PHYSICAL NOTES.

THE 'DARK LIGHT' OF M. LE BON.

During the past two years M. Gustav Le Bon has brought out a remarkable fact regarding the passage of light through metals and other so-called opaque substances. This fact, so far as it can be estimated from a study of Le Bon's and others' published results, without resort to confirmatory experimentation, is either that the extreme red or infra-red components of sunlight and of gas light pass through thick metal plates sufficiently to affect sensitive plates after prolonged exposure; or that the medium wave-length components of sunlight and of gas light excite hyperphosphorescence in such metals as copper and lead just as they are known to do in case of uranium as shown by Becquerel. It seems that Le Bon in his experiments has eliminated the effects of direct pressure upon the sensitive film, the effects of temperature and such effects as might be due to chemical action between the film and the metal screens.

In the exposition of his results Le Bon is unsatisfyingly fragmentary and vexatiously notional, and it is amusing, at best, to read his claim of a new connecting region between light and electricity—*la lumière noire*. "Elle ne se propageait peut-être plus comme la lumière et peut-être propageait-elle comme l'électricité." So far as known, 'electricity,' when it is propagated at all, is propagated in a manner identically the same as light, and a fancied difference is of no use in setting forth results. Facts are plain, new facts utterly so, and a discoverer who would have it appear otherwise is either not a discoverer or does not know himself to be one. W. S. F.

SCIENTIFIC NOTES AND NEWS.

The Weights and Measures (Metric System) Bill passed through the Standing Committee on Trade of the British House of Commons on July 5th, and was ordered to be reported without amendments.

A bronze monument of Père Marquette, the priest and explorer, was unveiled in Marquette, Mich., on July 15th.

A monument in honor of Daguerre, erected by public subscription, was unveiled at Bry-sur-Marne on June 27th.

The Paris Academy has elected Professor Virchow as a foreign associate in the room of the late M. Tchebitchef. The other nominees were Lord Rayleigh, as second choice, and, as third choice, Professors Schiaparelli, Stokes and Suess.

The Right Honorable Leonard H. Courtney, M. P., has been elected President of the Royal Statistical Society.

The Royal Society of Edinburgh has awarded the Gunning Victoria Jubilee Prize to Mr. John Aitken, the Keith Prize to Dr. Kargill G. Knott, the MacDougall-Brisbane Prize to Professor J. G. M'Kendrick and the Neill prize to Mr. Robert Irvine.

It is stated in the Washington *Star* that M. Zolla has been sent to America by the French government to study methods of agriculture.

The subject of the essays for the Howard Medal and Prize of the Royal Statistical Society for 1898 is 'The treatment of habitual offenders, with special reference to their increase or decrease in various countries.'

A meeting was held on July 2d, at University College, London, to inaugurate the memorial to the late Sir John Pender, to which we have already referred. Remarks were made by the chairman, the Marquis of Tweeddale, by Mr. Haldane and by Lord Kelvin. A check for £5,000 was presented by the chairman to the authorities of University College to endow the electrical laboratory, and the bust of Sir John Pender was exhibited. Lord Kelvin spoke of what Sir John Pender had accomplished. When the first experiment was made to lay a cable across the Atlantic, Sir John Pender was one of the directors of the company. When the temporary success was followed so soon by

failure, the directors resigned one after the other, and it was due to Sir John Pender alone that the undertaking was not abandoned in the period from 1858 to 1864.

WE regret to record the deaths of Samuel Brassai, professor of mathematics at Klausenberg, at the age of one hundred years; and of Dr. H. Wankel, of Olmütz, known for his researches in anthropology and archæology.

THE Librarian of Congress has made several excellent appointments, but has offered the position of chief of the art department of the Congressional Library to a newspaper correspondent. It is, perhaps, thought that connection with the New York *World* gives an adequate training in modern art.

THE government of La Plata has made arrangements for securing the services of a bacteriologist whose duty it shall be to make an experimental study of tropical epidemics.

MESSRS. KADY, Berg and See, architects, have submitted to the Department of Buildings, New York, plans for two additions to the American Museum of Natural History, one a lecture hall at the north end of the Museum to cost $150,000, the other a six-story building attached to the west wing to cost $400,000.

THE Boissier Herbarium at Chambésy, near Geneva, which recently acquired the books on lichens and the dried specimens of the late Dr. J. Müller, is, according to *Natural Science*, following the example of the trustees of the Tuckerman Memorial Library of Lichenology, Amherst, Mass., and has established a 'Lichenotheca Universalis Müller-Argau.' The curator, M. Eugene Autran, appeals to botanists for copies of publications bearing on lichens and also for specimens of new and rare species.

THE Prince of Wales Hospital fund had, up to the beginning of the present month, received donations amounting to about £130,000 and promises of annual subscriptions amounting to about £2,500. The hospital Sunday fund is, however, this year smaller than usual. It is stated that Americans resident in England have endowed with £1,000 each beds in five London hospitals, to be used in the first instance by Americans.

SIR ANDREW NOBLE has given £100 to the Royal Institute, London, for the fund for the promotion of experimental research at low temperatures.

THE State Department has transmitted to Congress a copy of the note from the Minister of Norway and Sweden, inviting the United States government to participate in the International Fisheries Exposition to be held at Bergen, Norway, May 16th to September 30, 1898, with a recommendation that an appropriation be made for this purpose.

THE seventh annual meeting of the Paris Society of Hypnotism and Psychology was announced for July 19th, under the presidency of M. Dumontpallier.

THE eighteenth annual meeting of the German Anthropological Society will be held from the 3d to the 5th of August at Lübeck. Excursions are arranged to Schwerin and to Kiel on the days following the meeting.

THE Board of Directors of the American Chemical Society have authorized the establishment of a local section at Columbus, O., the necessary steps having been taken as required by the constitution of the Society.

IT can scarcely be hoped that the letter addressed by the Secretary of State to the Ambassador at London, and for some inexplicable reason published in the daily papers, will conduce to a scientific solution of the question of the results of pelagic sealing in the Bering Sea. It is unfortunate when scientific testimony is used for conflicting political interests. It would apparently have been best for the British and American scientific experts to have drawn up a joint report containing only the facts on which they were agreed.

THE daily papers contain accounts of the arrival of a steamship from the Yukon district of Alaska, reporting great success in the Klondyke gold fields. It is reported that single individuals have taken out in two and a-half months more than $150,000 in gold.

THE steamer Svensksund has reached Norway from Spitzbergen with the news that Herr Andrée and his companions began their voyage on July 11th, at 2 : 30 p. m. The balloon was carried in a northeasterly direction.

A CONFERENCE was held in the rooms of the Royal Geographical Survey, on July 5th, for the purpose of promoting Antarctic exploration. The chief object of the meeting was to bring the matter to the attention of the Australasian Premiers, then in London, with a view to inducing them to secure from their governments contributions toward a British Antarctic Expedition, under the auspices of the Royal Geographical Society. Sir Clements Markham, President of the Society, the Duke of Argyle, Sir Joseph Hooker and Professor Rücker made addresses urging the great scientific importance of exploring the South Polar regions. The Australasian Premiers were, it appears, unable to be present, but replies were made by representatives of New South Wales, Victoria and New Zealand, favoring the plan. The President said that he had been authorized to state that the Council of the Society would contribute any sum up to £5,000 which the colonial governments might subscribe.

THE London *Times* states that Sir Martin Conway and Mr. E. J. Garwood left London on June 29th for Spitzbergen, in order to continue the exploration of the interior of the main island begun by them last year. They are to be landed at King's Bay, whence they hope to make sledge expeditions over the northern ice sheet. Afterwards they intend to revisit Horn Sound and complete the scientific exploration of the southern peninsula.

THE London correspondent of the New York *Evening Post* cables that Mr. George Murray, keeper of botany in the British Museum, has proceeded to Panama at the instance of the government grant committee of the Royal Society for researches on little known pelagic algæ. During the voyage these organisms will be obtained by pumping sea water through fine silk tow nets.

MR. GEO. H. ELDRIDGE, of the Geological Survey, has completed the field investigation of the phosphate deposits of Florida, and returned to the Washington office to prepare his report. This investigation was one of considerable magnitude, Mr. Eldridge having spent one year and nine months in actual field work.

THE Peary party includes, through arrangements made by Professor C. D. Walcott, Mr. Chas. Schuchert, from the U. S. National Museum, and Mr. C. David White, from the U. S. Geological Survey. They will disembark at Disco Island, off the western coast near the 70th parallel, and this island and the mainland immediately adjacent will be their field of work. Mr. Schuchert, who is in charge of the Department of Invertebrate Paleontology in the National Museum, will go in quest of Mesozoic and Tertiary fossils, and Mr. White, who is one of the paleobotanists of the Geological Survey, expects to make a large collection of the Mesozoic and Tertiary plant remains of the region visited. America has thus far secured but meager collections of polar fossils, Europe being far ahead in this regard. Mr. Robert Stein, of the Geological Survey, also accompanies the expedition, but not as an official representative of the bureau. He will leave the party at Wilcox Head, from which point he expects to make a survey of the coast north of Devil's Thumb, toward Melville Bay.

M. MAREY has contributed to the Paris Academy an account, by MM. V. Tatin and Ch. Richet, of trials of an aëroplane invented by them. Their first experiments were made in 1890, but the machine was wrecked. A new machine was then constructed, with which the first trial was made last year with some success. In a second trial in June last the aëroplane travelled through the air 170 m. at the rate of 18 m. per second. The machine weighed 33 kg. The authors compare their results with those obtained by Professor Langley, and, while admitting the greater distance traveled by the aerodrome, claim that their machine had the advantage of greater weight and greater speed.

AT the Royal Naval Review the performances of the *Turbinia*, a boat in which the Hon. C. P. Parsons has made use of the steam turbine for marine propulsion, excited much attention. It steamed at a speed of 34 knots an hour, and it is said that even yet the full power has never been applied.

AT the recent International Congress of Publishers at Paris the inexactness of designating the size of books as 4°, 8° and 12° was dis-

cussed, and a resolution was passed to the effect that catalogues of publishers should give the actual sizes of volumes in the metric system.

THE second interim report of the departmental committee appointed by the British Home Office to inquire into and report on certain dangerous trades has just been issued as a Parliamentary paper. This report, which is signed by all the members of the committee, including the additional member, Mr. C. V. Boys, F.R.S., deals with electrical generating works. According to the London *Times* the committee has framed several regulations which they recommend should be applied in all cases where electricity at high pressure—a direct current of 700 volts or more, or an alternating current of 350 volts—is in use. The recommendations include the following regulations: The frames and bedplates of all generating machines shall be efficiently connected to earth. The rails fencing dynamos or other generating machines shall be made of wood or other non-conducting material. The floors of all places where it would be possible to make connection with metal at high pressure should be covered with an insulating mat of suitable material and kept in a state of efficient insulation. In switchrooms and on the front of switchboards the main switches, main fuses, main terminals, omnibus bars and all other metallic parts shall be insulated or arranged in such a manner as to render it impossible for any person by accident or inadvertence to touch them. All switchboards erected after the application of these rules shall have at the back a clear space of at least four feet. This space shall not be utilized as a store room or lumber room, or be obstructed in any manner. Any person at work upon a cable or portion of the mains under high pressure shall wear india-rubber gloves on both hands, and the gloves shall be supplied by the occupier, and it shall be the duty of the manager to see that they are in a proper state of repair and are worn by the work people.

THE twenty-second annual report from the Savilian professor of astronomy at Oxford, Mr. H. H. Turner, is published in the *University Gazette* for June 23d. It is stated that the measurement and reduction of the plates for the Astrographic Chart has been the staple work of the year. The Royal Society having granted £150 from the government grant fund during the year, four or five boys who have just left school have been engaged to carry out the measures and reductions under the supervision of the assistants, and the experiment has been successful, one-tenth of the whole work having been accomplished in the last six months. The need of a residence at the observatory pressed on the attention of the board at their last meeting, and fully recognized by them, has not been acknowledged by the Hebdomadal Council. In journeying across America to and from Japan, in order to observe the total solar eclipse of August 9th, the Astronomer Royal, Captain Hills, R. E., and Professor Turner took the opportunity of visiting several Canadian and American observatories. Professor Turner acknowledges the courtesy shown to him, especially at Montreal, Chicago, Cambridge and Washington. "It would be ungrateful not to add that what we saw was of immense value to us, in the way of suggestion; the ideas acquired at the Harvard observatory alone were worth the journey, and cannot fail to leave their impress on the work here."

THE report of Dr. Gill for the year 1896, to the Lords Commissioners of the Admiralty, is abstracted in a recent issue of *Nature*. The McLean telescope is expected to be completely installed and in full working order before the end of the present year. During the last few years Dr. Gill has somewhat necessarily restricted the amount of observational work in order to make more progress in the computation and publication of many arrears, and it is satisfactory, then, to hear that it has now become possible to again resume a program of activity. Several important publications have been concluded in the last twelve months. Among them may be mentioned Vol. II., containing a determination of the solar parallax and mass of the moon, from observations of Iris, Victoria and Sappho, made in the years 1888 and 1889. Vol. I. is also practically complete. The first volume of the Cape Photographic *Durchmusterung* is also ready for distribution, Vol. II. being in course of printing. The observational work with the transit circle, equatorials and astro-

photographic telescope has been very considerable, and it may be mentioned that all the catalogue plates, with the last-mentioned instrument, have now been obtained. Out of the 230 chart plates, 169 have been satisfactorily exposed. The 7-inch equatorial has also been very busy in the hands of Mr. Innes, and, besides several new variables, 104 new double stars have been discovered. Dr. Gill refers also to the increase in staff and the necessity for a reversible transit circle for refined fundamental work, and mentions that these proposals have been favorably considered by the Lords Commissioners of the Admiralty and of Her Majesty's Treasury.

A CONVERSAZIONE was given by the President and Council of University College, London, on June 30th. According to the account in the London *Times* there were a large number of interesting exhibits. Professor Percy Gardner showed a series of archæological photographs, and Mr. Seton-Karr the interesting collection of flint implements recently discovered by him in Somaliland and Egypt. In the mechanical engineering laboratory all the machinery was in motion, besides a number of machine tools lent by various firms. In the electrical laboratory Professsor Elisha Gray's writing telegraph, by which writing may be transmitted long distances, was shown in operation by the Telautograph Company. Messrs. Harvey and Peek gave an exhibition of Tesla experiments with high-frequency currents, and Mr. J. W. Swan sent some of his experiments on electrical discharges against insulators in which curious frond-like figures were produced by the electric spark, and also a delicately-poised Gramme ring which rotated under the influence of the earth's magnetism. In the applied mathematics department apparatus and diagrams were on view illustrative of the work done and the methods of study pursued. These included various calculating machines, instruments for finding areas, and models illustrating games of chance and statistical variation and correlation. There was also a fine collection of books (mainly from the Graves Library of University College) and of portraits illustrating the history of pure and applied mathematics. In the physical lecture room experiments were shown with Hertzian waves and with the magnetic deflection of cathode rays, while Professor Ramsay exhibited the spectra of argon and helium. Some beautiful collections of begonias, orchids, roses and other flowers were to be seen in the anatomical museum, together with a collection of dwarf Japanese trees, some of them being a century old and yet only a foot or so high. Not the least attraction of the evening was Professor Flinders Petrie's exhibition of Egyptian antiquities, which includes the results of recent excavations at Deshasheh, Behnesa and El Kab.

IN one of the Harben lectures given on June 30th, at Kings College, London, Dr. Sims Woodhead discussed the antitoxin treatment of diphtheria. The London *Times* states that he showed examples of the degeneration of tissue produced in various organs of the body, even so soon as the third or fourth day of the disease, and pointed out that after these changes had occurred the physician could not expect to bring the patient back to health at once. This consideration explained the diminished curative power of the antitoxic serum in the latter stages of the disease. The life of a patient depended on the tissues being able to carry on their work, and they could do this if the action of the toxin on their cells could be prevented. In the presence of both toxin and antitoxin these dreaded organic changes did not occur. Hence, if a patient was to recover, antitoxin must be present, whether it was formed within the body or injected from the outside. The serum had both a preventive and curative action, and he would not hesitate to recommend its use as a prophylactic for people exposed to infection. As regards its remedial use the question of time was most important. The necessity of an early exhibition of the serum was illustrated by some statistics. In 1894, before the antitoxin treatment was adopted, the mortality of cases of which the treatment was begun on the first day of the disease was 22.5 per cent.; in 1896 it fell to 4.7 per cent. Of cases of which the treatment was begun on the second day the percentage of mortality decreased from 27 in 1894 to 12.8 in 1896, while in those which came under treatment in the third day the mortality was 29.4 in 1894 and 17.7 in 1896. Even in cases which were neglected till

the fifth day the antitoxin treatment effected a reduction of 6.2 per cent. in the mortality. In view of these figures, and of others dealing with the death-rate in post-scarlatinal and laryngeal cases, Dr. Woodhead expressed his strong conviction that those who opposed the use of the remedy assumed a tremendous responsibility.

MR. ALEXANDER WATT contributes to the last number of the *Bulletin de l'Institut International de Bibliographie* (why should a journal devoted to bibliography omit the date of issue?) an account of a new form of card catalogue. The usual plan of arranging a card catalogue is to place the cards in a drawer or box, a rod being run through the holes in the cards to keep them in their proper order. The examination of the catalogue is made by turning over the cards as one would turn the leaves of a book if it were laid upon its back with its fore-edge in front of the examiner. There are several inconveniences arising from this method of keeping cards. (1) A special cabinet of drawers or boxes is required. (2) As the drawers are bulky and expensive they are generally made too large (to reduce the bulk and expense), which prevents the catalogue being consulted by more than one or two persons at once. (3) It is difficult to keep a particular card in view during the copying of a title, and only one card can be readily seen at a time. In order to obviate these disadvantages Mr. Watt has devised a new receptacle for holding the cards, consisting of a case made in the form and of the materials of the boards of a book. The cards are placed between the boards of the case and are held in position by means of a pin passing through the *outer* corner of the cards and case. The pin, which is made to exactly fit the hole in the cards, has a fixed hole at one end and at the other end a head which screws into the pin. The cards during examination, instead of sliding along the pin, are rotated on it outwards *en bloc*, and may be spread out in the form of a fan so as to keep in view several cards at the same time. As the cards are examined they are pushed back into the case, one or more at a time. As the cases (which may be made of any thickness) when full of cards look like ordinary books they may be arranged like them on the shelves, and as they can be made very cheaply the catalogue of a library may be split up into hundreds of volumes, which will thus allow of its being consulted by many persons at the same time.

THE *Engineering and Mining Journal* has compiled its fifth annual volume on the mineral industry of the United States, giving statistics for the year 1896. The total value of the production was $706,015,411, an increase of $23,950,293 over the preceding year. The United States in 1896 was the largest gold producer of the world and the largest silver producer; it was also by far the largest producer of copper, furnishing over one-half of the world's supply of that metal. Notwithstanding the decrease in the pig iron output it was still larger than that of any other country. In coal the total was still less than that of Great Britian, though it is gradually approaching the point where the two will be equal. The editor writes: "In accordance with our usual custom, we have added to the usual measurements of quantities in each case the metric measures, which we earnestly hope will soon be the only legal measure in this country, as they already are in nearly every other civilized country."

THERE was recently an interesting debate in the British House of Lords regarding works of art and the finance act. A clause in that act enacted last year reads as follows:

"Where any property passing on the death of a deceased person consists of such pictures, prints, books, manuscripts, works of art, scientific collections, or other things not yielding income as appear to the Treasury to be of national, scientific or historic interest, and is settled so as to be enjoyed in kind in succession by different persons, such property shall not, on the death of such deceased person, be aggregated with other property, but shall form an estate by itself, and while enjoyed in kind by a person not competent to dispose of the same be exempt from estate duty; but if it is sold or is in possession of some person who is competent to dispose of the same shall become liable for estate duty."

This clause it appears has been interpreted so as to include only works of art, illustrating English history. It is not clear whether scientific collections must also be confined to English history in order to be exempted from death dues. It was claimed in the debate in the

House of Lords that the tax leads to the dispersion of art collections, pictures being exported from England to the value of $6,000,000 annually.

The *British Medical Journal* states, on the authority of the Secretary of the Pretoria Agricultural Society, that Professor Koch's results with rinderpest inoculation are better than usually stated to be. He says that the method carried out in hundreds of instances has proved successful, but the unfortunate part has been that the ignorant Boer has not carried out all the particulars as instructed. He knew of one instance in which a Boer, after inoculating an animal with the virus, actually cleaned his fingers on the back of the nearest one grazing. In his opinion, however, it is not quite possible to stamp out the disease by the method, as it is impossible to inoculate throughout South Africa the hundred thousands of heads of cattle belonging to the natives in isolated districts in various parts of the country, and this contagious virus is, moreover, carried by the aasvogels (a species of vulture), who feed on the carcasses and carry the rinderpest from farm to farm.

It is stated in *Nature* that a botanical society has recently been established at Perth, West Australia, and has been given the designation of the Mueller Botanic Society, as a tribute to the memory of the late Baron von Mueller, who spent the best part of his life in investigating the plants and other products of Australia. Sir John Forrest has been elected President of the new Society; Mr. Wittenoom and Mr. Leake, Vice-Presidents, and Mr. Skews, Secretary.

The Auckland Institute, says *Natural Science*, has decided to add a new hall, 50 feet square, to its Museum, on the east side of the Ethnographical Hall. It is intended to receive the statuary presented by Mr. T. Russell, which has hitherto found an uncongruous home among stuffed vertebrates. The space thus gained will be occupied by groups of the larger mammals, and £100 offered by Mr. Russell will be used to procure a group of the larger carnivores. Little Barrier Island, on which an attempt is being made to preserve the indigenous fauna and flora of New Zealand, has been placed under the control of the Institute, with a grant of £200 for the first year's expenses. Mr. R. H. Shakespear has been appointed curator, and it is hoped that he may be able to stop the depredations of collectors.

UNIVERSITY AND EDUCATIONAL NEWS.

It is announced that a college for women under the auspices of the Roman Catholic Church will be established at Washington. It will be called Trinity College, and will be adjacent to the Catholic University of America.

The municipal council of Marseilles has passed a resolution favoring the establishment of a university in that city.

Mr. C. L. Herrick, lately professor of biology at Denison University, has been elected President of the Territorial University at Albuquerque, New Mexico.

Dr. A. R. Hill has been appointed professor of psychology and ethics in the University of Nebraska, and Dr. E. L. Hinman has been promoted to an adjunct professorship of philosophy in the same University.

Miss Bertha Stoneman, who has been engaged for several years in the study of the development of fungi in the botanical department of Cornell University, and who received last year the degree of Doctor of Philosophy, has been appointed professor of botany in the Huegenot College in Cape Colony, South Africa. This is a college for the education of the daughters of the French and Dutch Huegenots and English residents in South Africa. She sails from New York on Saturday, July 24th, for Liverpool, and thence by the British African line of steamers for South Africa.

Miss Arma Anna Smith, M. S., and Miss Ethel Muir, Ph.D., both of Cornell University have been appointed assistants in Mount Holyoke College, South Hadley, Mass., the former in botany and the latter in philosophy.

Miss Ellen Hayes, for the past nine years professor of mathematics in Wellesley College, has just been made professor of applied mathematics in the same College. The courses of