pression is correspondingly slight; it also proceeds very slowly and is not prominent to the observer.

In the dry chinook the slope of the descent and ascent is great, and the warming is rapid and prominent; the rise or fall of the barometer is not a prominent feature of the dry chinook, which wind is essentially due to an overturning of the upper and lower layers of air when they are in unstable equilibrium; the dry chinook occurs with equal ease either with southwest winds and falling barometer, or northwest winds and rising barometer, depending on the location of the mountains relative to the station.

The low pressure in the great low areas is not due to the temperature, moisture, or density of the air, but is the mechanical result of the wind, like the whirlpools, vortices, or eddies in rapid rivers, or those made artificially in a basin of water. The large barometric gradient shown by the isobars on our daily maps is not that slight gradient which causes the wind, but is itself essentially produced by the action of the wind.—*C. A.*

THE HURRICANE OF 1867 IN THE BAHAMAS.

Mr. Maxwell Hall calls attention to the fact that the great Bahama hurricane of October 1, 1867, which was partially studied by Buchan (see p. 265 of his "Handybook"), is worthy of a more elaborate study. The material for such a study probably still exists in the archives of the hydrographic offices of France, Germany, England, and America, to say nothing of the observations at land stations, which are preserved in the archives of the meteorological offices of those same nations. Some reliable accounts will also undoubtedly be found in the newspapers and journals for that year. The compilation of these data and the preparation of the charts of isobars and winds would form a very appropriate subject for a thesis for a graduate degree. Such subjects are of great meteorological interest, as well as commercial importance.

During the month of June, 1867, the writer happened to have charge of the library and archives of the Hydrographic Office, U. S. Navy, which had just been removed from the Naval Observatory and was temporarily established in what is known as the "Octagon Building", corner of New York avenue and Eighteenth street. He well remembers the immense collection of log books from vessels of every nationality that had been accumulated by Commodore Maury for use in his enthusiastic researches on the meteorology of the ocean, and his compilation of general sailing charts, to which the modern pilot chart is a worthy successor. The whole series of charts published by him is rare and difficult to obtain. Perhaps very few realize that it included six different series, known by letters, as follows:

Series A. Track charts.
Series B. Trade wind charts.
Series C. Pilot charts.
Series D. Thermal charts.
Series E. Storm and rain charts.
Series F. Whale charts.

The whole series comprises at least eighty charts, published between the years 1849 and 1860, under the general title, "Wind and Current Charts".

The more recent charts of winds, pressure, temperature, currents, etc., on the various oceans, as published by the British, French, and German offices; the daily maps of the Atlantic, published by the French and British, and especially the Danish office; and the daily maps of the Northern Hemisphere, published by the U. S. Weather Bureau, show the great advance in our knowledge since 1860.

It would be interesting to publish the numerical statistics of the great mass of manuscripts and logs of vessels now preserved by the various governmental offices for use in the study of the atmosphere over the ocean. The old records of sailing vessels give us the most precious data, and almost all that we have, relative to those parts of the ocean where the modern steamship never goes. Maury began his work just in time to save the old records before they were destroyed as waste paper, and before sailing vessels were replaced by steamers.

In Bulletin No. 113, published by the U. S. Hydrographic Office, in April, 1897, Mr. James Page says that in addition to an indefinite number of rough logs presented by the masters of vessels that office has 380 abstract logs, each containing three months' records, and 85,000 forms 105*a* and 105*b*, containing the simultaneous Greenwich mean noon observations. The total number of complete observations was then estimated at 4,000,000, but by the present date (1907) this number must have been more than doubled.

NOTES FOR TEACHERS.

The December, 1906, number of School Science and Mathematics refers to several matters that may be interesting to teachers of meteorology. On pages 762–768 we have descriptions of several simple pieces of apparatus for determining the percentage of oxygen in the air. These are designed for use in large classes with the least possible expenditure of the teacher's time. Several pieces of apparatus may be kept in constant service for several weeks without requiring any of the teacher's time. Experimental work of this kind is the only way by which to convey instruction vividly and impressively. The scholar never forgets the percentages (by volume), 21 and 79, when he has made a few measurements of this kind with such apparatus.

A special application of apparatus for measuring the oxygen and the aqueous vapor in the ordinary atmosphere consists in applying it, first of all, to the pure air breathed into the lungs, and then to the impure air exhaled from the lungs. Of course in the latter case increased quantities of carbonic acid gas and aqueous vapor are discovered. We are often taught that this carbonic acid gas is produced by the oxidation of carbonaceous material in the blood when brought into contact with the warm air of the lungs; if this be true then the ratio of the oxygen to the nitrogen in the exhaled air should be less than the $\frac{21}{79}$ of the inhaled air. Possibly the student will be surprised to find that it is not so, and that he has been wrongly taught.

On page 772 is an interesting article by R. A. Millikan on "Cooling through change of state", in which a simple experiment shows the changes of temperature that are produced by crystallization from or solution in liquids. He lays especial stress upon the importance of graphs in some cases, but also confesses that, like many others, he has had "difficulty in finding a sufficient number of sensible and natural applications of the graphical method. The graph should be used as the interpreter of the physics, and not the physics as interpreter of the graph".

On page 778 a method of determining the horsepower of a small steam engine, or the work done in a unit of time, could probably be applied to the wind or to an anemometer for determining the work done by the wind.

On page 795 School Science reprints from Scientific American a general description of the use of hydrolith for generating hydrogen. This hydrolith is supposed to be a hydrate of calcium, and if the data given are correct its use would be of great advantage in aerial research. Unfortunately the article omits to state the fact that this chemical is not for sale in the market. Only a few pounds of it have ever been made. An analogous compound is offered for sale in the United States, under a different name, but its future usefulness is still problematical. The great stimulus recently given to ballooning will, however, undoubtedly bring about many chemical and mechanical improvements.—Editor.