In concluding these remarks attention is called to a certain source of error in testing aneroids that does not appear to have been mentioned hitherto, and if not noticed or guarded against may have an appreciable effect on results. Any sudden change in the air pressure under the receiver of a pump inevitably heats or cools the gas dynamically, in consequence of which there is a most pronounced and real "after effect" in the pressure of the air within the receiver. In my own experience I have been very greatly surprised at the slowness with which the gas acquires its stationary temperature and the magnitude of this effect on the resulting stationary pressure. The slow rate of pressure change adopted by Dr. Chree, namely, one inch in five minutes, in all probability eliminates any error of this kind, but the point is not mentioned, and it is just possible that the results of the older observations and of investigations made without due regard for this effect may be somewhat in error in consequence.

NOTES BY THE EDITOR.

THE OMAHA CONVENTION OF WEATHER BUREAU OFFICIALS.

On several previous occasions conventions of Section Directors of State Weather Services have been held, to the great advantage of the individuals and the Service, and it was, undoubtedly, a wise innovation when the Chief of the Weather Bureau decided to expand this idea and call for a general convention of Weather Bureau officials of every grade. The convention was of a thoroughly cosmopolitan character, every section of the country was represented, and every class of men. There was a large sprinkling of voluntary observers, an encouraging number of the younger employees, and several of the oldest and most venerable. Three men were present from the class of 1871, but the classes that were most prominently in evidence were those of 1881–83. The official report will show that the long programme was attacked and faithfully followed up, although the work had to be done too rapidly for comfort, owing to the loss of a day. The photograph of the group of seventy members remains as a visible embodiment of the fraternal intercourse, the social pleasures, and the intellectual profit of a meeting that will always remain vividly impressed upon the memories of all who were present as one of the most delightful events of official life. If it were not for the expense we are sure that every one would attend such a convention every year. Many inquiries were made for those who could not be present; both we and they lost much by their absence. The enthusiasm of all who took part in the discussions was remarkable; every one had some positive results of his own local experience to communicate for the benefit of the others. The diversity of ideas impressed one with the conviction that everywhere the work of the Weather Bureau is being adapted to special local conditions and that a hard and fast rule for the whole country would, oftentimes, work inconvenience or injury. One learned not to be so intolerant of the views of others and so positive that his own ideas will suffice for all occasions. The new devices submitted by Townsend of Philadelphia and Sims of Albany at their own expense and the new principle in meteorology brought forward by Hammon of San Francisco excited deep interest.

By its rather early adjournment the convention, unfortunately, missed the telegram inviting us to a special excursion to Lincoln, Nebr., where we should have inspected the relations of the Service to the State University. May we be more fortunate next time! In a few cases some general expression of opinion was uttered by the convention but, as a whole, the sentiment that pervaded it seemed to be to the effect that no business, properly so-called, need be transacted, as we were brought together at the call of the Chief to confer with him. Consequently, no vote was taken as to the time and place of the next meeting, that being a matter that can be left with Professor Moore; nevertheless, a hearty acclamation followed the pleasant rivalry between Hammon and Pague in advocacy of San Francisco, Cal., and Portland, Oreg., respectively. On the whole, the general conclusion must be that such conventions are essential to the welfare and strength of our meteorological service. Scattered as we are, widely over the whole country, we get but little opportunity for personal intercourse, we pursue our studies alone and with difficulty, little items of daily practice and of meteorological theory that would be quickly settled by conference with some neighboring observer, give us unnecessary trouble. The annual convention is a clearing-house, where we may balance accounts, discuss ideas, settle perplexities, dissipate the troubles of official life, burn our bridges, and take a new start.

THE WEATHER AND THE SUGAR CROP.

In the MONTHLY WEATHER REVIEW for August, 1897, page 354, we have given the general relation between annual rainfalls and sugar crops in the Island of Mauritius for the years 1880 to 1895, as quoted from the annual report of the Royal Alfred Observatory for the year 1895, by Mr. F. F. Claxton, who is now the director succeeding Dr. Meldrum who resigned September 30, 1896, on account of failing health, after a term of twenty-two years in the service. Since that date the reports for 1896 and 1897 have been received, from which we extract the following table showing the relation between the annual sugar crop of the whole island and the rainfall. The sugar crop is the result of the growth of the previous fifteen or eighteen months, beginning with the planting in September of the second year previous. The following table gives the total rainfall for those months during which the cane of the respective crops has been growing. It is an average for four stations, viz, Pamplemousses, Gros Bois, Cluny, and Union Bel-Air, which fairly represent the sugar districts:

Years of harvest.	Total sugar crop.	Rainfall during growth.
	Kilograms.	*Inches.*
1880	119,731,492	68.39
1881	117,809,610	78.68
1882	116,719,997	118.37
1883	120,396,858	84.03
1884	127,784,339	75.55
1885	115,299,030	77.13
1886	102,376,271	57.25
1887	124,073,140	86.18
1888	132,172,988	125.40
1889	124,564,951	108.71
1890	130,220,273	88.94
1891	113,813,075	96.61
1892*	68,718,573	98.78
1893	139,751,810	80.39
1894	113,793,319	88.11
1895	142,645,722	96.11
1896	152,677,973	108.58

* Destructive hurricane.

For the crop of 1897 the corresponding rainfall was the lowest on record, and in fact, scarcely one-half of the normal amount, and the sugar crop was exceedingly poor; but the exact figures are not at hand to be inserted in the above table. If we rearrange the above figures in the order of the rainfall, as in the following table, we may perceive a clearer connection between the rainfall and the sugar crop than was shown in our previous article:

Years of harvest.	Total sugar crop.	Rainfall during growth.
	Kilograms.	*Inches.*
1886	102,376,271	57.25
1880	119,731,492	68.39
1884	127,784,339	75.55
1885	115,299,039	77.13
1881	117,809,610	78.68
1893	139,751,810	80.39
1883	120,396,858	84.03
1887	124,073,140	86.18
1894	113,793,319	88.11
1890	130,220,273	88.94
1895	142,645,722	96.11
1891	113,813,075	96.61
1892*	68,718,573	98.78
1896	152,677,973	108.58
1889	124,564,951	108.71
1882	116,719,997	118.37
1888	132,172,988	125.40

* Destructive hurricane.

By taking the means of these figures in groups we see that there has been a steady increase in the sugar crop which averaged 119 millions during the first four years and 137 millions during the last four years, which increase is undoubtedly due to an increase of acreage. On the other hand, the average for the four years of the least rainfall is 116 millions, and for the four years of greatest rainfall 131 millions. In these latter averages the secular increase, due to acreage, has little or no influence, and the difference of 16 million kilograms may be attributed to the increase of average rainfall from 70 inches to 115 inches during the growing season, so that an increase of three inches in the rainfall brings an increase of 1 million kilograms in the crop.

CORRECTION.

It is said that the Editor seems to have been unnecessarily severe in some remarks on page 316 of the MONTHLY WEATHER REVIEW for July. He was trying to show how to define the expression "very violent thunderstorm," so that the record would show whether the violence referred to the thunder and lightning, or the wind, or the rain or hail. He unintentionally misquoted the original report from Elgin, Ill. (where the measured rainfall was 0.43 inch), but he did not intend to say that a storm having so small a quantity as 0.043 inch might not be a very violent storm. If the expression "violent storm" is not misleading, it is, at least, possible to remove its indefiniteness by stating wherein the storm was violent.

The observer writes to say that 0.43 is the correct rainfall, "and the recollection of that stormy half-hour will linger in the memory of thousands in this city for a long time, so, also, will its marks continue on our shade and forest trees."

We infer that the measured rain fell within half an hour, which brings it up nearly to the standard of excessive rainfalls tabulated monthly by Mr. Henry in Table XI.

The Editor hopes that the observers will agree with him that it is better for him to venture on an occasional critical remark than not to remark at all.

INSTRUCTION IN RESEARCH.

It will be recognized by those who carefully consider the subject that progress in science consists not merely in the diffusion of what is already known, but in the actual increase of our knowledge. The grand structure called science has been the growth of many thousands of years. It is said that Pythagoras added to geometry his discovery of that important theorem which is now so familiar to every school boy, viz, that the square of the hypotenuse of a right-angled triangle is equal to the sum of the squares of the two sides. After geometry and algebra and arithmetic had been studied for two thousand years, the modern experimental sciences began to develop more rapidly. Newton and Galileo discovered the laws of forces and gave us the true basis for mechanics. Newton, also, made great strides in the study of the phenomena of optics. During the past century the names of Liebig in agricultural chemistry, Gauss in mathematics and magnetics, Kelvin in electricity, Clausius in thermodynamics, and a host of others each in his own sphere have become famous for the energy with which they have pushed their inquiries forward into the unexplored fields of nature. Our own land has had her Espy and Ferrel, but still stands in need of the help of many other equally sagacious investigators.

We hear much of the study of science in schools and colleges, and at last meteorology is also beginning to be appreciated as an important course of study; but can we be content to merely teach over and over again that which has been accepted as true? We are everywhere confronted with unexplained phenomena, with events that contradict all theories and hypotheses. We must hold ourselves open to conviction and ready to accept whatever new modification of old views may result from better investigations. But how shall we educate investigators?

A mistaken idea has widely prevailed that the investigator is a genius, born and not made; sent to us by the Creator, and not educated by human design. The history of German science has, however, shown that environment and training are as important as birth and inheritance. The whole system of education in the German universities has for five generations been directed to the development of the investigator as its highest product. Those who discover important new facts, laws, or principles have been rewarded with the highest places in the intellectual world of that nation. Those who feel that they have a desire or calling for scientific research are encouraged to study for the degree of doctor of philosophy, a degree that is only granted when the candidate has, by actual observation, experiment, or exploration, made some important contribution to human knowledge. The professors under whom he studies have, in their turn, made many similar contributions, and are well prepared to judge of the value of *his* work. Of course a considerable percentage of candidates fail to receive the desired degree of Ph. D., even after many years of persevering work; but still the German universities have, during the past seventy years, published over fifty thousand so-called "doctors' dissertations," embodying the results of the works of fifty thousand candidates. The consequence is that to-day Germany easily leads all the world in the amount and value of her contributions to human knowledge and the energy with which her students pursue the study of nature.

In a recent address by Sir Norman Lockyer (see Nature for October, 1898) he states that in 1845 in England there were no laboratories in the universities, no science teaching in the schools, no organization for training science teachers, and, he might have added, still less organization for training scientific investigators. The same was at that time true, approximately, of the United States, and in both countries the young men who wished to devote themselves to science were accustomed to resort to France or Germany to find the necessary educational facilities, stimulus, and companionship. Since those days both England and the United States have awakened to the necessity of encouraging scientific investigation and the training of investigators.

A great stimulus to the study of nature was given in America by the influence of Agassiz, at Cambridge, beginning with 1846, and by the opening of the Smithsonian Institution in 1847. Almost simultaneously independent work be-