tigation and experience in this important subject in permanent and accessible form has been assumed by one so competent as the late chemist of the department of agriculture, under whose direction or at whose instigation so much of the work has been done. Dr. Collier's scientific standing, and his thorough knowledge of the sorghum question, will hardly be doubted; and, if at times he betrays the sanguine temper of the enthusiast, the failing is one which leans to virtue's side.

In the book before us we have a very full account of the history of sorghum; a description of its leading varieties, including a table for their identification; and the result of the experience thus far had, relative to the management of the crop and its profitable manufacture. The preparation and manuring of the ground; the selection of suitable varieties; the best methods of planting, cultivating, and harvesting; the effects of climatic conditions; the development of sugar in the plant as related to the proper time for cutting the cane; the operations of milling, defecating, evaporation of the juice, and separation of the sugar; and the utilization of the waste products, — all receive a due share of attention; and the whole constitutes an excellent handbook for the intelligent sugar-maker.

The book, however, is more than a sugar-maker's handbook. One of the most commendable features of the work is the fulness with which the evidence upon each point in turn is laid before the reader, thus enabling him to judge for himself of the value of the conclusions reached. This feature of the volume cannot fail to make it of great value to all who are engaged in investigations in this direction; for, not only are the results thus far obtained given with much fulness, but the author is as careful to exhibit our ignorance as our knowledge, and does not fail to point out the directions in which further investigations are needful.

That the latter are numerous need hardly be said. In spite of the great amount of work which this book records, or refers to, much yet remains to be done to render this industry an assured success. Indeed, to us the need of more knowledge is really the most striking conclusion to be drawn from a study of what is already known. Particularly is this the case with regard to the economies of sugar-making, where a wide field is open to investigation. If Dr. Collier's volume shall prove an incitement and aid to the acquisition of more light upon these and other points, as well as be of use to the practical sugar-maker, he may account it as in the best sense a success.

## *NOTES AND NEWS.*

The library of the late Professor Henry has been purchased from his heirs by Dr. A. Graham Bell. It contains about two thousand volumes, at least one-third of which treat of electrical science, and many of these bear marginal notes in the handwriting of Professor Henry. One of the terms of the sale was that the library should be kept intact.

— The Norwegian bark Loveid, recently arrived in Philadelphia, reports a very peculiar squall experienced Oct. 18, in latitude 39° 49′ north, longitude 69° 5′ west. During fine, clear weather, with a light breeze from the north-west, heavy banks of clouds of most threatening aspect suddenly appeared, driving in every direction. Almost immediately a heavy squall of wind and rain struck the vessel, the wind shifting quickly all around the compass. In the midst of this disturbance, which lasted about an hour, a single peal of thunder was heard, and simultaneously a bolt of lightning struck the fore royal mast-head, and ran down the mast to the royal yard, which was almost destroyed. The lightning, which looked like a ball of fire, then ran out on the horn of the cross-trees, and 'burst' with a loud report, scattering sparks all over the vessel. The barometer fell suddenly from 30 to 28.60, and then rose as rapidly, the weather becoming pleasant immediately afterwards. This is a rather peculiar squall, considering the locality and the season.

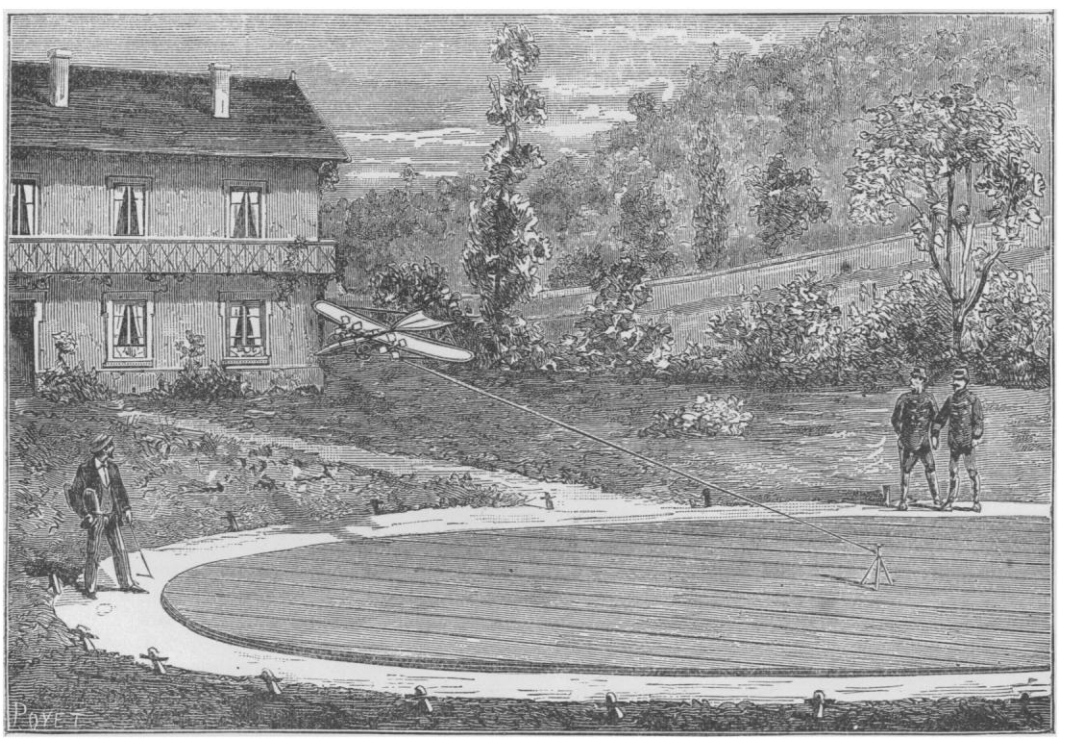
— The monthly weather-review of the signal-service, prepared, as announced for the first time in the August number, by Second Lieut. W. A. Glassford, has come to be a quarto of twenty-eight pages, with five charts. This is a good growth from the four small pages and three charts of the first issue, eleven years ago. Then, the headings were storms, anti-cyclonic areas, temperature, precipitation, peculiar phenomena and facts, rivers, and cautionary signals: now, all these subjects are treated in much greater detail; and among the many additional topics there may be mentioned atmospheric pressure and its range (illustrated by a new style of chart), Atlantic storms and ice, range of temperature, frosts (illustrated by a chart for Aug. 9 and 25), winds, local storms, tornadoes and thunder-storms, sunsets, drought, two and a half pages on the earthquake of Aug. 10, meteors, and notes of state weather-services for Alabama, Nebraska, Tennessee, Missouri, Louisiana, Ohio, and Georgia. The storm-tracks for the month are remarkably regular, and, with insignificant exceptions, all lie north of the Great Lakes and St. Lawrence: no tropical cyclones were felt along the seacoast. Nine tornadoes are reported, and many violent thunder-storms. Some of the results of the special studies of the latter, undertaken by Mr. H. A. Hazen during the past season, take form in a brief summary, from which it appears that the mean distance and direction of the nine hundred thunder-storms recorded in August, from the centre of the broad cyclonic storms in which they occurred, was five hundred and fifteen miles, a little west of south. A full account of these studies will be of much value

and interest. Most of the observations on meteors are of small value; and, at best, they have but an etymological connection with a weather-review.

— The fish-commission steamer Albatross will spend the winter in the Gulf of Mexico. A special study will be made of the waters in and about Mobile Bay, where, during the past few years, a strange and as yet unknown malady has poisoned the fish so as to render them unfit for food; but the larger part of the cruise is to be spent along the coast of Texas and Louisiana.

The exact days and place of meeting will be announced later. Titles of papers to be read, and nominations of candidates for election, should be sent to the secretary at once.

— Bulletin No. 5 of the U. S. geological survey is a dictionary of altitudes in the United States, compiled by Henry Gannett, chief geographer of the survey. It is essentially an extension of the 'Lists of elevations,' prepared by the same author for Hayden's survey; but, with the present broader organization of the geological survey, the lists now appropriately in-



EXPERIMENT WITH THE AEROPLANE MADE AT THE FRENCH MILITARY EXPERIMENT-STATION OF CHALAIS-MEUDON IN 1879. (*La Nature.*)

— The announcement is made, that copies in bronze of a bust of the late J. B. Dumas of Paris, may be obtained by subscription, addressed to the administration of the Génie civil, Paris. The original bust was executed by Guillaume, of the Institut, and was pronounced highly satisfactory. The prices range from sixty francs to six hundred francs, according to size and quality of the bronze.

— Phylloxera has made its appearance in the Pomological institute of Proskau (Silesia). It is hoped, however, that the spread of the disease may yet be prevented.

— The next meeting of the Society of naturalists of the eastern United States will be held at Washington during the week following Christmas, 1884.

clude the whole country, while the earlier editions were concerned chiefly with the region west of the Mississippi. A list of authorities fills eight pages, and railroad abbreviations occupy eight more; then the states and stations follow alphabetically, the number of altitudes given being about eighteen thousand. It is stated that the collection of railroad profiles for Pennsylvania is exceptionally complete and admirably adjusted, making the portion of the dictionary referring to that state by far the fullest and most satisfactory. By apparent oversight, it is not stated whether the base level is high, mean, or low tide.

— Two volumes of the addresses and speeches of Helmholtz have just been published in Germany.

A third edition of his well-known volume, entitled 'Popular scientific addresses,' having been called for, the author seized the opportunity to complete the collections, and in doing so has dropped the word 'popular,' although the earlier and later papers are alike designed to bring the results of mathematical, physical, and other scientific researches, before a circle of hearers and readers whose studies do not run in that direction. Among other papers, the volumes contain Helmholtz's prefaces to the German edition of Thomson and Tait's 'Natural philosophy,' and of Tyndall's 'Fragments of science,' and also his academic discourses. Among other noteworthy papers is an address on electrical units in reference to the action of the Electrical congress at Paris in 1881. This address, which was given in Berlin in December of that year, was reported, at the time of its delivery, stenographically, and has now been revised, and supplemented by a statement of the conclusions of the conference of 1884.

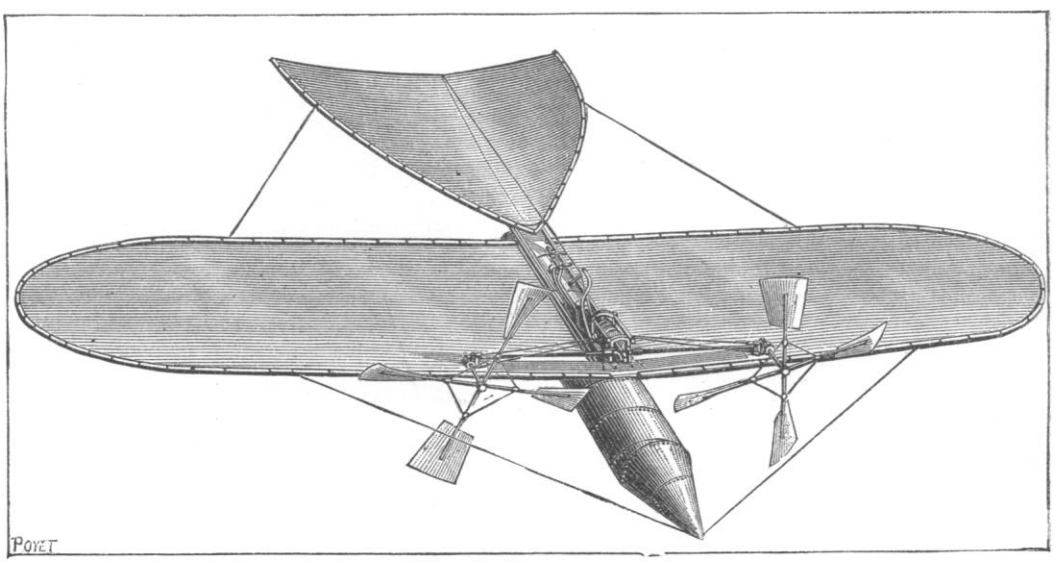
— Professor Valentine Ball of Dublin writes to *Nature*, lamenting the few copies of the English government scientific reports which are gratuitously distributed in the United States. He states, that although from a feeling of shame he did not seek to gather statistics, he found from casual conversation that a great many of the American libraries were obliged to purchase such reports as those of the various English surveys and the Challenger expedition. He praises the lavishness of our own government bureaus and the work of the Smithsonian in the distribution of printed matter, and expresses a hope that some similar free bureau of exchange may be established in England.

— Prof. F. Braun, formerly at the Polytechnikum in Carlsruhe, has been called to the professorship of physics at Tübingen. Dr. O. Lüdecke has been appointed professor in the philosophical faculty in the university at Halle.

— The German association of naturalists has selected Strassburg for its next year's assembly.

— The completion of the Lick observatory now depends upon the successful making of the disk of glass for the objective of the large telescope. The main dome cannot be made till the focal length of the large equatorial has been determined.

— The success of the flying-machine invented by Renard and Krebs has called attention to a partially successful experiment tried at the military experiment-station at Chalais-Meudon in 1879. The construction of the machine, an invention of Victor Tatin, is pictured in a general way above. It consisted of a cylindrical receiver for compressed air, which was used to drive two air-propellers. The weight of the whole was supported by the pressure of the air against the under sides of the laterally extended wings, the forward edges of which were kept inclined slightly up by the steering-action of the tail. The total weight of the apparatus, as tried, was 1.75 kilograms, and the velocity obtained, about 8 metres per second. The machine was able to rise from the ground; and, attached by a cord to a post, it flew around in a circle, passing over the head of the spectator (see p. 481). Mr. Tatin sent a description of his experiments to the French académie des sciences, in competition for the Perraud prize, and received a reward, as did Gaston Tissandier for his experiments on the application of electricity to aeronautics, and Duroy de Bruignac for his *aérophone mixte*.




AEROPLANE INVENTED BY VICTOR TATIN. (*La Nature.*)