that this has proved to be one of Dr. Coues's happy intuitions, and that his *nomen nudum* only awaits a description to take a secure place in ornithological nomenclature.

Dr. Emil Holub's brilliant description of a winter roosting place of *Hirundo rustica* must not pass unnoticed, nor must Mr. J. A. Allen's article on 'the migration of birds.' The latter is an exposition of the subject excellently suited to the unscientific reader, for whom, doubtless, it was intended, but it contains one or two statements that the field ornithologist of large experience might not assent to. Among the rest of the papers there are some, of which there is nothing especial to be said; others might better never have been written.

C. F. Batchelder.

SCIENTIFIC JOURNALS.

JOURNAL OF GEOLOGY, NOVEMBER–DECEMBER, 1896.

Age of the Auriferous gravels of the Sierra Nevada: By Waldemar Lindgren; with a *Report on the flora of Independence Hill:* By F. H. Knowlton. An attempt is made to definitely fix the age of the auriferous detrital rocks of the Sierra Nevada, resting uncomformably upon the bed rocks at high elevations and covered by volcanic flows. The beds include the deep gravels, the bench gravels, rhyolitic tuffs, gravels of the rhyolitic period, gravels of the inter-volcanic erosion period and andesitic tuffs and tuffaceous breccias. No fossils have been found in the deep gravels. They are older than the bench gravels, and may be as old as the Eocene. At Independence Hill leaves occur in a whitish or bluish clay interbedded with the uppermost gravels of the ante-volcanic period. These plant forms point very clearly to the Miocene age of the deposit. The Ione formation, correlated with the bench gravels, is also shown to be Miocene by the presence of characteristic shells. These gravels are probably Upper Miocene. The gravels of the inter-volcanic period and the andesitic tuffs are probably Lower Pliocene or Upper Miocene. In early Cretaceous the Mariposa and earlier beds were folded and eruptions were continued from the Jurassic. Shortly before the Chico the Sierra Nevada became separated from the Great Basin. In Chico time the sea advanced eastward. In late Chico and Tejon time the Sierra Nevada was being eroded, the greater part of the Chico sandstone being cut away. In early Miocene the sea retreated westward. The Sierra assumed the topography since preserved. The relation of the two eroded surfaces, Cretaceous and Miocene, is clearly discernible from the lower foot hills. In late Miocene (Ione) the sea moved eastward and gravels were formed. The gravel period was closed by rhyolitic and andesitic eruptions with Pliocene elevation. The andesitic flows are supposed to mark the close of the Pliocene. The Pleistocene was a period of erosion, with minor basaltic eruptions in the earlier and middle portions, and glaciation later.

Anorthosites of the Rainy Lake Region: By A. P. Coleman. Lawson has described eruptive masses through the Keewatin of the Rainy Lake region. The basic eruptions were identified as anorthosites, the larger area enclosing the southern arm of Bad Vermilion Lake. The rock presents some differences from typical anorthosites, an analysis showing that it is one of the most basic rocks. Lawson thought the area represented the truncated base of a Keewatin volcano. In this he was probably not correct, as apparently a long interval separated the anorthosite eruption from that of the granite.

Mechanic of Glaciers I: By Harry Fielding Reid. The greatest flow occurs through a section at the névé line, and diminishes as we go up or down the glacier from here; the diminution increasing with the distance from the névé line. In glaciers with beds of uniform slope the velocity and flow increase and decrease together, though not in the same proportion. In a glacier of indefinite length and uniform section the direction of the flow would be parallel to the slope, and the velocity parallel with the axis would not vary along the direction of flow. The velocity of a point under such circumstances would be the normal velocity corresponding to that form and size of cross-section. A glacier of uniform section could not exist if there was any melting; the slope of the glacier being uniform, wherever there is melting, the

cross-section must change to produce a smaller flow as we descend the glacier. The ice near the lower end of the glacier is under greater pressure than the normal pressure and would therefore have a tendency to rise. Stratification is not easy to recognize, but certain observations support the view that this potential rising becomes actual, which accounts for many of the phenomena observed. The surface at any point depends on velocity and rate of melting, and varies inversely with them. The larger the glacier the greater will be the differential motion. For small glaciers the differential motion is small and the slope steep. If anything cause an abnormal melting of the lower layers the upper ones will advance but over them, which is thought to be the explanation of certain facts observed in Greenland by Chamberlin and Salisbury. Although the sloping surface of Alpine glaciers is a surface of equilibrium it is unstable. If the surface be in equilibrium it will respond quickly to climatic variation. If it be widely removed from equilibrium it will respond more slowly, an explanation of the variation of glaciers differing from both that of Forel and Richter.

Loess in the Wisconsin Drift Formation: By R. D. SALISBURY. Loess has long been known to cover the glacier drift of the earlier epochs at various points. At least two loess sheets are known, one of which is correlated with Iowan ice and passes beneath the Wisconsin. Heretofore loess has not been known to occur in or above the Wisconsin drift, but during the past summer it has been found in connection with this formation at several points in Wisconsin, namely, Green Lake, Devil's Lake and Ablemans.

Geology of Chiapas, Tabasco and the Peninsula of Yucatan: By CARLOS SAPPER, translated by C. JOAQUINA MAURY and G. D. HARRIS. Southeastern Mexico shows three series of formations: an ancient complex of Palæozoic beds and eruptives in southern Chiapas; a more modern belt of Mesozoic and Tertiary formations in the middle and northern regions; and a third zone of great plains at the foot of the other belts, only slightly elevated above sea level, and of Quarternary age. In the peninsula of Yucatan there is less diversity and the beds are undisturbed, in which regard they are contrasted with those of Chiapas. Descriptions of the various formations, with lists of fossils, are appended.

Studies for Students—Stratified Drift: By R. D. SALISBURY. Water must have been an important factor in the deposition of the drift, particularly along the margin of the ice. A much larger amount of drift is stratified than is commonly thought. These deposits include extraglacial, supermorainic, submorainic and intermorainic stratified drift. The deposits made during the advance, maximum extension and retreat of an ice sheet show certain differences. During maximum extension there was a chance for the development of the following forms: (1) kames and kame belts at the edge of the ice; (2) fluvial plains and valley trains in virtual contact with the ice at their heads; (3) border plains or overwash plains in virtual contact with the ice at their upper edges; (4) ill-defined patches of stratified drift, coarse or fine, near the ice; (5) subaqueous overwash plains or deltas formed either in the sea or lakes at or near the edge of the ice; (6) lacustrine and marine deposits of other sorts, the material being furnished by waters arising from the ice. The same deposits might be formed during the advance of the ice, but would be subject to destruction by the overriding of the latter. They might be formed during the retreat, but in the latter case the formations dependent upon ice edge would not be so sharply formed. Superglacial streams are believed to be of only slight importance in this connection, because of their high velocity and the small amount of material upon the surface of the ice. Subglacial streams are considered to be the most probable means of the formation of eskers. H. F. B.

TERRESTRIAL MAGNETISM, OCTOBER.

IN the first article, by Lieutenant-General de Tillo, entitled *Isanomales et Variations Séculaires des Composantes Y et X de la Force Magnétique Horizontale pour l'Époque 1857*, the author concludes his series of charts of 'isanomolous lines' and of 'lines of equal annual secular variation.' As the title implies, the accompanying four colored plates apply to the westerly component (Y) and the northerly com-

ponent (X) of the earth's magnetic force, and to their secular variations, $\triangle Y$ and $\triangle X$. After obtaining the mean value of Y, for example, for a given parallel of latitude, he subtracts this from the values at selected points on that parallel. After proceeding thus for various latitudes he joins the places by lines where the residual Y has the same value, these lines being his 'isanomolous lines.' He finds that the X isanomolous lines present the same general characteristics as those of H (horizontal component), the Y as those of D (declination), and the Z (vertical force) as those of I (inclination). The same applies with regard to the secular variation of the components and elements. There is, furthermore, a strong resemblance between the respective isanomolous lines and lines of equal secular variation.

On the Distribution and the Secular Variation of Terrestrial Magnetism. No. IV.: On the Component Fields of the Earth's Magnetism. By L. A. Bauer. This paper is a continuation of the author's researches to localize the centers of disturbance in the earth's permanent magnetic field. He resolves the total field into three components, as follows:

I. A homogeneous magnetization about the rotation axis.

II. A homogeneous magnetization about an equatorial diameter.

III. The residual magnetization, *i. e.*, that which remains after deducting I. and II.

A striking graphical representation of No. III. is given. It is found, among other things, that the residual field and Schuster's diurnal variation field exhibit a strong resemblance.

Dr. Börgen, of Wilhelmshaven, contributes a valuable article in which he develops the most general expression for the coefficients in the formula giving the angular deflection of a magnetic needle produced by a deflecting magnet arbitrarily placed. After discussing the general case he takes up special cases ordinarily met with in practice.

Mr. Baracchi, the director of the Melbourne Observatory, gives an interesting account of 'Magnetic Work in Australia.' It seems unfortunate that no means have been found thus far to reduce and discuss the observations extending over thirty years.

Next follow editorial notes, reviews by Schott, Littlehales, Solander and P. W., and a list of current publications. This number concludes volume I.

SOCIETIES AND ACADEMIES.

THE SCIENTIFIC ASSOCIATION OF THE JOHNS HOPKINS UNIVERSITY.

THE one hundred and twenty-ninth regular meeting, President Remsen in the chair. The following papers were presented and read:

'Recent Researches on Metallic Carbides and Allied Compounds,' by Edward Renouf.

The recent application of the electric arc as a means of obtaining very high temperatures has stimulated research on metallic compounds formed at high heat and unstable in contact with water, hence not found in nature. We owe knowledge of the carbides or compounds of metals with carbon, principally to Moissan. Most metallic carbides are made by heating oxides with carbon at temperatures varying from 3500° to 5000°. They are metallic substitution products of hydrocarbons, and as a rule yield hydrocarbon and metallic hydroxide in contact with water. Some are acetylides yielding pure acetylene, as is the well-known calcium carbide used for the technical preparation of acetylene. Aluminium and beryllium carbides are methides yielding pure methane. Many other carbides, notably those of uranium and iron yield complex mixtures of saturated and unsaturated, gaseous liquid and solid hydrocarbons. Moissan thinks that natural gas and petroleum are formed by action of water on carbides contained in the earth's crust. Considering the evidence, this is the most acceptable solution of the problem of the formation of petroleum and natural gas yet offered. Metallic nitrides, compounds of metals with nitrogen, are mostly made by contact of nitrogen with metals at high temperatures; some by the action of ammonia on metals at high temperatures, when hydrogen escapes and the metallic nitrides are formed. They are decomposed by water into ammonia and metallic hydroxides, hence must be regarded as substituted ammonias.

Metallic silicides, compounds of metals with silicon, are formed by heating metals with sili-