is much to be hoped that when fully carried out it will not only
annihilate the others but will lead up to the true theory. (4) The
electric field theory.

The final theory must include the following points: (a) Storms
and high areas are largely dependent upon each other, and are
somewhat alike except with opposite signs.

(b) The velocity of the current varies at every level as one
rises in the atmosphere.

(c) In this country at least, storms and high areas seem to
extend far above our highest mountains, and may extend to the
line of the atmosphere.

(d) There is no motion or carrying of air or moisture particles
in a horizontal or up-and-down direction, by pure air currents, to
form storms or high areas.

(e) There is an enormous increase of moisture in the fore-front
of storms, clearly independent of precipitation, wind, heat, evap-
oration, and every other ordinary element.

(f) There is a corresponding dryness in the fore-front of our
high areas, which may be due in part to the descent by gravity
of these dry masses, and drier air above.

(g) The precipitation, in the case of general storms, is, in this
country at least, far (at times four hundred miles) in advance of
the central point of the isobars, and very often none at all falls
at the centre.

(i) In what may be called normal storms, the velocity may rise
to forty or even more miles per hour, especially in the winter sea-
son.

(k) The temperature in normal storms most emphatically shows
no reversal as we ascend in the atmosphere, but, if any thing,
shows a greater relative rise at the upper station than occurs at
the earth's surface.

(l) The temperature in normal high areas has, if any thing,
a greater relative diminution at a high mountain station than at
the earth's surface.

While the last two propositions are most abundantly borne out
on Mount Washington, it should be noted that a study of the
conditions at the highest regular station in Europe (Sonnblick,
10,000 feet) has shown no reversal. While there is a difference
in the results at the two mountains, yet this is only in degree.
Excluding a few anomalous cases, the conditions are practically
the same at both stations (Science, Sept. 5, 1890).

The time for formulating a consistent theory of storm genera-
tion and motion is still a long way off. It seems to me that the
most promising sign of recent discussions is the marked tendency
on all hands to lay aside pure theoretic considerations and to de-
mand rather the facts and causes which underlie all atmospheric
disturbances.

H. A. Hazen.

Washington, D.C., June 15.

BOOK REVIEWS.

An Introduction to the Study of Metallurgy. By W. C. Roberts-

In telling something about this book we cannot begin better
than by quoting the first part of the preface, which runs as follows: "The
literature of metallurgy is rich, but those who are beginning to
study it need guidance to a knowledge of the principles on
which the art is rightly practised. It depends, as is well known,
on the application of chemistry, physics, and mechanics; but the
methods of metallurgists vary greatly from those of chemists, who,
however, frequently fail to appreciate the difference. Ten years'
experience has convinced me that it is more important at the out-
set for the student to know what was the scope of mind of the early
practisers of metallurgy, and to see what kind of aid the art
may be expected to receive in future from the sciences, than to
acquire familiarity with complicated details of processes and ap-
piances."

In these few sentences the author has given not only the reason
for the existence of his book but also an outline of what the student
may expect to find in its pages. The first four chapters may be
considered almost as a separate section, covering the subject gen-
erally as a whole, the other chapters going more into the details
of the various processes employed in metallurgy.

The first chapter is devoted wholly to a consideration of the
relation of metallurgy to chemistry. The second treats of the physical
properties of metals,— molecular structure, density, fracture,
ductility, tenacity, etc. The third chapter is the best brief treatise of the kind and for the purpose we know in the
literature of metallurgy, and might have been expanded into a
separate volume without a suspicion of a resort to what is known as
"paddling." In its thirty-six pages the subject of alloys is pre-
sented, briefly, of necessity, but comprehensively and clearly;
and the results of recent investigations and experiments are given,
including those in which electricity plays a part. The fourth
chapter deals with the thermal treatment of metals.

The remaining chapters are devoted respectively to fuel, materi-
als and products of metallurgical processes, means of supplying
air to furnaces, typical metallurgical processes, and economic con-
siderations. The illustrations are as numerous as the purpose of
the volume warrants; there is an abundance of diagrams and
tables, and the table of contents and index are models of their
kind.

AMONG THE PUBLISHERS.

The first number of Vol. II. of the Outing Weekly Tennis
Record for the season of 1891, was published on June 15. It is
the official organ and bulletin of the United States National Lawn
Tennis Association.

— G. P. Putnam's Sons have just ready a handsome volume
entitled "Landscape Gardening," by Samuel Parsons, Jun., con-
taining notes and suggestions on lawns and lawn planting, laying
out and arrangement of country places, large and small parks,
trees, shrubs, plants, rockwork, etc. They have also ready an
American edition of Professor William Pock's "Popular Hand-

— J. G. G. Cupples of Boston will publish immediately "The Life-
Romance of an Algebraist," by George Winslow Pierce, a distin-
guished pupil of the late Benjamin Peirce, the eminent professor
of mathematics in Harvard University. This book opens with a
discovery in algebra, addressed to students, and proceeds with the
discussion of every subject of human interest, poetry, philosophy,
constructive criticism, adventure, forms of truth, and mysteries of
being, strewn on the thread of a love story.

— The July number of The Annals of the American Academy of
Policical and Social Science will contain a translation into
English of the Constitution of Mexico, by Professor Bernard Moses
of the University of California. Dr. G. Ritchie, instructor in Ox-
ford University, has contributed to the same number an article on
the teaching of political science in that institution. Professor J.
W. Jenks of the University of Indiana discusses a reform of the
system of land transfer, and advocates the adoption of a method
which shall guarantee security to the purchaser, without the heavy
expense and uncertainty which the existing system involves. "The
Economic Basis of Prohibition," a paper read by Professor Simon
N. Fatten of the University of Pennsylvania at the May meeting
of the American Academy of Political and Social Science, also ap-
pers in the same issue.

— Among its new and continued articles the American Journal
of Archaeology for the present year will contain the following:
"A Series of Babylonian and Assyrian dated Cylinders," by Mr. T. G.
Puches of the British Museum; "Etruscan Sculptures," and "Orien-
tal Antiquities," by Dr. William Hayes Ward of New York; "An-
tiquities of Pyrgia," by Professor William M. Ramsay of Aber-
deen, Scotland; "Terracottas in American Collections," by Salomon
Reinsch of the Museum of Saint-Germain, France; "The Aphrodite
of Milos," by Dr. A. Fortwangler of Berlin; "Three Heads of
Zeus, Hades, and Poseidon, of the Hellenistic Period," by Professor
Adolph Michaelis of Strassburg; "A New Fragment of the Edict
of Diocletian, found at Pataia in 1890," by Professor Theodor
Mommsen of Berlin; "The Manxian Reliefs," by Dr. Charles
Waddell, director of the American School at Athens; "Terraco-
ttas from Southern Italy, now in Baltimore," by Professor Har-

—A second edition of "On Treatise on Massage, Theoretical and Practical," by Douglas Graham, M.D., has been published by J. H. Vail & Co. of this city. In the five or six years since the appearance of the first edition of the work, the literature of the subject has increased materially, and massage may be said to have settled into its proper place in medicine. The volume covers fully its history, mode of application, and effects, together with indications and contra-indications; besides giving the results in over fifteen hundred cases. The work has been thoroughly revised and considerably enlarged. There are numerous additions and confirmatory of statements previously regarded as doubtful, and interesting items long lost sight of in old literature, about the employment of massage, will be found in the chapters devoted to the history of the subject. Two new chapters have been added, one on local massage for local neuralgias, and another on the treatment of sciocosis by means of massage. In addition there is much new information, mainly from Russian sources, on the uses of massage in affections of the ear, in sciocosis, in fractures near and into joints, and in affections of the abdominal organs.

No illustrations are given in the volume, as the author believes that "even instantaneous photography can give but a poor conception of motion, which can be done much better by words." The principal reason for this is so clearly set forth by the author, however, that they may be easily understood and made available by any one who has sufficient knowledge of anatomy, and acquaintance with the natural and morbid consistency of tissues. With this knowledge, as the author observes, "pictures are unnecessary; without it, they would be useless."

—Ginn & Co. announce to publish this month "The Modalist, or the Laws of Rational Conviction," a text-book in Philology, by Edward John Hamilton, D.D., Albert Barnes professor of intellectual philosophy in Hamilton College, New York. This book, which the publishers believe a noteworthy one, is called "The Modalist" because it restores modal propositions and modal syllogisms to the place of importance which they occupied in the lost sciences. The text, however, is written in English, and is intended to be not a complete treatise on modal logic, but a series of essays, dealing with the subject only as it is related to modern logic. The book is intended for use in the universities, and is the result of a long and careful study of the subject. The author, who is a professor of philosophy in a university, has been able to bring together a number of important and suggestive views, and to present them in a clear and concise form. The book is well illustrated with examples, and is written in a style that is both clear and interesting. It is a valuable addition to the literature of modal logic, and is likely to be of great interest to students of the subject.
pied in the logic of Aristotle. Professor Hamilton thinks that universal and particular categorical propositions cannot be understood, as principles of reasoning and as employed in "mediate inference," unless the one be regarded as expressing a necessary and the other a contingent sequence. Therefore also he explains the pure syllogism by the modal. Moreover, there are modes of reasoning which can be formulated only in modal syllogisms.

Logic is the science of thought simply as such, but of thought as the instrument of rational conviction, and therefore of thought in its relation to metaphysics, which is the science of the nature and laws of things. Some radical modifications of logical doctrine have resulted from the thorough-going application of this principle, and there, it is believed, have added greatly to the intelligibility of the science.

— Charles Scribner's Sons have in Press "Taxidermy and Zoological Collecting," a new book by William T. Hornaday, for eight years chief taxidermist in the United States National Museum. It will be copiously illustrated. The book is written in a popular rather than a technical style, and yet when necessary the details of the art of preserving birds, animals, etc., are described with the utmost precision.

With the issue of June 6, Geo. M. Guild, M.D., assumed editorial charge of _The Medical News of Philadelphia_. In "An Introductory Word," the new editor says: "Our aim will be to serve as the intermediary for bringing to the busy practical worker the useful results of original medical research, and the concrete lessons of many single rich experiences. A brilliant and striking illustration of such an ideal as we have described very aptly occurs in the present issue of _The News_ : When, from the examination of a drop of blood taken from a patient's finger, hitherto unsuspected disease may be diagnosed, and either a heroic treatment that saves life instituted, or a speedily realized fatal prognosis announced, our faith in science at once rises, and our power over disease is vastly increased."

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