one-thousandth of an inch in a year would account for the difference. In stellar parallax we find the important work of Gill and Elkin at the Cape of Good Hope, and the surprising results of the Pulkowa observations, which, if confirmed, will place the star Aldebaran among the three or four nearest of the fixed stars. Professor Newcomb mentions the spectroscopic investigations of the motions of stars in the line of sight, observations of the companion of Sirius, cataloguing stars by photography, and the red sunsets, and concludes with a review of the conclusions of the International meridian conference, and a notice in regard to the communication of astronomical discoveries, and the recently founded Watson and Draper astronomical prizes.

WATER-SUPPLY FOR NEW YORK.

MR. J. T. FANNING, who is well and favorably known to the profession by his valuable treatise on water-supply engineering, prefaces a study of the present and future water-supply of New York [1] by a couple of pages, giving a brief historical summary of the establishment of the Croton aqueduct, which at its opening in 1842 supplied the city, then having a population of less than one-third of a million, with an average of twelve million gallons of water daily. The history of the rapid increase in the consumption of water, next given, shows that by 1875 the demand for water had reached the limiting capacity of the aqueduct, which amounted to a daily average of ninety-five million gallons. Since 1875 "the public fountains have ceased, one after another, to flow. Drinking-fountains for either man or beast have been almost unknown of late in the public streets. Meters have been applied in charitable institutions, as well as in manufacturing establishments, and the most stringent measures taken to prevent waste, and at times most urgent appeals made to save the consumption, that the evils of an approaching water famine might be lessened." The New-York water department estimates that the works now in progress will draw from the Croton watershed a daily average of two hundred and fifty million gallons (see *Science*, No. 124).

On the basis of numerous statistical tables given in the report, as to increase of population and of water-consumption, the attempt is made to estimate the period during which these new works will provide a sufficient supply for the city, and for the population which must draw its water from the city supply.

In making this estimate, the needs of the city are taken to include a sufficient supply for the ordinary uses to which water is applied in our larger cities, not excluding those uses in manufacturing establishments for the lack of which business must be curtailed, or settle elsewhere.

The conclusion reached in this report is, that, before the year 1898, the regular increase of population and the expansion of business will require the whole of the projected average supply of two hundred and fifty million gallons *per diem*, and that before 1930 four times that amount may be needed.

Having thus determined that the total available supply from the Croton watershed cannot in any event answer probable legitimate demands for much more than a single decade, the author, in looking to other gathering-grounds from which to draw a sufficient supply for future needs, regards the head waters of the Hudson River in the Adirondack region as the most available source, provided the city is to be supplied by gravitation with water of unexceptionable quality, in adequate quantities, and at a pressure due to a head of two hundred feet or more above tide water, such as will carry water to the upper floors throughout the city.

Careful surveys show that a canal sixty feet wide, thirteen feet deep, and somewhat over two hundred miles long, would carry five hundred million gallons of water *per diem* from near Fort Edward to New York. The estimated cost of this conduit is nearly thirty million dollars; and the auxiliary structures, storage-basins, necessary tunnelling, etc., twenty-five million dollars: total, fifty-five million dollars. It is proposed that the canal run on the highlands east of the Hudson River at an initial elevation of three hundred and fifty feet above tide water, and that this source be also used as the water-supply for the cities and towns on both sides of the river, between Albany and New York, having, according to the census of 1880, an aggregate population of quarter of a million souls, besides the million and three-quarters in New York and Brooklyn. Detailed surveys and the statistics of annual rainfall show that the Adirondack watershed is capable of furnishing an average of nearly fourteen hundred million gallons daily without trespassing upon the river-supply available for canal and manufacturing interests.

This grand and beneficent project must evidently, before many years, be put in process of actual construction. It is greatly to be desired that the state of New York should, as soon as may be, put a stop to the destruction of the Adirondack forests, and reserve a principal part of that region for a park, thus preserving this region as a sanitarium for the commonwealth, as well as the source of a beautiful supply of good healthful water for the entire Hudson valley.

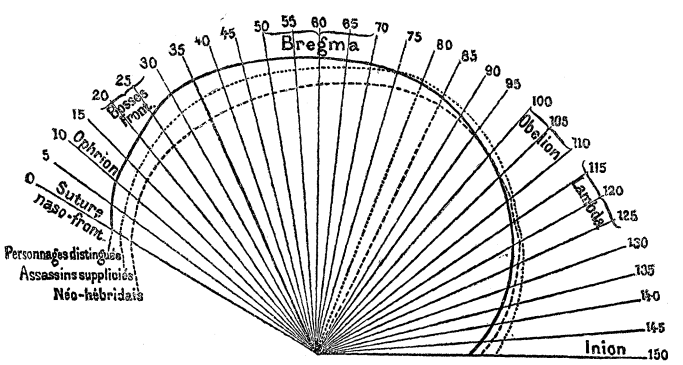
[1] *Report No. 2, on a water-supply for New York and other cities of the Hudson valley.* By J. T. FANNING, C.E. New York, 1884. 36 p., 3 maps. 8°.

COMPARISON OF THE SKULLS OF ASSASSINS AND MEN OF NOTE.

THE material for Dr. N. Bajenoff's studies of the heads of assassins and distinguished persons (*Bull. soc. anthrop. de Paris*) was of two kinds, — first, fifty-five heads of assassins; second, nineteen heads of distinguished persons. This last series seeming too small, he prepared another, composed of the heads of twenty-five noted living men. His main studies were carried on by means of the cephalometer of Anthelme,

which is the only instrument that permits the drawing of a curve from a series of heads by taking for each ray the mean in the series. The mean curve for each series shows that all the frontal rays of distinguished men are much greater than in the assassin, and that in a savage race, the Neo-hebrides, taken for comparison from four heads, the frontal development is even less than among assassins.

These last two curves cross the first in the parietal part, in the neighborhood of the bregma; and the posterior development of assassin and savages is greater in all points than that of distinguished men. In all the distinguished men the occipital rays were less developed than in the other series, though this difference is less marked. The maximum rays, represented in the diagram by dotted lines, are in distinguished



AVERAGE MEASUREMENTS OF THREE CLASSES OF HEADS.

men at the 35° line, while in the other two classes it is found at the back of the head, between the 80° and 85° ray. This rule is not so infallible that we can pick out men, and say this is a distinguished man, this an ordinary man, and this a criminal, simply by the shape of the head; but it can be said that seventy-five in a hundred learned men have the superior character, while at least ninety-five in a hundred assassins have the inferior character. A third part of Dr. Bajenoff's work deals with the cranial projection (total, posterior, anterior, and facial) and the facial angle. These confirm his first experiments. Among distinguished persons the anterior cranial portions are the best developed, while among savages and assassins the facial and posterior projections exceed the others.

ORIGIN OF THE CEREALS.[1]

RECENT numbers of *Naturen* contain interesting papers, by Professor Schübeler, on the original habitat of some of the cereals, and the subsequent cultivation in the Scandinavian lands and Iceland of barley and rye more especially. It would appear that barley was cultivated before other cereals in Scandinavia; and that the generic term 'corn' was applied among Northmen to this grain only from the oldest times; and that in the Norwegian laws of the seventeenth and eighteenth centuries, wherever reference was made to the '*Kornskat*' (or standard by which land in the northern lands was, and still is, rated in accordance with the corn it is capable of yielding), the term was understood to apply to barley. Proof of the high latitude to which the cultivation was carried in early ages is afforded by the Egil's Saga, where mention is made of a barn in Helgeland (65° north latitude) used for the storing of corn, and which was so large that tables could be spread within it for the entertainment of eight hundred guests. In Iceland barley was cultivated from the time of its colonization, in 870, till the middle of the fourteenth century, or, according to Jón Storrason, as lately as 1400. From that period down to our own times, barley has not been grown in Iceland with any systematic attention, the islanders being dependent on the home country for their supplies of corn. In the last century, however, various attempts were made, both by the Danish government and private individuals, to obtain home-grown corn in Iceland; and the success with which these endeavors were attended gives additional importance to the systematic undertaking which has been set on foot by Dr. Schübeler and others, within the last three years, for the introduction into the island of the hardier cereals, vegetables, and fruits. As many as three hundred and eighty-two samples of seeds of ornamental and useful plants, most of which were collected from the neighborhood of Christiania, are now being cultivated at Reykjavik under the special direction of the local government doctor, Herr Schierbeck, who succeeded in 1883 in cutting barley ninety-eight days after the sowing of the seed, which had come from Alten (70° north latitude). And here it may be observed that this seems the polar limit in Norway for any thing like good barley-crops. The seed is generally sown at the end of May, and in favorable seasons it may be cut at the end of August, the growth of the stalk being often two inches and a half in twenty-four hours. North of 60° or 61°, barley cannot be successfully grown in Norway at more than from eighteen hundred to two thousand feet above the sea-level. In Sweden the polar limit is about 68° or 66°; but even there, as in Finland, night frosts prove very destructive to the young barley. In some of the fjeld valleys of Norway, on the other hand, barley may, in favorable seasons, be cut eight or nine weeks after its sowing; and thus two crops may be reaped in one summer. According, even, to a tradition current in Thelemarken, a farm there owes its name, *Triset*, to the *three* crops reaped in the land in one year. Rye early came into use as a bread-stuff in Scandinavia, and in 1490 the Norwegian council of state issued an ordinance making it obligatory on every peasant to lay down a

[1] From *Nature* of June 4.