the greater depth at which the mines will have to be worked, and the increased cost of coal-mining. Reference was then made to the great expansion of coal-mining in America, and the author agreed with the late Professor Jevons that future British manufacturers must not expect to derive any help from the import of coal from the United States when coal shall have become dear or scarce at home.

A good discussion followed the reading of this paper. Mr. Bourne pointed out that the opening of the Canadian route to the East would ease the demand on English product, as coal had been discovered in the Dominion. Thus the Peninsular and Oriental ships, instead of filling with English coal at foreign stations, would probably be running from Vancouver to China and Japan, and use Canadian coal. The speaker looked to petroleum to lessen the demand for coal in many instances, as it had already done in many cases. He did not consider the electric light had done much in this direction, but, if water-power could be more largely used, some relief might be hoped for in that direction.

Mr. G. W. Hastings, M.P., spoke on the aspect of the question from the political economist's standpoint, and pointed out that coal-owners had been making very little profit from their exports.

Mr. John Marley, president of the Northern Institute of Mining and Mechanical Engineers (Darlington), said it would be well if Professor Hull had taken into consideration one or two facts in connection with the coal-trade. One was that thirty years ago the amount of coal required for the production of every ton of pig-iron and its detailed manufacture was double the quantity it is now. That would, therefore, form an element in future calculations. Also the manufacture of steel only required about half the number of tons of coal which was required for each ton of manufactured iron. Another point which the professor had named was his differing from the Royal Coal Commission in not taking into account the coal-seams between 12 inches and 24 inches in thickness. The professor evidently thought that these seams will not come into play so much as he (Mr. Marley) would venture to submit they will, on account of the great depth to which shafts will have to be sunk to work them. He would call Professor Hull's attention to the fact that these shafts have to be sunk, and are sunk, to the thicker seams; and when these thicker seams are exhausted, then the thin seams, between 1 foot and 2 feet in thickness, come into play. He spoke of what was an actual fact, for he knew many instances where seams of 14, 16, and 18 inches were at this moment being worked profitably in the county of Durham from shafts sunk from the thicker seams. Professor Hull would therefore see that his objection to the expensive shafts for these thin seams did not really apply.

Professor Hull, in reply, did not anticipate that petroleum, however largely it was likely to come into use in England, would make very much difference in the demand for coal. As to Mr. Marley's remarks on the greater economy of fuel in the manufacture of iron, he himself could remember when eight tons of coal were required in the Midlands for the production of one ton of iron, while now only 1¼ tons of coke were required in Cleveland per ton of pig-iron. At the same time, the economy in the use of coal was more than counterbalanced by the enormous increase in the production of iron.

HEALTH MATTERS.

Insanity following Surgical Operations.

IN a recent letter to the *British Medical Journal*, Dr. Tait writes, —

"I have now performed, so far as I can estimate, between seven thousand and eight thousand operations requiring the use of anæsthetics, and I have had anæsthetics administered in my practice for purposes not involving traumatism probably in three thousand more instances, and I know of seven cases of sequent — not necessarily consequent — insanity. Of course, there may have been others not known to me, and I shall say fourteen cases to cover that margin of error. My own practice, therefore, does not yield a proportion of cases of insanity following operations larger than the general proportion of insanity in the adult female population; and, if I include the cases of anæsthesia, it is probably considerably smaller.

"Dr. Denis, in his book on this subject, says, 'En moyenne, on observe 2.5 cas d'aliénation mentale sur 100 opérations.' But if this had been the case, all of us engaged in active operating practice would have felt the influence of the fact long ago. Personally I have been struck by the occurrence of insanity after operations as being like the occurrence of tetanus, — something to be met with occasionally, but not a matter to calculate upon. If I saw an insanity rate of 2.5 in my operations, it would be more striking than any death-rate in every thing but my hysterectomies, and in that class I have already said I have never seen insanity follow in a single instance; and Dr. Bantock's experience amounts to practically the same result, for his exception cannot really be called one of insanity following an operation. As a *per contra*, I can point to at least thirteen cases where operations have cured insanity."

TRANSPLANTATION OF SKIN FROM A CORPSE TO A LIVING PERSON. — Dr. Bartens has successfully transplanted the skin of a corpse to a living person who had been severely burned. His method of procedure, as described in the *Brooklyn Medical Journal*, was as follows: On Dec. 13 a lunatic died in the hospital of pyæmia following a compound fracture of the arm, and about twenty minutes after his death two large, good-conditioned flaps were removed from the legs of the corpse. These were laid in warm water to which a little salt had been added, and then were taken to the division of the hospital (two or three hundred yards away) in which the scalded boy lay. These flaps were then carefully washed, and cleansed of their subjacent fatty pannus; that done, they were divided into smaller pieces of from one centimetre wide to about one to two centimetres long (the ulcerated surfaces of the boy's legs had been cleansed in the same manner as the flaps in the mean time); then these pieces were laid on to fit as nearly as might be, dusted over with iodoform and covered with batting, and compresses applied. This whole proceeding took about one hour and a half from the time of the death of the old man. There were twenty-eight pieces applied in all; as it happened, too, fourteen on each limb. On the 19th of December the bandages were removed for the first time, and it was found that there was union of twenty-four of these grafts.

COCAINE HALLUCINATIONS. — MM. Magnan and Saury report three cases of hallucination due to the cocaine habit. According to the *British Medical Journal*, one patient was always scraping his tongue, and thought he was extracting from it little black worms; another made his skin raw in the endeavor to draw out cholera microbes; and a third, a physician, is perpetually looking for cocaine crystals under his skin. Two patients suffered from epileptic attacks, and a third from cramps. It is important to notice that two of these patients were persons who had resorted to cocaine in the hope of being able to cure themselves thereby of the morphine habit, — an expectation which had been disappointed. For more than a year they had daily injected from one to two grams of cocaine under the skin; without, however, giving up the morphine injections, which were only reduced in quantity. The possibility of substituting cocainism in the endeavor to cure morphinomania is a danger, therefore, which must be carefully held in view.

NOTES AND NEWS.

THE officers for the coming year of the Society for the Promotion of Agricultural Science are Professor C. E. Bessey of the University of Nebraska, for president; Professor W. R. Lazenby of Ohio University, for secretary and treasurer; and professor T. J. Burrill of Illinois University, for third member of the council.

— The thirty-third annual convention of the Association of College Presidents in New England began Nov. 7, in New Haven, Conn., at the residence of President Dwight. Delegates were present from eleven colleges, including President Eliot of Harvard, President Warren of the University of Boston, Professor Richardson of Dartmouth, President Smith of Trinity, President Carter of

Williams, President Dwight, Professors Newton and Wright of Yale, President Capen of Tufts, President Raymond of Wesleyan, President Hyde of Bowdoin, and President Andrews of Brown. The discussions were on these subjects: First, "What should be the Minimum of Mathematical Studies for the Degree of Bachelor of Arts?" Second, "Ought not our Courses of Study, both Prescribed and Elective, be so arranged that any Given Candidate for the Degree of Bachelor of Arts should be compelled to confine his Time to a Smaller Number of Subjects?" Third, "The Expediency of requiring Somewhat of Natural Science for Admission to College." Fourth, "The Means of inducing Secondary Schools to teach Science by Laboratory Methods." The convention continued through Nov. 8. Among the subjects discussed were, "The expediency of reducing the College Course to Three Years," "Limitation of Society Conventions in Term Time," "The Advantage of College Training for Teachers," and "The College Pastorate."

— Peter Graff of Worthington has announced the gift of twenty-five thousand dollars out of the estate of his son, Charles H. Graff, M.D., to endow a professorship of hygiene and physical culture in Pennsylvania College at Gettysburg. Dr. George D. Staley of Lebanon, formerly of Harrisburg, has been chosen to fill the chair.

— The leading ship-builders in England have just submitted to the Canadian Pacific Company offers for the construction of three first-class passenger-steamers for the Atlantic service in connection with the new route to the East. It will be remembered, says *Engineering*, that a week or two ago the Naval Construction and Armament Company, whose works are at Barrow, were commissioned to build three twin-screw steamers of 7,000 tons, being 440 feet long, to attain a speed of 18 knots an hour, for service between Vancouver and Yokohama, the other sea-passage of the route; the Canadian Pacific Railroad carrying the passengers from the Atlantic seaboard in Canada to the Pacific. The new Atlantic steamers will be faster than the Pacific vessels, having a maximum speed of 20 knots, with the engines indicating about 10,000 horse-power, and the boilers, of which there will be ten, working at a pressure of 165 pounds to the square inch. The intention is that the voyage from the south of England to Halifax in the winter, and Quebec in the summer, should be accomplished in at most five days and a half. Unlike the Pacific steamers, they will be propelled by a single screw, but it is quite possible that before the contract is ultimately fixed this may be altered. In the case of the Pacific steamers the first idea was to have a single screw; and, as negotiations proceeded, the builders were asked to tender for twin-screw boats, and the beam and depth of the hulls were considerably increased. The Atlantic vessels will, according to present design, be 480 feet long by 54 feet beam by 25 feet draught. The first of the new vessels, according to the mail contract with the government, must be ready to sail in February, 1891, so that the order for the steamers will likely be placed before long. It is expected that the passage from the south of England to Japan will be made in twenty-three days without any difficulty. The distance is about 9,250 miles, as against 13,750 by the Suez Canal, and 15,500 by the Cape. To Shanghai, also, the route is shorter *via* Canada, being 10,500 miles, as against 12,500 and 14,500 respectively by Suez and the Cape.

— An imperial Chinese edict, dated Aug. 27, 1889, states that "the sovereign is of opinion that to make a country powerful, railways are essential." What a wonderful change this represents in Celestial opinion since the time of the Chinese war! The great trunk line between Peking and Hankow is to be immediately commenced in two places, — in the south, from Hankow to Sin-Yang Chow; in the north, from Lu-Kow K'iao to Cheng-Ting Fu,— leaving the intervening sections for a future period. Lu-kow is five miles south of Peking. The construction of the line, according to *Engineering*, is to be under the management of Chow Fu and Taoti Pan Chün-teh, under the general superintendence of Li Hung Chang and the Admiralty. Li has transferred the whole of the foreign staff of the existing Maiping-Tientsin line to the new railway, although one of his colleagues advises that Chinese capital and labor should be relied upon solely. There is still a very strong opposition to railways in China; and the emperor, out of compassion for those who, in pulpit phraseology, may be called his "weaker brethren," has ordered the viceroys and governors of Chihli, Hupeh, and Honan to issue explanatory proclamations, exhorting and commanding all people to throw no impediment in the way. "It is the imperial desire that all shall work together to make this great work a success." This will be the first railway openly constructed in China. The existing line commenced as a tramway from the coal-mines to a canal. Then a locomotive was put upon it, and little by little it was extended until it reached Tientsin. If the Chinese would only commence to build railways in good earnest, the effect would soon be felt in England.

— At the recent meeting of the Congress of German Men of Science and Physicians at Heidelberg, Herr O. Ammon submitted to the Anthropological Section some interesting results of observations he had made in Baden. These observations, says *Nature*, related to five thousand soldiers, The tall men had generally long skulls, or skulls of medium length, whereas the short men had round skulls. Most of the round-skulled men came from the Black Forest; the long-skulled usually belonged to the valley of the Rhine, and were especially numerous in towns and in the neighborhood of the castles of ancient families. From this fact Herr Ammon concluded that the round-skulled men had been the original inhabitants of the Rhine valley, that they had been driven from it by long-skulled invaders, and that the latter had established themselves near the settlements of their victorious leaders. Having shown that there is a certain relation between the height of the figure and the shape of the skull, Herr Ammon went on to indicate the relation between fair hair and blue eyes. No fewer than 80 per cent of the men with blue eyes had fair hair. He found also that physical growth is generally quicker in the case of the brown-eyed than in that of the blue-eyed type.

— In a paper read before the Royal Danish Academy in February, M. Adam Paulsen gave some interesting particulars of observations made with the object of determining the height of the aurora. *Nature* states that two theodolites were used, the observing telescopes of which were replaced by short tubes having small holes at the eye ends, and metallic cross-wires at the other ends. Two of the stations were situated in the same magnetic meridian, on opposite banks of the Fiord of Godthaab, at a distance apart of 5800.4 metres. The vertical circles of the two theodolites were placed in a common plane by means of observations of "blue-fire" signals given at each station. Signals were also exchanged on the appearance of an aurora which it was thought possible to measure, so that simultaneous observations were secured; and it was previously agreed to direct the instruments to the base of the auroral arc. The observations at Godthaab gave heights for different auroræ ranging from 0.6 of a kilometre to 67.8 kilometres. A second series of observations with the same apparatus and methods was made in 1885 by MM. Garde and Eberlin at Nanortalik, near Cape Farewell, the base-line in this case being 1247.8 metres; and the values determined here were 1.6 to 15.5 kilometres. The results obtained by the staff of the Swedish International Expedition at Spitzbergen, with a base of 572.6 metres, range from 0.6 to 29.2 kilometres. These observations, therefore, lead to the conclusion that auroræ are by no means confined to the highest parts of our atmosphere, but that they occur almost indifferently at all altitudes. In support of this view, M. Paulsen gives accounts of several appearances of auroræ beneath the clouds and the summits of mountains. It is interesting to compare the new values with those given by previous observers. M. Flögel calculated the heights of several auroræ which appeared in the autumn of 1870, and concluded that only the very lowest parts of the aurora came at all within the limits of our atmosphere: he gave the actual limits as 150 to 500 kilometres. For an aurora on Oct. 25, 1870, M. Reimann found a height of from 800 to 900 kilometres, and Nordenskiöld came to the conclusion that the mean height of auroræ was about 200 kilometres. On the other hand, Lemström has observed auroræ as low as 300 metres, and M. Hildebrandsson has seen auroræ in a completely clouded sky. Considering all the facts of the case, M. Paulsen inclines to believe that in the temperate zone, auroræ only appear in the higher layers of the atmosphere; whereas in the auroral zone, properly speaking, the phenomenon is generally produced in the lower layers.