

especially his American friend, Prof. Cleveland Abbe, who aroused my interest in meteorology and called my attention to his great meteorological work. Just a year ago I returned to Japan with great enthusiasm and sweet anticipation of seeing our eminent mathematician and meteorologist and of studying under his personal guidance; but alas! I found him intellectually dead. It is, however, a great privilege and honor to me that I now hold the chair of meteorology at the Naval Staff College which Professor Kitao once occupied and that the task of writing his memoir has fallen to my hand.

It is certainly a great misfortune that both his greatness and his work, like those of my former master, Professor J. Willard Gibbs, were not fully appreciated in the world, and were really very little known to laymen as well as to scientists in Japan. * * *

H. C. RUSSELL.¹

The announcement of the death of Mr. H. C. Russell, who for nearly forty years was among the foremost representatives of science in the colony of New South Wales, has been received with great regret by many men of science. Since 1870 he held the post of government astronomer and director of the Sydney Observatory, in succession to Mr. G. R. Smalley, and in that capacity rendered most important services to the colony. His first duty on appointment was to organize the resources of the colony for the observation of the transit of Venus. With small funds, little skilled assistance, and short time for preparation he nevertheless succeeded in equipping several stations in a highly efficient manner, reflecting great credit upon the readiness of the colonists and the exertions of the observatory staff.

Thenceforward the observatory pursued a course marked by continually increasing usefulness, culminating in the acceptance of a share in the international photographic chart of the heavens. * * *

But most of all the colony is indebted to him for his organization of the meteorological service. He had charge of a district of the climate of which little was known, and as the colony extended and the population occupied areas of unexplored country, he had to widen the range of his inquiry in order to supply the necessary information to intending settlers. The long series of observations that he published on climate factors, especially those having reference to rain, evaporation, and state of the rivers, attest to his industry, his powers of organization, and his recognition of the requirements of a young and rising colony. He put it on record that when he assumed office there were but five rain-gauges in the colony. On his retirement there were something like two thousand. His discussion of the results has scarcely been as happy as his collection. He seems to have relied upon statistical methods rather than on physical facts, and in this way was led to suggest a theory which would make the amount of precipitation depend upon the moon's nodes. These cycles are shown very distinctly over the few years that he was able to bring under discussion, but his explanation has not been generally accepted. This is a small matter in comparison with the value of the information which he was able to furnish, and which has contributed in no small degree to the prosperity of the colony. This collection of observations will be of the greatest service in subsequent inquiries.

Mr. Russell has left a character for industry and closeness of application that can not but prove stimulating to future astronomers in the southern hemisphere. He was much esteemed by many friends in this country, who regretted his retirement from the observatory; and besides being a Fellow of the Royal Society, to which he was elected in 1886, he was

¹ Part of an obituary notice signed "W. E. P.", printed in *Nature* (of London), issue of March 7, 1907. Mr. Russell was a member of the International Meteorological Committee. His death occurred at Sydney, Australia, February 22, 1907.—EDITOR.

a member of many learned bodies, and was well known as a contributor of frequent and welcome papers.

AN IMPORTANT METHOD IN AERIAL RESEARCH.

As many individuals in this country wish to do something in connection with the recent development of the study of the free air, the Editor takes pleasure in commending to their attention the following translation of an article by Doctor de Quervain, the enthusiastic assistant to Professor Hergesell as secretary of the International Union for Aerial Research. De Quervain's success in Europe in keeping sight of a small balloon (with the help of a special telescope) demonstrates that still better work can be done in the clear air of our prairies and mountain plateaus, where especially we need to know more about the upper currents, and where de Quervain's methods are the least expensive and troublesome of all as yet devised.

In this connection it is worth noting that the need of a better knowledge of the upper currents, the altitudes of clouds, etc., led the Editor to urge the use of pilot balloons in 1871, but an adverse report hindered the work. In 1872 he fitted out the *Florence* arctic expedition with the necessary instructions, including the method for determination of the vertical velocity at each ascension, but it afterwards appeared that the hydrogen gas apparatus was left on shore at New London. In 1889 he carried a large supply of balloons on the cruise of the *Pensacola* round the Atlantic, but the carboy of sulfuric acid frequently made trouble on the deck of the vessel and was soon thrown overboard, so that the work had to stop. (An order to send the carboy "below" was interpreted by the crew to mean "Davy Jones's locker"!)

There are many difficulties in store for us, but we must do the best to overcome them, and make every possible effort to use balloons and kites in the study of the atmosphere. A convenient apparatus for filling small balloons with hydrogen can be bought of the dealers in New York, N. Y., and many chemical laboratories have something equivalent. We hope to hear of these being used for meteorological work.—C. A.

A PROPOSAL THAT PILOT BALLOONS BE MORE GENERALLY USED IN MAKING METEOROLOGICAL OBSERVATIONS.

By Dr. A. de QUERVAIN. Translated from *Das Wetter*, May, 1906, by Dr. C. Abbe, jr.

In investigating the free air it is just as important to have a knowledge of the direction and velocity of the air currents at different levels as it is to know the distribution of temperature. In many cases accurate cloud observations yield us fairly accurate information concerning the directions of these currents. Such observations are yet more valuable if the observatory is also in a position to measure the altitudes of the clouds.

On fine clear days the atmospheric currents even at great altitudes may be studied most advantageously by determining trigonometrically the course of a sounding balloon with the aid of some appropriate instrument. Such a series of observations presented so many practical difficulties, especially in the case of Assmann's rubber balloons, which are now generally used, that until recently no one had undertaken them. Since the accurate study of atmospheric currents has long seemed to me to be of the greatest importance, I have, during the past five years, made numerous practical attempts to work out a method for doing this. Finally, with the support of the firm of J. and A. Bosch, of Strassburg, I succeeded in constructing a special theodolite¹ by the aid of which I found it possible on clear days to determine the path of a sounding balloon with certainty and convenience up to altitudes of over 16,000 meters, and to horizontal distances of over 60 kilo-

¹ See the detailed description in *Zeits. Inst'kunde*, 1905, p. 135; and *Met. Zeit.*, 1906, p. 149.