow was struck.

The six destroyers, "Audaz," "Osado," "Terror," "Furor," "Pluton" and "Proserpina," are the fastest and most formidable of their class. They have a speed of 30 knots and carry two discharge tubes for the deadly Whitehead torpedo. As they are unarmored, they can be easily sunk by gun fire, and for this reason they will rarely make an unsupported attack in the open. In line of battle, however, they will be certain to play a very important part. Sheltering themselves behind the advancing ships (which they can easily do, on account of their small size), they will rush out at the opportune moment and fire their torpedoes at the enemy. So greatly is the torpedo dreaded that the hostile fire is certain to be drawn away from the battleships and concentrated on the destroyers in the effort to sink them. This diversion will be of great value to the fleet possessing a torpedo flotilla, and may easily turn the tide of battle at a critical moment. The moral effect which these boats will produce in a naval battle is shown in the naval war game which we illustrated in the last issue of the SCIENTIFIC AMERICAN SUPPLEMENT. We have nothing of the size and speed of these 400-ton destroyers which we could send against them, unless it were the "Porter" and "Dupont," of 28 knots. Our torpedo boats would be too small to accompany a fleet on the high seas.

The possession of a numerous torpedo flotilla by Spain goes far to restore the balance which, on account of our battleships and monitors, would be strongly in our favor in a pitched battle, and it is the knowledge of this fact which renders the sailing of the flotilla for the West Indies a matter of the gravest concern to this country. The flotilla consists of six torpedo boat destroyers and six torpedo boats convoyed by a couple of small cruisers. The boats have been stripped of their guns and torpedoes and they are being nursed across the water by the larger boats, which are ready to give them all necessary assistance. The flotilla in its present condition is as helpless as a brood of ducklings, and it is no doubt the knowledge of this fact that has led Spain to hurry them across the water in time of peace.

It will be noticed that in the foregoing comparison we have taken no note of protected cruisers and gunboats, for the reason that these have theoretically no proper place in a battle between armorclads. Of protected cruisers Spain has two of 5,000 tons, three of 3,090 tons and three of 1,000 tons, besides some older wood and iron ships of less value. Against these we could at present oppose on the Atlantic two protected cruisers of 7,500 tons, one of 4,000 tons, one of 3,600 tons, one of 3,200 tons, three of 1,750 tons and sixteen of from 1,000 to 1,500 tons.

In torpedo gunboats and craft of under 1,000 tons displacement Spain is stronger. She has fourteen torpedo gunboats of from 500 to 850 tons displacement and 19 to 22½ knots speed, and over ninety small gunboats, many of which, however, are obsolete. We have three gunboats of less than 1,000 tons displacement, among which is included the "Vesuvius," with its pneumatic guns for the discharge of dynamite shells.

Should the war be prolonged, our navy would rapidly increase in strength. The "Oregon" would reach eastern waters, and in a few months we should have the powerful battleships "Kentucky" and "Kearsarge" in commission, to be followed later by that celebrated trio, the "Alabama," "Wisconsin" and "Illinois." Our torpedo fleet would grow apace, and it would not be long before we should have an overwhelming superiority upon the seas. We are indebted to La Ilustracion for our illustration of the Spanish fleet.

Government Alaska Literature.

We have received from the United States Geological Survey three excellent works regarding the gold fields of Alaska and the Yukon district. The first is intended for general distribution. It is entitled "A Map of Alaska, Showing Gold-Bearing Rocks, with Descriptive Text Containing Sketches of the Geography and Geology of the Gold Deposits and Routes to the Gold Field." The map is large (57 miles to the inch) and clearly colored, showing all the gold districts, and the various routes to all parts of Alaska are clearly indicated. This important pamphlet is written by S. F. Emmons, aided by W. H. Dall and F. C. Schrader. It will prove of great use to prospectors and miners who might visit Alaska. There are 40,000 copies printed. The other two books are not of as great interest to the prospector but are important to those who are interested in geology and to the mining expert. The "Geology of the Yukon District, Alaska," by Josiah Edward Spurr, with an introductory chapter on the history and condition of the district to 1897, by Harold Beach Goodrich, an abstract from the eighteenth annual report of the Survey. It is a quarto of 392 pages and is illustrated by 51 plates in addition to maps. The third book is "The Reconnaissance of the Gold Fields of Southern Alaska, with Some Notes on General Geology," by George F. Becker, which is also an abstract from the eighteenth annual report of the Survey. It is illustrated by maps and excellent half tone engravings. The books have been published most opportunely.

THE TOTAL SOLAR ECLIPSE, JANUARY 22, 1898.

There could hardly be a greater difference than between the eclipses of 1896 and 1898. The shadow track in the former case ran through a vast extent of country which offered, however, but few suitable sites. These were clustered together at two or three main points, and in almost every case the intending observers were disappointed of the spectacle which they had come to see. In 1898 the eclipse track lay chiefly in one single country which offered a large number of easily accessible sites, nearly all of which were occupied, and all were favored with the most perfect weather. Up to the present time it certainly is the record eclipse, either as regards the number of observers, the character of their equipment, or the uncheckered favor which they experienced from the weather.

"A victory all along the line" is what we have to record. The full significance of that victory, and what results may accrue from it, it will take us many months to learn.

As a sensation, the eclipse did not fulfill the popular descriptions. Whether, as has been asserted, the corona was unusually large and bright, or, from the special atmospheric conditions prevailing in India at the time, the darkness was much less than is usual in any eclipse of two minutes' duration, the general effects in color, light and the appearance of the landscape were very much those which were brought about more slowly some four and a half hours later, some thirty-five or forty minutes after the sun had set. At any rate, the light at mid-totality was certainly greater, considerably greater, than we ordinarily get at night at the full of the moon.

The fall of temperature was, however, considerable, amounting to some twelve degrees ; and it was noticed by some of those who had taken part in the Norway expedition of 1896 that, whereas on that occasion the darkness of the eclipse was felt to be a sensible relief from the unceasing sunlight, so now the coolness of the eclipse was a relief from the too powerful heat of the sun.

Consistently with the small amount of darkness of the eclipse, the approach of the shadow at the beginning of totality was less marked than usual, and in some places, though watched for, escaped notice. The only record that has yet reached me of its approach having been distinctly observed is from Dr. Robertson, of Nagpur. The shadow bands were also looked for at some stations without success, though they were caught at both Jeur and Nagpur. At the latter place Miss Henderson, M.D., describes them as having been faint dusky ripples some two inches in breadth, and separated from each other by about the same interval, and in appearance and speed of motion resembling the ripples seen on the ceiling of a cabin in an ocean steamer as they are deflected through the porthole from the water outside.

Of the stars visible during the eclipse, one caught every attention, and was, indeed, seen after totality had passed. This was the planet Venus, some six degrees southwest of the sun at the time. Mars, though very small and further from the sun, was also glimpsed and some two or three other stars were noted.

The shape of the corona recalled at once that of 1896, and with it the two earlier years, 1868 and 1886, which it had resembled. To the southwest a long ray nearly in the solar equator was easily traceable for two, if not three, solar diameters from the dark limb of the moon. On the east side a pair of broader and less extended streamers formed a single connected structure in which the characteristic coronal curves were repeatedly seen.

Bearing in mind that these four years all fell at the time of small but not of minimum sunspot activity, it appears clear that we have here brought out a third coronal type as distinct and definite, perhaps even more so than those which have been already recognized as appropriate to the times of actual maximum and minimum ; and it may be hoped that we have now material enough to enable us to trace the course of change which the corona undergoes in its passage from one extreme form to the other.

It may be opportune here to correct a widespread misapprehension, that minimum coronæ are small and faint except for the two great equatorial rays. The reverse would seem to be the case, except in the immediate neighborhood of the sun's pole. The corona, for instance, of 1878, so far from being small and faint, was unusually large and bright ; and the present one, though we have not yet reached the actual minimum, possesses the same characteristics.

The feathery structure round the solar poles, which was so plainly seen in the eclipse of 1878, and which has been recognized more or less clearly at so many eclipses since—especially at or near the time of minimum—was very apparent on the present occasion.

The photographs of the corona have been unusually numerous, and have been taken on every variety of scale, from a diameter of a single millimeter with a hand camera, up to one a hundred times as great. The latter were obtained at three stations : by the Astronomer Royal at Sahdol, with an aperture of nine inches and an enlarging lens; by Dr. Copeland, at Gogra, near

Nagpur; and by Prof. W. W. Campbell, at Jeur, with telescopes of about forty feet focal length. Next in order to these giant photographs come the standard instruments of the Joint Eclipse Committee, with their twin cameras giving images of an inch and a half and of six-tenths of an inch. These were employed by Prof. Turner at Sahdol and Captain Hills at Pulgaon. The cameras taking photographs of one inch in diameter and smaller were much too numerous to recount; but special note should be made of Prof. Burckhalter's device for obtaining both the inner and outer corona on the same plate by means of a revolving screen worked by a spindle passing through a hole in the center of the plate, which diminished the exposure given to the bright central regions of the corona so as to bring it more in accord with the faint light of the outer extensions.

At the extreme ends of the line of stations a novel experiment in coronal photography was attempted. At Buxar, on the Ganges, and at Viziadrug, on the coast, a kinematograph was employed so as to obtain a continuous series of photographs of the progress of the eclipse. The former instrument was supplied by Mr. Nevil Maskelyne, and was worked by the Rev. J. M. Bacon, the astronomer in charge of one of the two parties organized by the British Astronomical Association, and the other was in the hands of Lord Graham.

Of direct visual spectroscopic observations there were few. Mr. Newall and myself endeavored to trace the distribution of coronium—that is, of the substance which shows its presence in the 1474 K line; but the line was faint, and it could only be ascertained that it showed a general conformity to the shape of the brighter part of the inner corona, without its being possible to ascertain whether it corresponded in minuteness of structural detail. No rifts were detected in it.

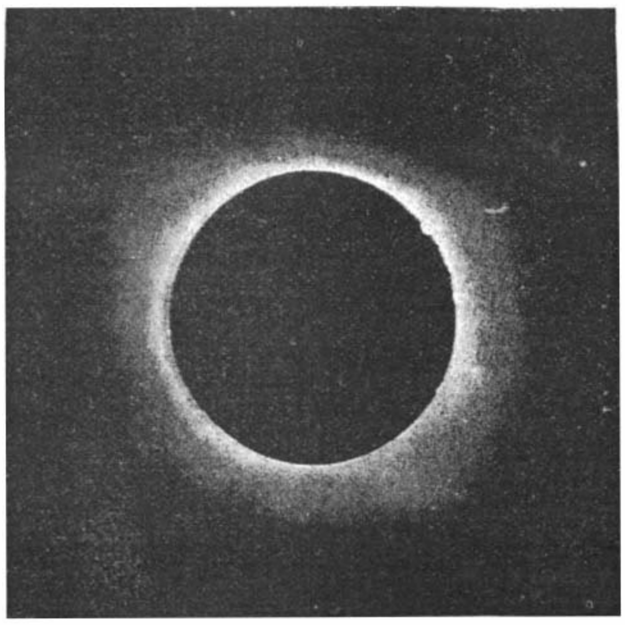
The photographs of the spectrum claim the highest interest, and these were of unprecedented number and value. Capt. Hills, at Pulgaon, with two great slit spectroscopes, obtained records of the "flash," both at commencement and end of totality, which give a complete history of the spectroscopic changes seen in the various strata of the sun, from its ordinary spectrum up to that of the prominences at Viziadrug on the coast. Mr. Fowler and Dr. Lockyer were equally successful with prismatic cameras of six inches and nine inches aperture, while smaller spectrographs of extreme beauty, and ranging from C in the red far into the ultra-violet, were secured by Mr. Evershed, at Talni.

The examination and interpretation of these photographs will be the work, not of days and weeks, but of months, and possibly years; but we may confidently look to them for a complete answer to many questions which are engaging the attention of solar physicists at the present time, and particularly for information as to the exact locale of the absorbing vapors which give rise to the Fraunhofer lines. Sir Norman Lockyer's theories, in particular of dissociation in solar and stellar atmospheres, will be put to the severest test, and our knowledge of solar mechanism can hardly fail to receive a great advance.

One inquiry which it was hoped the present eclipse would advance has failed to meet with success. Mr. Newall was endeavoring to ascertain if the spectrum of the corona, as obtained from the two opposite limbs of the sun, gave any evidence of relative motion in the line of sight due to rotation. It will be remembered that in 1893 M. Deslandres came to the conclusion that the corona rotated in essentially the same period as the photosphere. Mr. Newall had arranged an exceedingly beautiful instrument for this purpose—a spectroscope, the collimator view telescope of which was parallel to the polar axis. The spectroscope was also provided with a double slit, the one slit tangential to one limb and the second to the other limb; the one slit stretching from the sun's equator northward, the other from the opposite end of the equator southward. The experiment, which abundantly deserved to succeed, was, however, frustrated by the faintness of the coronal spectrum.

Of other observations it is scarcely possible to speak as yet. It should, however, be added that the polariscope, which has been almost forgotten in eclipse work for the last fourteen or fifteen years, was very successfully used, both at Sahdol and at Pulgaon, and the clearest indications were secured of strong radial polarization.

Such is a very brief outline of the principal results (so far as we yet know them) of this the most completely successful eclipse on record. The above article was contributed by E. Walter Maunder, F.R.A.S., to Knowledge.



THE SUN'S CORONA, TOTAL ECLIPSE, JANUARY 22, 1898.

The Correspondence Schools' Car.

A handsome car for the International Correspondence Schools of Scranton, Pa., has just been built at Wilmington, Del., and will shortly be sent on a tour through the manufacturing cities of the country. The length of the body of the car is fifty feet and the width is nine feet eight inches over the sills. The interior is divided into compartments as follows: A reception room eighteen feet long, furnished in quartered oak and fitted with bookcases, center table, wicker chairs, couch, etc. There are four sleeping sections of upper and lower berths, eight in all. The seats forming the lower berths are covered with plush and fitted with head rests. Tables are provided, to fit between the seats, for holding books, writing materials, etc. At the extreme end of the car there is a toilet salon. On the panels between the windows there are suitable inscriptions accompanying the names of the various inventors and scientists, such as John A. Roebling, George H. Corliss, George Westinghouse, Jr., Sir Henry Bessemer, Abram S. Hewitt, Thomas A. Edison, Michael Faraday, etc. It is proposed to locate the car for a time in the immediate vicinity of large manufacturing establishments, thus affording those interested a practical demonstration of the methods in which the work of the schools is carried on.

RECENTLY PATENTED INVENTIONS.

Engineering.

ROTARY ENGINE.—Frank A. Boyd, New Rochelle, N. Y. This invention provides an engine of comparatively simple construction which is designed to be of high efficiency and not liable to derangement of working parts in service. In a suitable casing, the driving shaft carries a bucket wheel, on the sides of which and near the periphery are track rings having V-grooves in their outer edges, while in an adjustable concave-faced bracket block supported from the casing, there being side plates on the block, are induction and exhaust passages having communication with the buckets of the wheel, there being adjustable gates in these passages.

Railway Appliances.

CAR DOOR FASTENER.—Reynolds H. Johnson, Long Island, Kansas. To hold a sliding car door in place and prevent its rocking or jarring back, the fastener is, according to this invention, applied near the rear edge, pivoted bolts engaging the adjacent door jamb having bifurcated lever arms, a bar connecting the arms of the bolts, and the bar sliding in a mortised keeper. A drop key engages the keeper to hold the connecting bar at either end of its throw, and is provided with a lateral spur to prevent accidental displacement. All parts liable to be displaced and lost are dispensed with, and the arrangement is such that the seals cannot be tampered with nor the bolts disturbed without its being readily discovered from the outside of the car.

RAILROAD SWITCH AND FROG.—Charles E. Harris, Ellwood City, Pa. This invention provides a peculiar construction of the rails by which objects which lodge between the fixed and movable rails will be raised out of the groove by the operation of the switch. In the complementary rails for the switches and frogs, one rail has a horizontal recess opening to one side and extending beneath the tread portion and the other rail has a side projecting flange fitting and adapted to enter the recess, one of the rails having the opposed surface of that part above the flange beveled away from the other rail.

DUST GUARD AND AXLE WIPER.—James S. Patten, Baltimore, Md. The dust guard proper, according to this invention, is composed of two metallic members, preferably flexible cast brass, and helical springs arranged in inclosing keepers which are composed of integral semicircular portions formed on one member, and an integral face on the other member, the portions being opposite and adapted to slide on each other, the upper member having lateral lugs which form supports for the springs and slide with them into the keepers or pockets when the guard is adjusted to an axle. An integral lateral flange has angular wiping portions that are flush with the concave edge, while intermediate bridging portions serve as caps for the spaces between the wiping portions.

RAILWAY TRACK TIE AND FASTENING.—William A. Detwiler, Cincinnati, O. This invention relates to means for quickly locking rails to metallic ties, the fastening being easily removed, if desired. The tie may be of cast or sheet metal, with a concave body and pendent integral angular flanges having in their horizontal portion an opening with convergent or beveled sides, while rail clamps fitting loosely in the top openings have claws to engage the tie, wedges holding both the clamp and tie in locked position. A firm and cheap fastening is thus provided, which can be applied with great rapidity.

UNCOUPLING LEVER.—Robert H. Munger, Quimby, Ia. To facilitate lifting the coupling pins of car couplings of the Janney type, this invention provides a pin lifter comprising a two-part rock shaft supported to rock on the end of the car, one part of the shaft having a crank arm loosely shackled to the coupling pin, and the other part of the shaft being flattened at the outer end and provided with a handle lever, a coupling box loosely connecting the two sections of the rock shaft, and there being means for loosely connecting an arm on the cranked sections of the rock shaft with a pin-lifting device on the roof of the car. Means are provided for temporarily maintaining the vertically slidable coupling pin in elevated position, to be automatically dropped by the impact of two meeting cars.

Mechanical.

TURBINE WATER WHEEL.—Samuel and Arthur C. Martin, Muddy Creek Forks, Pa. The hub of this wheel is carried on a vertical shaft, and is curved inwardly from the top and bottom, the blades consisting of metallic plates running throughout the height of the wheel, and the lower portion of each blade having an extension which forms the bucket, the buckets being below the plate where the water is introduced to the wheel at the upper side of a horizontal platform, there standing on the plate a series of tangential partitions forming sluices through which the water passes. With the special form of blade employed, the water received on its upper curved portion is forced downward, so that water from one sluice cannot come in contact with the water from the next sluice and destroy its force.

Agricultural.

CHECK ROW FOR PLANTERS.—Firman S. Breckenridge, Caledonia, Mo. A simple and inexpensive attachment is provided by this invention, the markers being adjustable so that the rows may be checked with great accuracy at any desired distance apart. The attachment comprises a marking wheel having a hub made in sections capable of adjustment one upon the other, there being locking devices for the sections and arms projected from one of them, points being adjustable upon the arms. The device can be applied to any two-horse corn planter, and to those having revolving seed drops as well as those having reciprocating slides.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS, ETC.

LIBRARY OF THE WORLD'S BEST LITERATURE. Thirty volumes. Charles Dudley Warner, Editor, and Hamilton Wright Mabie, Lucia Gilbert Runkle, George H. Warner, Associate Editors. New York: R. S. Peale, J. A. Hill.

It is impossible in any single review to give an adequate idea of the marvelous scope of this work, and the high plane on which it has been brought out, from both a literary and artistic point of view. The work has been in progress of publication for the past two years, and the appearance of each successive volume has been a continual surprise, even to those who had formed the highest anticipations of its excellence. Its primary purpose has been the interpretation of literature in essays by scholars and writers competent to speak with the highest authority, such essays embodying critical, interpretative, biographical and historical comments upon authors and their works. From a long list of eminent contributors we note a few only of the great names which appear: Andrew D. White, ex-president of Cornell University; William Dean Howells, the distinguished novelist and critic; Ferdinand Brunetiere, the famous French critic; Prof. Lounsbury, of Yale University; Dr. Lyman Abbott, the successor of Henry Ward Beecher in Plymouth Church, Brooklyn; Prof. Charles Eliot Norton, of Harvard University; Dr. Richard Garnett, of the British Museum; Dr. R. H. Hutton, editor of The London Spectator; Dr. William T. Harris, chief of the National Bureau of Education, Washington, D. C.; Prof. John Bach McMaster, the great living historian; Dean Farrar, Dr. Henry Van Dyke, Julian Hawthorne, Col. T. W. Higginson, with others which might be added—enough to fill a column in the enumeration of authors alone.

The Library is embellished with more than a thousand full page and vignette portraits of the highest order, enabling the reader to obtain an idea of the appearance of a host of literary celebrities, many of the portraits having been made from paintings, etchings or busts which are acknowledged masterpieces of art.

The work is made for both practical use and literary enjoyment, being a library to be read as well as a library of reference. It affords a general view of literature from remote antiquity to the present time, and contains the brightest and best reading from the brightest and best writers, speakers and thinkers of all ages, nations and periods. It treats of every important literary subject which the minds of men have considered for the past thirty centuries, and presents specimens of every class of literary quality—poetry, prose, history, biography, etc. As one of the most important characteristics of the century has been the spread of scientific knowledge, the literary work of Huxley, Tyndall, Pasteur and Agassiz receives full attention, especially in the departments of Astronomy, Geology, Geography, Navigation, Botany and Zoology, the great thinkers and philosophers, from Socrates, Plato and Aristotle to Galileo, Spinoza and Darwin, being represented by selections that are entertaining as well as instructive.

The last volume of this great work is now about to be issued, and it is reported that the sales thus far have reached the great total of 400,000 volumes.

WHAT IS LIFE? OR, WHERE ARE WE? WHAT ARE WE? WHENCE DID WE COME? AND WHITHER DO WE GO? By Frederick Hovenden. With cuts and diagrams. London: Chapman & Hall, Limited. 1897. Pp. 290.

This work is based on the author's previous book entitled "What is Heat?" Indeed, it is a sequel to that work. The author says that the practical purport of this book is the suppression and prevention of human suffering, so that institutions for the mitigation of human suffering may not be required to the present extent. The writer says that the facts in the text may be regarded as authoritative as well as up to date. The co-ordination and the deductions from the facts are the author's.

OBSERVATIONS UPON THE HERRING AND HERRING FISHERIES OF THE NORTHEAST COAST. WITH SPECIAL REFERENCE TO THE VICINITY OF PASSAMAQUODDY BAY. By H. F. Moore, Ph.D., Assistant United States Fish Commissioner. Washington: Extracted from United States Fish Commission Report for 1896. 1897. Appendix 9. Pp. 387 to 442.