

in the broadest way, mean that the sun is blue, but mean a great deal more than that; this blueness in itself being, perhaps, a curious fact only, but, in what it implies, of practical moment. We deduce in connection with it a new value of the solar heat, so far altering the old estimates, that we now find it capable of melting a shell of ice sixty yards thick annually over the whole earth, or, what may seem more intelligible in its practical bearings, of exerting over one-horse power for each square yard of the normally exposed surface. We have studied the distribution of this heat in a spectrum whose limits on the normal scale our explorations have carried to an extent of rather more than twice what was previously known, and we have found that the total loss by absorption from the atmosphere is nearly double what has been heretofore supposed. We have found it probable that the human race owes its existence and preservation to the heat-storing action of the atmosphere even more than has been believed.

The direct determination of the effect of water-vapor in this did not come within our scope; but that the importance of the blanketing action of our atmospheric constituents has been in no way over-stated, may be inferred when I add that we have found by our experiments, that, if the planet were allowed to radiate freely into space, without any protecting veil, its sunlit surface would probably fall, even in the tropics, below the temperature of freezing mercury.

I will not go on enumerating the results of these investigations; but they all flow from the fact, which they in turn confirm, that this apparently limpid sea above our heads, and about us, is carrying on a wonderfully intricate work on the sunbeam, and on the heat returned from the soil, picking out selected parts in hundreds of places, sorting out incessantly at a task which would keep the sorting demons of Maxwell busy, and, as one result, changing the sunbeam on its way down to us in the way we have seen.

I have alluded to the practical utilities of these researches: but, practical or not, I hope we may feel that such facts as we have been considering about sunlight and the earth's atmosphere may be stones useful in the future edifice of science; and that, if not in our own hands, then in those of others when our day is over, they may find the best justification for the trouble of their search in the fact that they prove of some use to man.

May I add an expression of my personal gratification in the opportunity with which you have honored me of bringing these researches before the Royal institution, and my thanks for the kindness with which you have associated yourselves for an hour, in retrospect at least, with that climb toward the stars which we have made together, to find from light in its fulness what unsuspected agencies are at work to produce for us the light of common day.

#### NOTES AND NEWS.

THE Committee on meteorology, instituted by the International congress of meteorology, will meet for a third session in Paris in the beginning of the coming

September. Up to the present time, the following questions have been proposed for consideration during this session: 1°. Report of the secretary on the labors of the committee since the meeting at Copenhagen; 2°. Report of Messrs. Brito Capello, Hildebrandsson, and Ley, on the observation of the cirrus; 3°. Does it seem opportune to soon convene a third international congress of meteorologists? 4°. Establishment of stations of the first order on the Kongo; 5°. Discussion on the utility of the summaries of the state of the weather as published in the different countries, and the eventual preparation of a plan for more uniformity; 6°. Discussion of the utility of the meteorological telegrams from America proposed by Gen. Hazen, and of an eventual organization for their distribution in Europe; 7°. By what means can the timely receipt of meteorological telegrams be assured? 8°. Should the reduction of barometer readings to gravity under 45° of latitude be generally introduced? 9°. Is it desirable to also count in meteorology the hours of the day from 1 h. to 24 h. according to the resolutions of the international conference in Washington? 10°. Designation for a uniformly covered sky according to the form of the clouds; 11°. Definition of rain and snow days; 12°. Should not the general adoption of a uniform height above the earth for rain-gauges be recommended? 13°. What progress has been made lately in the more exact measurement of snow; 14°. International meteorological tables; 15°. Modification of the rules for the administration of the international committee. Any meteorologists intending to submit to the committee remarks on one or the other of these questions, or to propose other questions, can address Mr. Robert H. Scott, Meteorological office, 116 Victoria Street, London.

— The French Academy of inscriptions and belles-lettres offers the Bordin prize in 1887 for the best treatment of the subject, 'A critical examination of the geography of Strabo.' Competitors are invited, 1°, to review the history of the constitution of the text of the work; 2°, to compare the language of Strabo with that of contemporaneous Greek writers, such as Diodorus Siculus, etc.; 3°, to classify the original observations of Strabo, and segregate them from such as are merely quoted by him from other authorities; 4°, to draw such definite conclusions as the above-mentioned studies may suggest. The memoirs, under the usual conditions, should be deposited with the secretary of the academy at Paris by the 31st of December, 1886.

— The fifth German geographical congress was held at Hamburg, April 9-11 last, under the auspices of a local committee.

— A meeting of the American metrological society was held at Columbia college on Wednesday, May 20. Several interesting communications were made.

— The *Geographisches Jahrbuch* (Gotha), now edited by H. Wagner since the death of its founder, Behn, will hereafter appear in two annual parts, with alternating contents, instead of as a single volume every two years, as heretofore. The part of volume x. just

issued contains reviews of physics of the earth, by Zöppritz; geographic meteorology, by Hann; European geodesy, by Oppolzer; geography of plants by Drude, of animals by Schmarda; and ethnological investigation, by Gerland. It is as indispensable as the earlier volumes to those who wish the broader view of these comprehensive subjects.

— The following temperatures and specific gravities of surface water in the Mississippi River were taken on March 1 and 2, 1885, from the South Pass to the mouth of the river, by the officers of the U. S. fish-commission steamer Albatross. From 7 P.M. of March 1, to 3 A.M. of March 2, the course of the ship was S.E.  $\frac{1}{2}$  E., with a speed of 8.2 knots.

Hour.	Locality.	Corrected temperature, F.	Specific gravity reduced to temperature of 60° F.
5 P.M. . . . .	South Pass . . . .	41°	1.00136
5.30 " . . . . .	Jetties . . . . .	41°	1.00136
6 " . . . . .	Off Jetties . . . .	54°	1.01039
7 " . . . . .	" " . . . . .	58°	1.01413
8 " . . . . .	" " . . . . .	58°	1.01495
9 " . . . . .	" " . . . . .	62°	1.01514
10 " . . . . .	" " . . . . .	57°	1.01820
11 " . . . . .	" " . . . . .	58°	1.01989
12 M. . . . .	" " . . . . .	64°	1.02564
1 A.M. . . . .	" " . . . . .	65°	1.02714
2 " . . . . .	" " . . . . .	66°	1.02754
3 " . . . . .	" " . . . . .	61°	1.02809
6.27 " . . . . .	{ Lat. 28° 00' 15" N. Long. 87° 42' 00" W. }	66°	1.02823
8 P.M. . . . .	{ Lat. 28° 05' 00" N. Long. 87° 56' 15" W. }	66°	1.02819

— Capt. Magee of the schooner Henry Waddington reports that he passed close to a white whale on March 1, in latitude 27° 3' north, longitude 75° 30' west. This position off the Bahamas is unusual, as the white whale is usually found in northern waters. The portion of the whale seen was entirely white, and about thirty feet long.

— Dr. Klein has been experimenting with chlorine as an air-disinfectant, especially in respect to swine-disease, this being easily conveyed by the air. He experimented with two pigs — one healthy, the other diseased — confined in the same stable, and in an atmosphere impregnated with as much chlorine as the animals could endure without evincing discomfort. The healthy pig remained well for as long a time as six hours, for five successive days, provided the air in the compartment was maintained well-fumigated with chlorine gas; two good fumigations, up to a marked pungency in the six hours, being required. One good fumigation would effectually disinfect a compartment in which a diseased pig had been.

— A new map of north-western Afghanistan, on the larger and more convenient scale of ten miles to the inch, has been issued by the English war office.

— The increase in the price of boxwood for loom-shuttles has directed attention to the possibility of producing some cheaper material equally suitable. It has been found that compressed teak will answer

the purpose; and a powerful hydraulic press has just been completed by Sir Joseph Whitworth of Manchester, Eng., for Mr. Robert Pickles of Burnby, to be used in compressing this class of timber for the manufacture of loom-shuttles.

— Baron Miklouho-Maclay writes to *Nature* from the biological station near Sydney, Australia, that he has found the temperature of the body of *Echidna hystrix* to be (average of three observations) 28° C., and that of *Ornithorhynchus paradoxus* (two observations) 24.8° C. These temperatures present a special interest, comparing them with the mean temperature of the body of mammalia in general, which is (after Dr. J. Davy's observations of thirty-one different species) 38.4° C.

— The hydrographical researches in Davis Strait, says *Scandinavia*, further corroborate the evidence that there exists in this place a warm undercurrent; for it was found that the highest temperature, when the depth is more than a couple of hundred fathoms, is nearest the bottom. The results of the haulings and scrapings, extending to a depth of three hundred fathoms, in Davis and Disco Bays, were many varieties of lower animals, a few of which were new species. Davis Strait is a favorite ground for deep-sea dredging; for on the 28th of June, 1845, Henry Godfrey, a member of the Sir John Franklin expedition, obtained in Davis Strait, from the depth of three hundred fathoms, a capital haul, — Mollusca, Crustacea, Asterida, etc.

— Dr. Leonard Weber published in the *Elektro-technische zeitschrift* a paper on the estimation of the illumination which a light of any given strength would give upon a table, or on a wall, or any other object which it might be desired to illuminate; his point being to consider not only the intensity of the source of light, but also the position in which the light should be placed to render it available to the highest degree.

— Woeikof of St. Petersburg contributes to the *Geneva Archives des sciences* a sample chapter in French from his recent work in Russian on climatology, describing the supply and discharge of the rivers and lakes of Russia. The most characteristic examples of river-discharge of the Russian type include such rivers as the Volga, Kama, and Moskva, which rise to high flood regularly once a year in April or May, when the winter snowfall melts and flows away. The Moskva, which has been carefully gauged in recent years, discharged 93,000,000 cubic metres in the twenty-five days from April 16 to May 10; during the rest of the year, the total discharge was only 85,000,000. The Neva, a lacustrine river, is, of course, much more regular in its flow: it carries out about one-eleventh of the volume of Lake Ladoga every year. Evaporation on the Caspian is estimated at a little over a metre a year, but fine exactness is not claimed for this result.

— The long series of experiments made during last summer and autumn at the South Foreland light, England, to test the respective merits of oil, gas, and electricity, for lighthouse illumination, will shortly be

reported. The result is strongly in favor of electricity. The electric light could be seen fourteen miles when the others were lost sight of at eight miles; and, when the others were at a maximum power of ten miles, the electric light could be seen at fourteen and a half; and, though its power is much diminished by fog, it is still superior to all other lights, — a point hitherto doubtful.

— In consequence of the increase of shortsightedness, and the theories current as to its cause, a new departure in book-printing has been made in Holland, the letters being printed in dark blue on a pale-green page. Messrs. Issleib of Berlin have also printed one of their latest publications, 'Die naturgeschichte der Berliner,' in this manner, but the result is not wholly satisfactory.

— *Scandinavia* states that H. C. Muller, who, as 'Sysselmand,' has been present at a large number of 'drivings' of whales at the 'Farøer,' has recently described, in the Proceedings of the Natural-history society at Copenhagen, the process of catching the grindehval. The largest number are caught in the months of June, July, August, and September. A few wounded specimens are found to be troubled with parasites, small white crustaceans, rarely by cirripedes. It has an enemy in *Delphinus orca*, the marks of whose teeth have often been observed on it; but that *Lagenorhynchus Eschrichtii* or *Delphinus turrio* should bite it, is a fable, for its mouth is too little and its teeth too small to do the grindehval any harm. Besides, it feeds on the same food as the grindehval, viz., squids. The news of the arrival of the whales spreads like fire. From every village people hasten to the place. By throwing stones the whales are driven into the bay, whence they are either dragged on land and killed, or slain with knives on the shallow places. Then, after the whales have been killed, a division of the catch is made by the participants, certain portions being reserved for the state, church, and school funds.

— Professor Kiessling of Hamburg has given especial attention to the famous sunset question, and during the past year has devised a number of experiments for illustrating the action of minute solid or liquid particles on sunlight, by which sky colors are produced. He has lately summarized his results in a pamphlet entitled 'Die dämmerungserscheinungen in Jahre 1883 und ihre physikalische Erklärung.' Diffraction is considered the most important optical process that contributes to the result, as the dull reddish ring around the noonday sun, the horizon colors at sunset, and the purple and other glows half an hour later, are all ascribed to this action. The explanation of the purple and pinkish glows is especially apt and ingenious, and more to the point than any other solution of the question that has been presented. An important supplement to his pamphlet describes the construction of an apparatus designed to illustrate his explanations experimentally. He is a strong supporter of the volcanic origin of the particles on which the diffracting water-particles have condensed.

— We learn from *Scandinavia* that Professor Falbe Hansen of the University of Copenhagen delivered recently a very interesting lecture upon the progress of Denmark in recent times, especially after the free constitution of 1848. During the last century, the yearly increase of the population was nearly 2,000; after 1840, 17,000. Copenhagen had, in 1840, 124,000 inhabitants, while it now has 330,000. The provincial towns rose in the number of its inhabitants from 148,000 in 1848, to 304,000. Early in the century, at the accession of King Frederick VI., the national wealth could be computed at 530,000,000 crowns; in 1848, at the accession of Frederick VII., at 1,000,000,000; at his death in 1863, at 2,300,000,000; and now, at 4,000,000,000. Denmark cannot any longer justly be named, as formerly by the poet, 'a poor little country.'

— Miss E. A. Ormerod has just issued her eighth annual report of "Observations of injurious insects and common farm pests during the year 1884, with methods of prevention and remedy." It embodies the remarks of numerous observers in various parts of Great Britain on the occurrence of insects injurious to farm and garden crops, on their habits, and on the best ways of getting rid of them. It is not a little remarkable, says *Nature*, to notice how observant, often of minute and interesting details, Miss Ormerod's correspondents are; and, though many of them probably have little or no scientific training, their aptitude for studying the habits and effects of certain insects makes their records of considerable value. Aside from the scientific interest of the report, Miss Ormerod has done a good work in inculcating habits of observation among farmers and gardeners, who have opportunities such as few others have for noticing facts connected with the life-histories of insects.

— In the January number of the *Journal of anatomy and physiology*, Dr. Alexander Hill describes a very interesting parasitic monster which he recently dissected. The parasitic twin consisted of a lobulated mass projecting from the anterior nares of a more perfect foetus. The mass is about as large as the head of the other foetus, and is divided into three large and six small cotyledons. In one of the large lobes there is an embryonal form of liver; in another a central irregular mass of bone, full of cysts. From a study of this parasite, Dr. Hill concludes that the foetus is a double monster, one part of which has been arrested in development by some mechanical advantage which the more perfect foetus possessed over the other in the beginning; and that the parasite did not begin to develop until after the perfect twin was rather far advanced. The parasite is well supplied with blood, and the skin is well developed; but the larger part of its mass is made up of jelly-like embryonic tissue.

— A German engineer is reported to have invented a method of ascending and descending in a balloon at pleasure until he finds a current of air moving in the horizontal direction he wishes. The agent he uses is compressed carbonic acid, with which he is enabled to condense or expand the gas.