# SCIENCE:

*A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.*

PUBLISHED BY

N. D. C. HODGES,

47 LAFAYETTE PLACE, NEW YORK.

SUBSCRIPTIONS.—United States and Canada.....$3.50 a year.
Great Britain and Europe..... 4.50 a year.

Communications will be welcomed from any quarter. Abstracts of scientific papers are solicited, and twenty copies of the issue containing such will be mailed the author on request in advance. Rejected manuscripts will be returned to the authors only when the requisite amount of postage accompanies the manuscript. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guaranty of good faith. We do not hold ourselves responsible for any view or opinions expressed in the communications of our correspondents.

Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

VOL. XVI. NEW YORK, DECEMBER 5, 1890. No. 409.


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## REVIEW OF THE WORK OF THE "PILOT CHART."

WITH the December number the eighth year of this publication begins, the first number having appeared in December, 1883. The various changes and improvements that have been made in the chart since that time are strikingly shown by a comparison between a late copy and that first issued. The most conspicuous additions are the following: steam and sailing routes; region of equatorial rains; table of barometer normals and percentage of probable calms for each 5°-square; storm diagrams, with brief rules for action to avoid a hurricane; cautionary and storm signals in use along the Atlantic and Gulf coasts of the United States; the tracks, names, and dates of derelicts; list of dangerous obstructions to navigation along the coast, and of charts published and cancelled during the preceding month; regions of observed and predicted fog. Besides these additions and other less striking ones, the greater portion of the forecast meteorologic data has been thoroughly revised, and brought up to date; while the review is now prepared with very much greater accuracy and completeness, owing to the far greater number of observers who now send in regular reports to the United States Hydrographic Office, and the hearty approbation and support received from masters of vessels of every nationality.

During the last three years, especial efforts have been made to publish promptly, and make practically useful to navigators, the results of the many reports that are made, thus giving to each and every observer the benefit of the combined experience of hundreds of observers, and at the same time securing a wide and international circulation for data relating to the ocean. In this attempt two objects have been kept in view by the Hydrographic Office,—first, to give, in clear, practical form, as much late and important news as possible to navigators, and to aid them by every means in their power in lessening the dangers of the sea and increasing the safety and success of commerce; second, to attract the interest and attention of other classes of people to the life and duties of the officers and men of the navy and mercantile marine, and thus to insure a fair hearing and some attention and sympathy in any reasonable effort to improve the status and prospects of seafaring men and others directly interested in commerce. That these efforts have been successful to some extent, seems to be indicated by the support that their work has received from masters, owners, and agents, as well as from the public generally; and numerous quotations might be made from home and foreign reviews, and from public and private statements by recognized authorities, showing general recognition of the fact that this publication has achieved success in a new and untried field, and has been creditable to the United States. Not the least of the valuable results that have been achieved is the general recognition of the benefits to be derived from the use of oil in preventing heavy seas from breaking on board vessels,—a result universally attributed to the reports that have been published on the "Pilot Chart."

The subject of derelicts at sea, and the danger therefrom to commerce, has been emphasized in the same way; and some authorities are of the opinion that the recent marine conference owed its inception largely to the interest caused by the continued publication of such data.

A feature of the "Pilot Chart" that deserves special mention is the occasional publication of a supplement devoted to some subject of immediate importance. This plan was first tried in September, 1887; and since that time several supplements have been issued, each of which has attracted much favorable attention, and has been widely quoted. The following is a complete list of those published thus far:—

September, 1887, West Indian Hurricanes.—Diagrams and text explaining the circulation of the wind in a hurricane, with brief rules for action.

December, 1887, Transatlantic Steamship Routes for December.—The plan for steamer-routes recommended in order to avoid collisions, with a brief discussion of the winter storm-belt of the North Atlantic.

March, 1888, Water-Spouts off the Atlantic Coast of the United States during January and February, 1888.—Positions of water-spouts plotted on a small chart, with reports quoted in full, and a discussion of the subject.

August, 1888, Derelicts and Wreckage in the North Atlantic.—A history of the great log-raft, with a complete list of reports received from vessels that sighted the logs as they spread over the ocean, together with a graphic record of the drifts of the most notable derelicts.

February, 1889, The Derelict American Schooner "W. L. White."—An account of the transatlantic voyage of this notable derelict vessel, with all reports received, and a chart showing the track of the vessel and the general drift of Atlantic currents.

October, 1889, The St. Thomas-Hatteras Hurricane of Sept. 3–12, 1889.—Ten small charts, with accompanying text, illustrating the progress of this great hurricane from St. Thomas to our coast north of Hatteras, with a complete list of vessels from which reports were received in time for use in this connection.

During 1890 no supplements have been issued, but a large number of reprints in black and white have been made of the various diagrams and printed matter accompanying the chart. These have been widely circulated and republished, notably by the *New York Herald*, the *Boston Post*, and the *Liverpool Journal of Commerce*, to which papers the Hydrographic Office feel especially indebted for valuable assistance and support.

It is proposed to publish with the January chart a supplement devoted to the subject of ice in the North Atlantic during the season of 1889–90. This will contain charts showing the positions and dates of icebergs and field-ice reported during the past season (perhaps the most notable ice season on record), for which the data at

hand are very complete. Full credit will be given for every report received, and quotations will be published from reports containing information of special value.

## LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

*On request, twenty copies of the number containing his communication will be furnished free to any correspondent.*

### On the Geology of Quebec City.

THE researches of Sir William Logan, Mr. Billings, Dr. Sterry Hunt, Dr. Selwyn, Sir William Dawson, Professor James Hall, Professor Emmons, Professor Walcott, Professor Marcou, Dr. Ells, Professor Lapworth, and many others, on the geology of Quebec and its environs, have made that region classic ground to the student of North American geology. The famous Quebec group controversy, as well as its closely related friend the Taconic question in geology and the Lorraine-Hudson River problem, are all involved in the geologic history of Quebec. Much diversity of opinion has existed as to the exact geological position of some of the terranes at and about Quebec City, as also along the whole line of the great Appalachian or St. Lawrence-Champlain fault; and this is not at all astonishing, seeing that profound dislocations exist, intricate foldings of strata occur, and several terranes are met within an exceedingly small area, faulted and folded together in any thing but a simple manner, which require exceedingly detailed and careful examination before satisfactory conclusions are arrived at.

The rocks forming the citadel hill or promontory of Quebec (Cape Diamond) have been assigned to different positions in the geological scale by different writers and at different times. An elaborate review of their views is given in Dr. Ells' last report to Dr. Selwyn (1888), and published by the Geological Survey of Canada, which includes Dr. Bigsby's paper (1827), down to Professor Lapworth's report, etc., published in the "Transactions of the Royal Society of Canada" (1887). These Quebec rocks have been referred by some of the geologists above named to the age of the Quebec group (Levis division), while others, and the majority at present, regard them as newer than the Trenton limestone, viz., being of "Trenton-Utica," "Utica-Hudson," or "Lorraine" age. But before assigning a definite position to the rocks of Quebec City in the scale of terranes in America, it is necessary for the writer to state that so far he has been unable to find any evidence in the field, either stratigraphical or paleontological, whereby the Hudson River rocks and Lorraine shales as originally understood by Emmons could be correlated, and referred to the same or immediately following geologic terrane.

The fauna of the Norman's Kiln shales, that of the Marsouin, of the Tartigo River, Griffin Cove, and Gagnon's Beach rocks, as well as those from Crane Island, south-western point of the Island of Orleans, Quebec City, Etchemin Riviere (between St. Henry and St. Anselme), Drummondville, and other localities in Maine, Vermont, and New York States, form one large assemblage of forms peculiar to one terrane.

The fauna of the Lorraine shales (Cincinnati era) as characterized at Montmorency Falls, Cote Sauvageau, St. Charles Valley, Charlesbourg (near Church, two miles above St. Nicholas), Yamaska River, Riviere des Hurons, and in the undisturbed regions of Ontario (intermediate between the Utica terrane and the base of the Silurian (Upper) epoch), marks another terrane.

These two faunas, I hold, are very distinct, both in their paleontological and stratigraphical relations. The Lorraine terrane (see Dr. Selwyn's classification of formations in Canada, "Index to the Colours and Signs used by the Geological Survey of Canada") has a definite position; viz., at the summit of the Cambro-Silurian or Ordovician system. The strata at Quebec cannot be referred to the Lorraine terrane, nor to the Utica, nor yet to the Trenton or the Black River formation. Sir William Logan referred the Quebec City rocks to the Levis division of Quebec group; and yet the fauna which Mr. Weston and the writer have, along with Mr. Giroux and L'Abbe Laflamme, been able to obtain from the rocks of that locality, contains some forty or fifty species of fossils, including graptolites, brachiopods, ostracods, and trilobites, different from Levis forms, and yet capable of being correlated with forms from a portion of the Quebec group of Logan as described in his Newfoundland section, as also with Cambro-Silurian strata in the Beccaginmic valley of New Brunswick.

To give the precise geological horizon of the strata at Quebec City, I hold, is perhaps premature. They appear, however, to occupy a position in the Ordovician system higher than the Levis formation, being probably an upward extension of that peculiar series of sedimentary strata occurring along the present St. Lawrence valley, and which, owing to the peculiar conditions of deposition and specialized fauna entombed, Sir William Logan advisedly classed together under the term "Quebec group." This would make the rocks at Quebec about equivalent to the Chazy formation of the New York and Ontario divisions.

As to the propriety of retaining the term "Hudson River" group or terrane in geologic nomenclature at present, there may be some doubt. Much confusion exists as to its use. It would very naturally follow, however, that some such designation as the "Quebec terrane" or "Quebec formation" would be most acceptable at this particular juncture, and would include those rocks which constitute the citadel and main portion of Quebec City and other synchronous strata.

In a paper which the writer is now completing for the approaching meeting of the Geological Society of America next month, on the same subject, a more detailed and exhaustive demonstration will be made of the facts now in our possession, whereby to correlate many series of strata hitherto separated, and differentiate others which are by nature unlike. HENRY M. AMI.

Geological Survey of Canada, Ottawa, Nov. 28.

### The Education of the Deaf.

POSITIVE evidence is all the world over regarded as of more value than negative testimony; and any one desirous may convince himself that congenital deaf-mutes can be taught to use spoken language correctly by articulation and by writing, without the intervention of any artificial signs, by a pilgrimage to the Institution for the Improved Instruction of Deaf-Mutes, corner of 67th Street and Lexington Avenue, this city; the Clark Institution for the Deaf at Northampton, Mass.; or the Day School for the Deaf, Boston, Mass. Any unbiased individual will come away from such a visit with the firm conviction that some teachers for the deaf have been for the last seventy years working great detriment to the elevation of an unfortunate class of our fellow-beings by preaching the fallacious and utterly untenable doctrine that such an education is an impossibility, and impracticable if possible. B. ENGELSMAN.

New York, Dec. 2.

## BOOK-REVIEWS.

*Are the Effects of Use and Disuse Inherited? An Examination of the View held by Spencer and Darwin.* By WILLIAM PLATT BALL. London and New York, Macmillan. 8°.

THIS book is ultra neo-Darwinistic. Natural selection has achieved every thing, according to the author: the effects of use and disuse are not inherited. "Innumerable modifications in accordance with altered use or disuse, such as the enlarged udders of cows and goats, and the diminished lungs and livers in highly bred animals that take little exercise, can be readily and fully explained as depending on selection. As the fittest for the natural or artificial requirements will be favored, natural or artificial selection may easily enlarge organs that are increasingly used, and economize in those that are less needed. I therefore see no necessity whatever for calling in the aid of use-inheritance, as Darwin does, to account for enlarged udders, or diminished lungs, or the thick arms and thin legs of canoe Indians, or the enlarged chests of mountaineers, or the diminished eyes of moles, or the lost feet of certain beetles, or the reduced wings of logger-headed ducks, or