the absolute form of Munk's localizations, Professor Christiani does little to put any other positive and definite conceptions in their place, and one may say as a last result, that he leaves the subject of division of labor in the brain as obscure as he found it. There are some other important and interesting experimental discoveries in the book, to which we lack space for reference. It may be added, in a general way, that the question of localization seems now in a far more hopeful state than ever before. The distinction of relative centres and absolute centres, introduced by Exner, in his statistical study of human brain lesions, bids fair to be a fruitful conception, if it can ever be intelligently worked out. A recent article by Exner in the *Biologisches centralblatt* (band v., hefte 1 und 2), takes a mediating position and tries to show that the facts reported by Goltz and Munk are far less at variance than the reporters themselves think. It is a very praiseworthy article, and should be read by all those who are interested in the subject of Professor Christiani's work.

GEOGRAPHICAL NOTES.

ADVICES from the Pacific coast afford some details in regard to the journey of Lieut. H. T. Allen and his companions, though the complete report is of course reserved for headquarters. There is a good deal of confusion of names, distances, and positions in the press reports, from which, however, we are able to gather that the party ascended the Copper or Atna River, and explored its northern and western branch to its source, a distance which, omitting irregularities of the stream, must be between two and three hundred miles. The Copper River had been explored by Serebrannikoff to a distance of some fifty miles from the mouth in 1848; and several prospectors have been on the river since the purchase of the territory by the United States, but no record, except in newspaper articles, has been kept of their wanderings. The branch explored by Lieutenant Allen and the eastern branch are about of equal size; the latter is believed to rise not far from the head of Lynn Canal. They found the river extremely rapid, with many cataracts, and having in some places a fall of seven feet to the mile. Its width is variable, sometimes several miles, including large islands; at others but a few hundred feet. There are many glaciers near it, and the active Wrangell volcano rises almost from the river. Remains of the mammoth were seen; the color of gold was found in the river-bed, and copper and silver ore brought back, the former from the range in which the river heads. A portage was made across this range to the sources of the Tananah, where there are a number of extensive lakes. The river was reached about 125 miles above the point to which it had been explored, and it and the Yukon were followed to the sea. Game was not very abundant, fish being the chief reliance of the Indians. No casualties occurred, the chief difficulty being to obtain labor, since the Indians were averse to work. Two miners and several Indians were with Lieutenant Allen's party, which found some difficulty in subsisting on the country. Great credit is due Lieutenant Allen and his companions, whose journey may be compared to that in which the celebrated Robert Campbell discovered the sources of the Yukon.

Lieutenant Cantwell's recent exploration of the Kowak River was made by a party consisting, beside the commander, of two seamen; C. H. Townsend, naturalist; an interpreter; and eight or ten Innuit. The river was entered July 2 with a steam launch and two canoes. At the rapids Townsend remained with the launch, the rest ascending in skin canoes. They reached with great difficulty a cañon some 300 feet deep and very narrow. The boats were hauled over a temporary bridge constructed of felled trees. Above the gorge the stream became very shallow. After great difficulty the source of the river was reached, consisting of four large lakes, of which the most important is in about north lat. 67°, west long. 153°. It is supposed to be about 520 miles from the mouth of the river.

Assistant engineer Samuel B. McLenegan, who accompanied Cantwell in his exploration of the Kowak in 1884, this year undertook a very difficult bit of exploration in a double bidarka or kayak, obtained at Unalashka. Owing to the difficulty of obtaining native assistance he was accompanied only by Seaman Nelson of the Corwin. They ascended the Noătak, also called the Nunatak or Inland River, which has been known for thirty years, but never explored. This river enters Hotham Inlet, westward from the Kowak, and about thirty miles north of the arctic circle. They entered the river July 2, and found almost from the first great difficulty in stemming the rapid current; at times they were compelled to track the canoe by a line from the bank, or wade in the shallows of the river-bed. Much of the region was mountainous. The river passed through numerous cañons, with sides rising high above the water, even reaching 1,000 feet in some places. The scenery was very grand. Indications of iron and copper ore were observed in many places. Two hundred and seventy-five miles, by the river, above its mouth, part of the provisions were cached, and the explorers lived on the country,

finding game plentiful. On the 30th of July a point was reached where canoe navigation ceased on account of shoal water, and the two men proceeded on foot. Near the head-waters, instead of mountains, there were elevated moorlands, with scanty vegetation and destitute of timber. The source of the branch ascended was found to be a small lake surrounded by snow-banks, and supposed to be about 400 miles from the coast. The natives, of whom about 250 live on the river, were friendly, and the return voyage was made without accident. The run down the river was very exciting owing to the numerous rapids and impediments. The party reported on board the Corwin August 27. The voyage, which was extremely creditable to those who took part in it, is noteworthy, as the party reached the highest latitude yet attained by white men in the interior of this part of Alaska. The report and charts which are being prepared for the department will doubtless fill a large part of the blank space which occupies the best maps of this area.

A letter from Mr. Henry D. Woolfe, who has been during the past year stationed at Cape Lisburne on the arctic coast north of Bering Strait, states that the winter there had been a mild one, February being the coldest month, with a minimum for the winter of — 45° F. There were many heavy southerly gales during December, January, and February. The range of hills in which the Noätak or Nunatak River rises was in a direction E. N. E. mag. only three days from the station. In February and March he travelled along the coast from Cape Lisburne to Hotham Inlet, and ascended the Noätak on the ice about thirty miles to a village of Innuit. Between the Corwin Lagoon and Cape Krusenstern a river falls into the sea, which he was informed was connected with the Noätak, running behind the hills which lie back of Shesholik village. Mr. Woolfe is preparing a map showing all the native settlements and even single huts temporarily occupied along the coast between Cape Krusenstern and Point Barrow. He had discovered several new coal veins, and, in fact, found a region about twenty miles square that was a continuous coal-field, the coal belonging geologically to the carboniferous age, and being easily got at, and of excellent quality. It has long been used for fuel by the whalers, and the Pacific whaling company are having it mined to supply their steam whaling vessels.

ASTRONOMICAL NOTES.

Small versus large telescopes.—Mr. Denning's crusade in favor of small telescopes seems to have come to a rather inglorious ending in the closing sentence of his letter (*Observ.*, '85, 305), which reads, "The efficacy of small instruments comes in where it is desirable to have that critical sharpness of the image resulting from a suitable blending of aperture and power with atmospheric conditions," whatever that may mean. The truth would seem to be, that very much of what observers with small telescopes call 'sharp definition' is merely the smoothing out of actual minute irregularities, or very slight unsteadiness, which limited aperture is powerless to separate or define, on account of the overlapping diffraction circles or bands, which necessarily constitute the image of every point or line. One matter, however, might with profit be further investigated, and that is, whether the larger cylinder and cone of rays from a large aperture materially increase the disturbance of the image when the seeing is bad. Perhaps the most amusing feature of the whole discussion is where Mr. Denning (*Observ.*, '85, 207) fails to grasp the sarcasm of Professor Hall's communication (*Observ.*, '85, 174), and takes it as written in sober earnest.

Comet 1885. III. (Brooks).—The comet found by Brooks on August 31 appears to have passed perihelion about three weeks before discovery. According to three independent sets of elements, perihelion passage occurred on August 10, the comet being then at a distance 0.75 from the sun (the earth's distance from the sun being unity). The nearest approach to the earth seems to have occurred about September 25. Even at its best, the comet seems to have been a very unsatisfactory object to the observer; and it can probably be seen now only in the more powerful telescopes. It is less than a third as bright as on September 5. The observations thus far published extend to about the middle of September, and the comet is generally described as round, faint, increasing a little in brightness toward the centre, without definite nucleus or tail, and some two or three minutes of arc in diameter. We should mention that Mr. A. A. Common, of Ealing, England, is reported to have discovered the comet independently on the evening of September 4.

New variable in Cygnus.—Mr. J. E. Gore announces (*Astr. nachr.*, 2683) that the red star Birmingham 587, south-following ρ Cygni, varies between 5.8 and 7.5 magnitudes, in a period of about 250 or 300 days, the last maximum having been in December, 1884. The star is Lal. 42153 and D.M. + 44°, 3877.

Common decimal unit of circular measure.—It seems that the recent somewhat sensational announcement (*Nature*, xxxii. 465) of a supposed rapid proper motion in Nova Andromedæ arose from the failure of an English amateur to distin-