squirrel—the rabbit, the kangaroo—and so on through the list. The intellectual standard finds its expression in a greater brain-weight among animals.

Any one who has glanced at the older anatomical atlanti will have been struck by the picturesque folds and festoons into which the brain-surface is thrown. He may compare the folds in the representations of different authors and will arrive at the conclusion that they can have no definite importance, because they differ so absolutely in every diagram examined.

The fact is that these folds or corrugations, familiarly known as the CONVOLUTIONS of the brain, were later recognized to be very methodically and regularly arranged, and to follow a distinct plan for each zoological species, including man. The old anatomical masters, ignorant of this fact, allowed their draughtsmen to fill in the details according to their fancies, and these naturally led the latter to pay more attention to the picturesque than the true. Now the contest as to the location of mind in the brain took another form, the opponents of the materialistic theory, that brain and soul are united, tacitly admitted the general proposition, and orthodox anatomists endeavored to discover as numerous and as decisive criteria by which to distinguish the brain of man from that of the ape as diligent research could unearth. But one barrier after another which they erected has been swept away by their opponents. Owen's claim that the apes had no lesser hippocamp, was demolished by Huxley, the Island of Reil has been demonstrated in animals far below the monkey tribe, the cerebral overlap is recognized to be decided in the anthropoids and in other monkeys as in many human subjects, and even an indication of an opercular formation has been found in defective human brains, while the last criterion, the alleged absence of the "*Zwickelwindung*" in man, has been demonstrated to be faulty by Parker, of Philadelphia.

The great similarity of the chief surface features of the monkey's brain with those of the human, led Ferrier and Munk after preliminary experiment by Hitzig and themselves to attempt the isolation of willed muscular movements, and of special sensory perception in the cerebral convolutions of the monkey. The researches of Meynert had shown that anatomically the brain "bark" or "rind" [*cortex cerebri*] occupied the position of a mirror as it were, on whose inner face abut the photophone wires represented by nerve bundles, transmitting the messages from the outer world. Meynert found that the nerve fibres from the eye, the skin in general, the ear, the nose, and tongue, went to special convolutions, and that to other convolutions went fibres which controlled muscular movements. Now the experiments of Munk and Ferrier confirm the anatomical premise of Meynert, in its general bearings. They found by cutting away a given part of the brain, blindness would result, the removal of another part would be followed by deafness, of still another by paralysis. They and others also established that if those parts whose removal was known to be followed by paralysis, were instead of being injured, stimulated (by electricity) special motions could be produced at will. In other words, these investigators found the keys of the mind before them in the convolutions of the brain, and by touching a special key, were enabled to forge the will signature of the animal, as it were. Special parts of the human brain, when the seat of disease or of injuries, are shown to have similar functions. A man has an apoplectic stroke, or an abscess, or a softening, or a tumorof the brain. If that disturbance is in one part he may be blind in a portion of his visual field, or he may lose the memory of words, or their articulation, or the ability to write, or he may be paralyzed in one arm, or one leg, or only on one side of his face. If the disturbance is extensive, several of these symptoms co-exist. It is noteworthy that these disease experiments, if we may so term them, confirm the physiological experiments made on monkeys in a remarkable manner, and it seems that the great problem of the relation between brain and mind is nearing a solution through different channels of research, approaching the same goal.

NEW YORK ACADEMY OF SCIENCES.

November 28, 1881.

LECTURE EVENING.

The President, Dr. J. S. NEWBERRY, in the Chair.

The hall was filled to overflowing.

In introducing the lecturer of the evening, the President stated:

"Captain Cheyne asks you to examine his plans carefully. He has been with three expeditions to the Arctic regions, and has spent there five and a half years. He has been there under so many circumstances that he knows, perhaps better than any other man, the difficulties to be encountered and how to overcome them. He comes recommended by the highest authorities in England. His plan is not chimerical, and it is certainly heroic. Men will yet surely go to the Pole, if they have to crawl there on their hands and knees; and an enterprise of this kind is worthy of attention in these days, if only to withdraw the minds of men from their shops and money-getting and purely selfish occupations."

COMMANDER JOHN P. CHEYNE, R. N., F. R. G. S., then delivered the following lecture:

THE DISCOVERY OF THE NORTH POLE PRACTICABLE.

(Abstract.)

Reference was first made to the large number of local committees—sixty-two—and of influential persons in England who have signified their approval of this enterprise.

A Council has been formed in England and is now awaiting the news from America. As soon as it is has heard of action taken here toward the formation of an Anglo-American expedition, the members of the Council

will bestir themselves. It was originally designed, by means of an expedition, the cost of which would have been about £30,000, to include the circumnavigation of Greenland, besides the journey to the North Pole.

The lecturer then considered the probable position now occupied by the "Jeannette," under the command of Lieut. De Long. His opinion was that this vessel is somewhere to the northward of Grinnell Land, and it was based on the presumption of a circumpolar current flowing towards the east along the American continent, carrying the "Jeannette" from Behrings Straits towards Greenland, and not along the Siberian coast, as some have supposed. The great body of warm water that flows northward by the peninsula of Norway and Sweden strikes the lighter currents near the Pole and goes on as a submarine current, sweeping around the Pole till it goes out again through Smith's Sound. This current would naturally carry the "Jeannette," as she goes towards the Pole, in the direction of Smith's Sound. Hence Commander Cheyne proposes to search for her by proceeding up Baffin's Bay and Smith's Sound as far as the coal mine near Discovery Harbor. Not very far from this vicinity he expects to find the missing vessel, if she has not already reached the North Pole. The "Jeannette" has been only two years absent, and it is time enough to expect her next October or November. There is as yet no occasion for anxiety as to her safety, nor will be for a year to come.

The following plan is proposed for reaching the Pole: a small vessel will be engaged to convey the exploring party, with provisions for two years and a half, to St. Patrick's Bay, near Discovery Harbor, leave them there, and immediately return. The party will consist of seventeen persons all told, including Lieut. Schwatka, U. S. A., the commander of the late American Franklin search expedition, who has most cordially volunteered to accompany this party on the part of America.

To attempt to reach the Pole in the usual manner, there would be required six sledging parties of five men each. Each man would have to drag 215 pounds. The Lecturer believed that the journey could be performed by means of sledges, as he had not the most remote idea that there is an open sea about the Pole. Starting in April or early May with the six sledges, they would go fifty or sixty miles on the journey; and then sledge No. 6 would stop and bury in some safe place all its spare supplies as a depot for the return journey, and that sledge would return to the ship. After going fifty or sixty miles more the fifth sledge would stop in the same way, bury its spare provisions, and return to the ship. The first sledge would keep on until the Pole was reached. In this way the journey might be made in 106 days, but would be far more difficult and laborious than that proposed by the following plan:

On arrival at St. Patrick's Bay three snow observatories will be established, one situated in the immediate vicinity of the coal mine, at St. Patrick's Bay, another fifty miles further north, and the third the same distance to the south. These observatories will be connected by telegraph wires, and hourly meteorological observations will be taken and transmitted to the central station. Thus accurate information as to the direction and force of the wind simultaneously over a distance of one hundred miles will be obtained and immediately plotted at the central station. When the proper wind curve for reaching the Pole is found to exist, the attempt will be made by means of balloons. These will be of large size, and three in number, costing altogether, about £12,000. Each will carry three men, be provided with a boat car, a set of Esquimaux dogs, and provisions for fifty-one days. The total load for each balloon will be between one and one-half and two tons. The gas for inflating the balloons will be generated, at least mainly, from the abundant coal at this harbor, and to prevent the too rapid diffusion and loss of gas, it is proposed to employ a double envelope of silk with an intermediate layer of gold-beaters' skin. It has not yet been decided whether to use pure hydrogen or a mixture of coal gas and hydrogen. The Commander has convinced himself by experiments with balloons, both in polar regions and in England, that they can be satisfactorily used in the way above proposed; and he hopes to cover the distance from St. Patrick's Bay to the Pole, 496 miles, in from eighteen to twenty-four hours. The altitude of the balloons will be regulated at about one thousand feet by means of a trail rope. After arrival at the Pole, advantage will be taken of a favorable wind to return to St. Patrick's Bay, or, possibly, to continue in one balloon right on to some part of Russia, should it appear better to take that course. Any loss of gas during the balloon trip, which may be found to have occasioned a deficiency on arrival at the Pole, or during a short stay there for scientific observations, may be remedied by the abandonment of one balloon and the transference of its gas into the other two and possibly, by the conveyance of a small supply of hydrogen in steel cylinders.

Many interesting arctic phenomena were discussed: *e.g.*, the proofs that the aurora borealis was not caused by atmospheric electricity but by magnetism: the numerous parhelia and mock moons visible in polar regions: the mode of formation of glaciers and icebergs, and the curious shapes assumed by the latter.

The coal of the mine at St. Patrick's Bay was described as equal to the best Welsh, almost smokeless, and existing in very large quantities. The present meagre flora of Greenland was compared with the rich ancient flora, almost tropical in character, shown by the fossil plants found in the Tertiary beds of the vicinity of Disco. More than fifty species of trees and shrubs have been obtained from these deposits.

In conclusion the Lecturer spoke of the very probable success of the proposed Anglo-American expedition now being organized by Lieut. Schwatka and himself, and stated that the estimated expense, at a minimum, is to be £16,000, each country to provide half of this sum, and all discoveries to be equally shared by the two nations. The Commander laid great stress upon the good feeling existing between America and England, expressing the opinion that the organization of such a joint expedition as proposed, especially if the two national flags were to be planted side by side at the world's apex, would so materially develop that feeling, that therein would be at once an answer to those questioners who asked "*cui bono*? What commercial return can we expect for our expenditure for equipment?" Further utilitarian achievements were then touched upon, as relating to the more thorough study of the sea-bottom by soundings, and of the oceanic currents within the Arctic circle, so that in time commerce will be enabled to work out more definite highways for the passage of ships across the ocean; also to the development of knowledge in different branches of science, in addition to the advantages that might accrue in opening up and investigating such a vast unknown area.

At the conclusion of the lecture, the audience expressed, by a show of hands, its hearty interest in the subject, after the delightful mode of its presentation and illustration by Commander Cheyne, and its recommendation of the matter to the careful consideration of the public.

ELECTROLYSIS OF WATER.—D. Tommassi.—According to the author a zinc-copper or zinc-carbon element plunged into dilute sulphuric acid does not decompose water if the two electrodes are of platinum. In order that the electrolysis of water may take place, the positive electrode must be formed of a metal which, under the influence of the voltaic current is able to combine with the water.—(*Comptes Rendus Oct.*, 24, 1881.)