spongy masses, at other times as long, firm, ivory processes of the most varied shapes, several inches or more in length. The disease is more or less hereditary, nevertheless its apparent frequency among the ancient Incas is interesting.

Of more especial interest, however, is the relation which Virchow surmises to exist between this multiple exostosis and the bony growths found with remarkable frequency in the ear-canals of the ancient Peruvian crania. Nearly two scores of specimens have been described, in which either one or both auditory canals were more or less filled with bony growths, usually near the middle. As in nearly all these cases the peculiar flattening or elongation of the occipital region occurs to a greater or less extent, some have assigned this as the cause. Others have thought that the custom, so common among the Incas and other non-civilized races, of wearing rings or large disks of metal in the fleshy ear, had produced the affection. To both of these views Virchow objects. Not only have cases been observed among the North American Indians where there is no cranial deformation, but in the Incas themselves deformed skulls without, and undeformed skulls with, the exostosis, are known. The very common custom among many races of the present day, of wearing foreign substances in the ears, is not known to produce this result. The author believes them to be due to abnormal ossification, of a nature either closely related to, or identical with, that in other parts of the skeleton. Why this disease should have occurred with such greater frequency among this race we do not know, and we can only speculate upon the extent that it affected the audition. The effects of the disease must have been produced in childhood, probably early. In many cases the auditory canal is entirely closed on one or both sides, in others much narrowed. That it must have diminished the power of hearing, is evident. To what extent absolute deafness was caused, one cannot say.

LARGE VERSUS *SMALL TELESCOPES.*

THE critical observer can hardly fail to have noticed, during the past few years, the setting-in of a slight reaction against the monster telescopes and their capacity for advanced astronomical work. Perhaps this is not better defined at present than a tendency to reaction merely; and it seems to have had its origin mainly with a few possessors of medium-sized instruments, who, perhaps, had failed in their efforts to procure larger ones. Any astronomer who has had experience in the adaptation of different kinds of observational work to the varying capacity of different instruments knows very well that there is work enough of a sort which the largest telescopes only are fitted to perform in the best manner; and he also recognizes the fact that in other times of research, which are happily by no means exhausted, the small telescopes have many advantages over the large ones. But these relate rather to the mechanical than to the optical parts of the telescope.

It is not too much to say that the methods peculiar to the opticians of the present day have advanced the construction of the telescope to a degree of perfection which far surpasses the apparent possibilities of observational astronomy in other directions. If the optician gives the astronomer a practically perfect instrument, and the latter finds its performance disappointing, one or other of three things will be true: either he has set it up in a bad atmosphere, or the work to which he has put the instrument is ill adapted to its size, or (it is a good thing for every ambitious fledgling to institute this modest though often disastrous inquiry) the trouble resides in the cerebro-optical apparatus just outside the eye-piece. The first of these conditions appears in a fair way to be partially removed in the early future by the building of mountain observatories in regions where great steadiness of the upper atmosphere is insured; the second gradually removes itself with every new experience; while the third constitutes a very serious obstacle to the progress of the sciences; for what can the conscientious astronomer do with the work of a bad observer? He hesitates to mingle bad observations with good ones, for he cannot tell how much the accuracy of the final result may be impaired; nor does he like to reject the bad ones, because his work is then open to the charge of incompleteness; and, besides, the bad observer makes it an invariable rule to omit all data which might help the theoretical astronomer to find out just how bad his observations are.

Until lately, those who have been discussing in astronomical journals the relative merits of large and of small telescopes have quite overlooked the astonishing variation in the eye-power of different observers. As a general rule, — and for a very obvious reason, — the large telescopes come into the possession of the best observers, while the weaker eyes and heads must continue their use of the smaller instruments. Notwithstanding this natural result of evolution, the lesser telescope sometimes seems to have the greater advantage. While fully realizing the superior power of the great telescope, the observer using it has learned to be very cautious in pronouncing upon what he sees: but the imaginative amateur is bound by no such restrictions; he is free to conceive what

ought to be there, points to his spy-glass, and, lo! there it is. If, then, a trained observer with a larger telescope fails to verify his marvel, what better proof is needed that the great telescope is ineffective? It is an axiom in astronomy, that, when once a discovery is made with a large telescope, the object can always be seen with a smaller one. This presumes, of course, that the same observer uses the two instruments, and that he knows where to look and what to look for with the smaller one. And this in no wise constitutes an argument for equality of the small telescope with the larger; for with a good atmosphere, and the superior telescopes now made, it is never true that the nature of any celestial object can be made out with a small telescope which a larger one will fail to show more satisfactorily. Taken in connection with the attempts of late years, so far successful, to set up powerful telescopes on mountain elevations where a correspondingly perfect atmosphere is obtained, the future of the monster telescope is most hopeful. D. P. T.

MAKING A NEW MERV OASIS.

The Russians have fixed their minds, says *Engineering*, on a new enterprise, well calculated to set on edge the teeth of English and Indian statesmen. This is no other than the formation of a new oasis, as large as that of Merv, along the new frontier to the Oxus, which the Afghan delimitation commission will delineate as soon as the spring weather enables it to quit its winter quarters at Tchamshambe. Briefly, the scheme, which is said to be a sober engineering design, complete in all details, and drawn up on the spot by the surveyors of General Annenkoff, the constructor of the Transcaspian railway, provides for cutting the bank of the Oxus near Tchardjni, and allowing the water to flow afresh through some ancient channels running in the direction of Merv.

There is no particular novelty in the idea, the oasis of Khiva being formed entirely of country irrigated by an elaborate system of canals running out from the Oxus near its entrance into the Aral Sea, while the Merv oasis is of a similar character, and uses up all the water of the Murghab. The channels, we have said, already run into the desert near Tchardjni; and a careful series of levels, taken during the autumn, show, that if the bank of the river be cut, and the channels cleared of drift in one or two places, the water will run freely for sixty or seventy miles. The nomads can then be left to manage the rest of the business themselves; for the natives of Merv and Khiva are extremely clever in making irrigation canals, and they would speedily establish a network, and convert the clayey expanse now devoid of vegetation into a green oasis, as fertile as any in central Asia.

Readers of O'Donovan's and Marvin's books on Merv will not have forgotten, that as far as the Turcomans convey water from the Murghab, there amazing productiveness prevails, although immediately beyond is a desert. All that is really needed, therefore, is to withdraw from the Oxus a sufficient quantity of water (and Annenkoff's calculations show that abundance can be spared), and a year would be sufficient to create an oasis capable of supporting a quarter of a million people. In that case Russia could march troops from Askabad and Merv to the farthest parts of Turkestan, and despatch the Tashkent and Samarcand forces through Bokhara to Merv and Sarakhs in return, without having any desert to traverse, and the communications along the new frontier would be perfect. As the cost would be only £160,000, no doubt whatever is entertained in Russia that Annenkoff's proposal will be accepted.

Dr. Aristides Brezina of Vienna has published a catalogue of the fine collection of meteorites in the Hofkabinet. The richest collections of meteorites are those of the museums of London, Vienna, Paris, and Calcutta. On May 1, 1885, the Vienna collection contained representations of 358 genuine falls. Dr. Brezina accompanies his catalogue by a valuable essay on the origin and classification of meteorites, and by a map of the world showing the localities in which the Vienna specimens have been found.

— The *Revue sud-américaine* of Dec. 30 announces the organization of a new scientific society in Paris under the name, 'Académie de l'Amérique latine.' The academy will be divided into four sections, as follows: social and political; historical and literary; geographical and ethnographical; economical, commercial, and financial. It will be devoted solely to the Latin nations of America, and the membership will be unlimited. It will publish a bulletin in the French, Spanish, and Portuguese languages.

— Extended researches by F. Emich (*Centralblatt für agrik. chemie*) show that the purification of natural waters is effected almost wholly by organic agencies; the chemical action of ozone, peroxide of hydrogen, and the oxidation from the air, exerting but a feeble influence. This was proved by experiments made upon water in which the germs had been destroyed by boiling.