thousand times more remote than the stream of stars which compose our own galaxy; and it also involved the assumption that the matter of the universe is aggregated into clusters, separated by immense barren spaces, in which we must assume that there are very few luminous stars, and but few dark stars which would absorb light, as well as comparatively very little opaque matter distributed as meteors are distributed in the region of space we are familiar with.

We have evidence that the greater part of the lucid stars belong to the galactic system, but the large proper motion of some stars, taken in conjunction with their small parallax, affords evidence, as Professor Simon Newcomb has pointed out, that they will in time pass away from our galaxy. (Professor Newcomb has shown in his "Popular Astronomy" that, making the most liberal assumptions as to the number and masses of the stars of our galactic system, the highest speed which a body could attain if it fell from an infinite distance through such a stellar system would be twenty-five miles a second, a velocity which is certainly smaller than that of many stars.) The regions outside our galaxy cannot, therefore, be absolutely barren, but however sparsely luminous stars are distributed through space, if there were no absorption of light in its passage through the ether, and no opaque bodies to blot out the light of distant stars, it would be impossible, as Olbers long ago pointed out, to draw a line in any direction which would not in an infinite universe pass through some luminous star, and the whole heavens ought to shine with the average brightness of such stars.

That the heavens are comparatively dark may, therefore, be taken as proof either that the light-transmitting ether is not perfectly elastic, or that there are numerous dark bodies in space that blot out the light which we should otherwise derive from the more distant parts of the universe.

NOTES AND NEWS.

THANKS to new sanitary measures in England, says the *Medical Record*, there has been a diminution of more than thirty per cent in the death-rate from consumption since 1861.

— In a recent number of the *Archives of Surgery*, Mr. Jonathan Hutchinson says that he has for many years been in the habit of forbidding fruit to all patients who suffer from tendency to gout. In every instance in which a total abstainer of long standing has come under his observation for any affection related to gout, he has found on inquiry that the sufferer was a liberal fruit eater. Fruits are, of course, by no means all equally deleterious; cooked fruits, especially if eaten hot with added sugar, are the most injurious, the addition of cane-sugar to grape-sugar adds much to the risk of disagreement. Fruit eaten raw and without the addition of sugar would appear to be comparatively safe. Natural instinct and dietetic tastes have already led the way in this direction; few wine-drinkers take fruit or sweets to any extent, and Mr. Hutchinson suggests as a dietetic law that alcohol and fruit-sugar ought never to be taken together; and he believes that the children of those who in former generations have established a gouty constitution may, though themselves water-drinkers, excite gout by the use of fruit and sugar.

— A statement, by State Geologist Arthur Winslow, of the operations of the Missouri geological survey during the month of July shows that work on iron ores was begun during the latter part of the month, and inspections were made in Callaway and Wayne Counties. Zinc and lead deposits have been examined and reported upon in Newton, McDonald, Barry, and Lawrence Counties. The occurrence and distribution of coal have been studied in Carroll, Chariton, Howard, Monroe, Buchanan, Nodaway, Gentry, and Davis Counties. Detailed mapping has been prosecuted in Macon, Madison, Ste. Francois, and Ste. Genevieve Counties, and about 160 square miles have been covered. In the laboratory the analysis of some twenty-two samples of mineral waters have been completed. The work on paleontology and general stratigraphy has been actively prosecuted in the north-eastern part of the State along and adjacent to the Missouri River. The quaternary formations in Buchanan, Jackson, Saline, and adjacent counties have received special study. A work recently started, looking towards obtaining an estimate of the total amount and value of the mineral products of the State up to the present date, has been given special attention during the past month, and is now well advanced. In the office, Bulletin No. 5 will be ready for distribution soon. It consists of a paper on the age and origin of the crystalline rocks of Missouri and one on the clays and building stones of certain counties tributary to Kansas City. Considerable progress has been made in the preparation of Bulletin No. 6, and in the draughting of maps for publication. The granites and porphyries in Madison County have further been studied and their areas mapped, and the distribution of the geological formations have been outlined in a part of Greene County. Inspections of building stones and of clay deposits have been made in Stone, Jefferson, Ste. Genevieve, Mississippi, Stoddard, Scott, Cape Girardeau, Madison, Iron, Wayne, Butler, Greene, Webster, Phelps, and Crawford Counties. In connection with the various works above referred to, many photographs have been taken illustrating the occurrences of minerals and other geological phenomena in the State, and a large number of specimens have been collected for purposes of study, test, and exhibit.

— A correspondent of the *American Field*, writing from Sidney, O., says: "A friend of mine, a careful observer, recently related an occurrence he witnessed some years ago. While watching fish through clear ice in shallow water, he saw a muskrat moving about on the bottom, apparently feeding. Presently the animal stopped and emitted the air in his lungs, which came up in small bubbles to the under surface of the ice. He then came up, put his nose to the large bubble and rebreathed the air. This may be old, but it was new to me, and may be to others"

— In a paper on the density of weak aqueous solutions of certain sulphates, read before the Royal Society of Canada on May 28, 1890, Professor J. G. MacGregor of Dalhousie College, Halifax, gives the following as the general results of his study of the subject: (1) In addition to magnesium, zinc, and copper sulphates, already known to form weak aqueous solutions having a volume less than their constituent water would have in a free state, aluminum, cadmium (possibly), cobalt, and nickel sulphates are found to exhibit the same peculiarity; (2) the formation of such solutions is not a property of the sulphates generally; (3) neither is it a property of all the metals of any one of the groups into which the metals are divided by chemists; (4) the formation of such solutions does not seem to depend upon the amount of the water of crystallization of a salt.

— From a series of observations on woodpeckers, made in the region of Mount Chocorua, New Hampshire, Mr. Frank Bolles, in a communication to the *Auk* for July, draws the following conclusions: that the yellow-bellied woodpecker is in the habit for successive years of drilling the canoe birch, red maple, red oak, white ash, and probably other trees, for the purpose of taking from them the elaborated sap and in some cases parts of the cambium layer; that the birds consume the sap in large quantities for its own sake and not for the insect matter which such sap may chance occasionally to contain; that the sap attracts many insects of various species, a few of which form a considerable part of the food of this bird, but whose capture does not occupy its time to any thing like the extent to which sap drinking occupies it; that different families of these woodpeckers occupy different "orchards," such families consisting of a male, female, and from one to four or five young birds; that the "orchards" consist of several trees usually only a few rods apart, and that these trees are regularly and constantly visited from sunrise until long after sunset, not only by the woodpeckers themselves, but by numerous parasitical humming-birds, which are sometimes unmolested but probably quite as often repelled; that the forest trees attacked by them generally die, possibly in the second or third year of use;

that the total damage done by them is too insignificant to justify their persecution in well-wooded regions.

— London *Iron* says: "A novelty in boat building is the tiny steamer just completed for the Frankfort Electrical Exhibition by Messrs. Escher, Wyss, & Co. of Zürich, and which made a successful trial trip on the Limmat the other day. It is constructed entirely of aluminum, even to the engines and screw propeller, and is the first vessel that has been built of the light, ductile, silver-white 'metal of the future.' The lilliputian bark is twenty feet long and five feet wide, and is driven by a two horse-power naphtha motor. As this compact style of engine, when, as is usually the case, it is wrought out of iron, is already considered one of the lightest on the market, the further advantage gained in this respect when the motor is constructed of aluminum is obvious."

— That severe mental distress or fright sometimes produces physical disease, and occasionally even death, is an admitted fact, according to the *Lancet*, although the way in which it acts has hitherto been but little studied. In order in some measure to supply the deficiency in our knowledge regarding this matter, Dr. G. Bassi has recently made a number of observations on animals which apparently died in consequence of capture. Birds, moles, and a dog which had succumbed to conditions believed by Dr. Bassi to resemble those known among human beings as acute nostalgia and "a broken heart," were examined post mortem. Generally there was hyperæmia, sometimes associated with capillary hemorrhages of the abdominal organs, more especially of the liver, also fatty and granular degeneration of their elements, and sometimes bile was found in the stomach with or without a catarrhal condition. The clinical symptoms were at first those of excitement, especially in the birds, these being followed by depression and persistent anorexia. The theory suggested by Dr. Bassi is that the nervous disturbance interferes with the due nutrition of the tissues in such a way as to give rise to the formation of toxic substances, — probably ptomaines, — which then set up acute degeneration of the parenchymatous elements similar to that which occurs in consequence of the action of certain poisonous substances, such as phosphorus, or to that met with in some infectious diseases. In support of this view, he points out that Schule has found parenchymatous degeneration in persons dead from acute delirium, and that Zenker found hemorrhages in the pancreas in persons who had died suddenly. He refers also to some well-known facts concerning negroes in a state of slavery, and to the occasional occurrence of jaundice after fright. He hopes that these hints may induce medical officers of prisons and others to study both clinically and anatomically this by no means uninteresting or unimportant subject.

— Additional experiments and observations upon ammonite seem to confirm the first opinions regarding its safely and its power. Direct application of heat or concussion fail to explode it. Atmospheric changes exert no influence upon it whatever. It has been tried in a large number of the most dangerous coal mines in England without igniting the gases which were known to be present at the time. A mixture of coal-gas and coal-dust was not exploded by it, even when no more than two inches of tamping was used. The safety tests have been so thorough and satisfactory that the railroads of the United Kingdom accept ammonite as freight without the usual restrictions placed upon explosives, and it even meets the requirements of Sir George Elliot for perfect security, which is saying a great deal. According to the *Railroad Gazette*, ammonite consists of an intimate mixture of 81½ per cent of ammonium nitrate and 18½ per cent of mono-nitro-naphthalene. The manufacture is extremely simple and practically unattended with danger. Being free from chlorates it is not liable to decomposition or spontaneous combustion. Having no picric acid or chlorinated derivatives of hydro-carbons in its constitution it yields no injurious or corrosive fumes among its products of combustion. It is put up for use in lead-foil cartridges and exploded with a detonator. Tests made in England on July 9 showed that it possesses great strength, a projectile of 29 pounds weight being thrown from a mortar elevated forty-five degrees to a distance of 320 feet from the muzzle by a five-gram charge, as against 289 feet by a similar charge of No. 1 dynamite, and 136 feet by an equal weight of gunpowder. Notwithstanding this, ammonite has as yet only been proved of value in comparatively soft material. Experiments are in progress, however, to secure if possible a high efficiency with this explosive in hard rock work. While the security claimed for ammonite is highly encouraging it should be remembered that it is commonly "the unexpected that happens." It would seem that ammonite possessed a special virtue in the absolute safety of its separate ingredients, and in the great ease of its manufacture, which would enable it to be made upon the spot where it was needed, by any one having even a meagre knowledge of chemistry, and with a very inexpensive plant.

—The Supreme Council of Hygiene of Austria has been engaged in discussing the advantages of erect as compared with slanting writing, and the official report of Drs. von Reuss and Lorenz points strongly in favor of the former. According to the London *Educational Times*, they point out that the direction of the written characters has a marked influence on the position of the body. In "straight" writing the scholar faces his work, and is spared the twist of the body and neck which is always observable in those who write slantwise, and one common cause of spinal curvature is thus obviated. The erect method is, therefore, expressly recommended for use in schools in preference to the ordinary sloping lines.

— M. Constantin Miculesco has communicated to the Paris Académie des Sciences a note on a new determination of the mechanical equivalent of heat. According to *Engineering*, the method used was in principle the same as that of Joule, viz., the production of heat in a calorimeter by means of friction. In Joule's experiments, however, the total work done was small, and hence a long time was required to obtain a sensible heating of the calorimeter, and various difficult corrections had to be made. To avoid this, M. Miculesco made use of a fairly powerful electromotor to supply the work which was to be turned into heat. The apparatus consisted of a one horse-power Gramme electromotor, carried on a frame suspended on knife edges, the shaft of the motor being central with the line of these supports. A calorimeter consisting of two concentric cylinders was mounted on a separate frame, so that the axes of the cylinders coincided with the centre line of the motor shaft. This shaft was coupled, by a flexible connection, to one carrying paddles, which it caused to rotate in the water in the cylinder. Under these circumstances the frame carrying the motor tended to swing on its knife-edges so as to balance the torque on the motor shaft, and by correcting this tendency by carefully adding weights, this torque could be measured with great accuracy. The result obtained was J=777.7 foot pounds.

— The United States Coast and Geodetic Survey Office at Washington has received a report from Assistant J. E. McGrath of that service, dated June 20, 1891, Camp Davidson, Upper Yukon River, near eastern boundary of Alaska, in which he states that the health of the party has been excellent, and the work at that station is practically completed; and that as soon as the necessary solar observations for rating the chronometer could be obtained, they would leave for St. Michael's. The trip will be made in open boats, as certain magnetic observations were to be made at Fort Yukon, obliging the party to stop there. Mr. McGrath expects to reach St. Michael's by Aug. 25, and in time to come south on the revenue cutter "Bear." In his report Mr. McGrath states that the astronomical observations have been very much delayed by cloudiness and rain. Meteorological observations have been continuously made three times a day. The average monthly temperature since December shows an increase of a few degrees over the same months of the preceding year. The lowest minimum temperature noted was on Jan. 16, on which date the lowest temperature read was —60.5° F. The Yukon River opened nine days later this year than in 1890. Mr. McGrath speaks in the highest terms of the diligent and faithful conduct of all the members of his party, mentioning by name his assistants Mr. Davis and Dr. Kingsbury. The latter gentleman had at the date of the report left camp for home, carrying with him the duplicate records of the party, it being deemed safer to have them sent ahead of the originals, to avoid possible loss of

both sets. Mail has already been received from Dr. Kingsbury from San Francisco.

— Particulars of the observatory which it is proposed to erect on Mont Blanc at the very summit are given in the *Neue Züricher Zeitung*, from which *Engineering* quotes as follows. The idea originated with M. Janssen, who stayed on the mountain some time last summer for the purpose of making meteorological observations. In conjunction with M. Eiffel, and with the support of M. Bischoffsheim, Prince Roland Bonaparte, and Baron Alfred de Rothschild, he has now elaborated the plan of an observatory to be entirely of iron, and to have a length of eighty-five feet and a breadth of twenty feet. The iron roof is to have a spherical form. The erection of such a building on the highest point of Mont Blanc naturally involves preliminary studies, with which a Zürich engineer experienced in works on high mountains has been charged by M. Eiffel and M. Janssen. In the first place, it is necessary that a firm foundation should be found for the supports of the building on the rock of the mountain. For this purpose a horizontal gallery is to be driven through the ice of the highest glacier until rock is met with, and by means of this gallery the formation and position of the rock buried beneath the ice and snow are to be ascertained and examined. If once this has been accurately determined, a structure is to be designed which will give to the observatory a firm hold by iron pillars founded in the rock. The question of how the heavy materials are to be moved to the top of the mountain does not appear to give much concern, but more is thought of the work of surveying, which was to have been commenced this month. Should the surveys prove the practicability of the plan, it is intended to proceed with the erection in September.

— In connection with an item from *Nature* on copepoda in these columns last week, the following communication to the same paper, from Mr. I. C. Thompson of Liverpool will be of interest: "Professor Herdman's practical demonstration at the North Cape confirms a theory I have long held, that the copepoda, which abound in every ocean, sea, and lake, might be largely and advantageously made available for human food. It is well known that the species *Calanus finmarchicus*, so abundant in our northern seas, forms the chief food of the Greenland whale. Our own immediate coasts abound in this and other equally edible species. During a recent dredging cruise round the Isle of Man, each pull of the tow-net contained thousands of another and larger species of copepod, *Anomalocera patersonii;* and Dr. John Murray has found that a still larger species, *Euchæta norvegica*, is plentiful in the lower depths of several Scotch lochs. A number of finely-meshed trawls, used off the west coast of Ireland, would, I am convinced, furnish excellent food for starving multitudes in time of need. *A propos* of the distribution of copepoda, my attention was called a few days ago by the Mayor of Bootle to the filter-beds of the town salt-water baths, which he said were swarming with *Entomostraca*. The water is supplied direct from the river, and examination showed the presence of copepoda in enormous quantities, the bulk of them being *Eurytemora hirundo*, a species only once before taken in Britain, and then in near proximity to Bootle. Probably other filter-beds are equally prolific, and may prove valuable hunting-grounds, the copepoda undoubtedly acting as scavengers in keeping the water pure from putrefaction."

— It seems as if the introduction of large engineering views may soon produce a very marked effect upon the future of Egypt. Mr. Willcocks, one of the Inspectors of Irrigation, has communicated a letter to the London *Times*, in which he says that the summer supply of the Nile is lamentably deficient for the existing cotton and sugar-cane crops of Egypt, so that all extensions of these valuable crops are out of the question under existing conditions. The Nile Valley in Nubia is eminently suited for storage of water, but up to the present all projects for storing the muddy flood waters of the Nile below the junctions of the Blue Nile and the Atbara have been condemned, as the construction of solid dams would have resulted in the silting up of the reservoirs themselves. This difficulty has disappeared now that it has been discovered that open dams can be constructed that will allow the muddy flood waters to flow through, and store the clear winter supply for use in summer. The construction of these dams has been rendered possible by the great success of Stoney's patent roller-gates, which can be worked under heads of 70 feet of water on a scale sufficient to pass the full flood supply of the Nile. At any time now Egypt can construct a reservoir in its own territory by building an open dam at the head of the Assouan cataract. If, however, Egypt were allowed to occupy the Nile Valley as far as Dongola, the reach of the river above the Wady Halfa cataract would provide the necessary reservoir, and the Philæ immersion difficulty would be at an end. So far the summer supply needed for Egypt proper. If the Soudan itself is to be developed, it will only be necessary to construct solid dams at the heads of the Ripon Falls and Fola Rapids, and thus secure the Victoria and Albert Nyanza Lakes as magnificent reservoirs. These reservoirs would not only secure Egypt and the Soudan from drought, but would also, if provided with open dams, secure Egypt from excessive floods. The White Nile as it leaves the two lakes is a clear stream, so that the silting up of the reservoir would be out of the question, leaving alone their great size.

— The success of the University Extension scheme in this country, says the London *Educational Times*, has attracted much attention in educational circles in France, and the ministry of education has decided to have the subject investigated on the spot. Accordingly, M. de Varigny, a member of the University of Paris, has been delegated to study the working of the scheme during the present summer and autumn in England and Scotland, and to make a report upon it.

— Professor Langley, the director of the Smithsonian Institution, is now in England. *A propos* of his recent researches on mechanical flight, *Nature* learns that Mr. Maxim is building a "flying machine," with which a series of experiments is contemplated. It is now being constructed at Crayford, and is nearly ready for launching. It will be propelled by a light screw, making twenty-five hundred revolutions a minute. The motive power (it is reported) is supplied by a petroleum condensing engine weighing eighteen hundred pounds, and capable of raising a forty thousand pound load. The real suspending power will lie in an enormous kite measuring one hundred and ten feet long and forty feet wide.

— Mr. Edward Standford has published a pamphlet on "The Spread of Influenza: its Supposed Relations to Atmospheric Conditions," by the Hon. R. Russell. The following, says *Nature*, are some of the author's conclusions as to the conditions which give rise to influenza, and permit it to be spread. Influenza is a disease caused by exceedingly minute microbes, arising from extensive areas of marsh or sodden land in Central Asia, China, or Siberia. The minuteness of the microbes or their spores is shown by their easy transmissibility, and the large number of persons capable of being infected by a single case in a large room, most persons probably requiring many virulent organisms to be inhaled in a short time before the resistant power of the blood is overcome. This microbe, like that of cholera, multiplies with great rapidity, and probably soon produces sufficient poison to terminate its career in the body, but not before multitudes of spores or microbes have been given off by the breath. Given the original conditions of rainfall, soil, and high temperature, the certain result is the development of inconceivable multitudes of microbes and spores. One species of these is capable of planting itself and living in the tissue and blood of man, of which the temperature is probably near that to which it has been accustomed under the summer sun in wet and drying ground. The somewhat rare and occasional visitations of influenza may be due to at least two or three causes — first, the occurrence of unusual rainfall and favorable summers; second, the prevalence of air-currents from the drying area towards inhabited places; third, adequate communication between these infected places and the towns of Russia, whence progress is rapid towards western Europe. The wind has no influence that can be verified in the transportation of influenza. As for the means of prevention, Mr. Russell thinks that measures of disinfection and isolation of the earliest cases, and rules at ports and landing places similar to those employed against cholera, would probably prove of the greatest service. Inland, every locality should isolate and disinfect its first cases.