lies and genera are defined, as well as the species. Some of the descriptions are original, but most of them are quoted from 'Baird, Brewer and Ridgway's History of North American Birds', and its continuation, the 'Water Birds of North America,' for which work, as everyone knows, they were originally written by Mr. Ridgway. The general matter is not very full and is frequently quoted from the same work. Unfortunately about two-thirds of the biographical part was omitted because of the necessity of limiting the number of pages. There are numerous quotations from Mr. E. W. Nelson's papers on the birds of Illinois, and a few personal observations by the author, chiefly relating to the Austroriparian fauna of the extreme southern part of the State, where he has done much field work, extending over a long period of years. A novel feature is a synonomy of popular names, given under each species.

The first volume covers 520 pages and is illustrated by 32 plates; the second volume covers 282 pages and has 33 plates. Nearly all the plates in both volumes are from Baird, Brewer and Ridgway, and Ridgway's Manual. Most of those in the second volume were made originally for this work, but owing to delay in publication were first used in the 'Manual.' The great majority are outline figures of heads, wings and feet; but some are shaded cuts of birds. Owing to the destruction of the electros, part of these are process reproductions made from proofs and are poorly printed. The frontispiece is a beautiful colored picture of a Meadowlark in full song, drawn by the author, and of unusual excellence.

In faunal works relating to particular areas it is customary to record somewhat in detail the manner of occurrence of each species, to indicate breeding ranges, time of nesting, dates of migration and so on. Very little information of this kind is to be found in the Ornithology of Illinois. The work consists mainly of technical descriptions and synonymy, to which is added, under each species, a paragraph or two of general matter which as a rule, excepting the quotations from Nelson, is hardly more pertinent to the State of Illinois than to any other part of America where the bird occurs.

Of 49 species classed by Mr. Ridgway as rare, detailed records of occurrence within the State are given for 36.

Mr. Ridgway states that the intent of the book was "to supply the people of Illinois with an inexpensive work which would enable them to identify the birds they desired to learn the names of, and to acquaint them with their leading characteristics." These primary aims the work certainly has fulfilled. C. H. M.

Tests of Glow-Lamps: W. E. Ayrton and E. A. Medley. The Philosophical Magazine, May, 1895.

Readers of Science who are interested in the matter of electric lighting from a practical standpoint will find much that is instructive in this paper recently printed in the Philosophical Magazine and published as a separate. For several years Professor Ayrton has been investigating the question of the economy of incandescent lighting and and especially the behaviour of the glow-lamp under continuous use. Some of the earlier results of this investigation have been announced from time to time in the English journals, having been communicated by Professor Ayrton to the Physical Society of London. The present pamphlet contains some additions made in January, 1895, and from these additions it appears that the results previously obtained have not been entirely supported by subsequent tests. The principal result reached in these tests was the rather unexpected fact that the glow-lamps examined appeared to increase in effectiveness during the first 80 or

100 hours of their use. It had been very generally assumed that a glow-lamp was at its best, under fixed conditions of pressure, at the very beginning of its life and that it would deteriorate from that time on. The authors of this paper appear to have found, however, that this is not the case and that, on the contrary, the light is increased from the beginning through a certain considerable part of the life of the lamp, after which it slowly fails. One form in which this conclusion is put is that if a group of glow-lamps, such as were examined in this case, being the Edison-Swan Lamps, marked 100–8 and run at a pressure of 100 volts, be kept continuously in operation by putting in a new lamp of the same character whenever a filament breaks, and never replacing the lamps by new except for a broken filament, the light given out by the group will never be as small as at the beginning. Some reference is made to the probable cause of the rise in candle power by use, and the explanation given a year or two ago by Mr. Howell, at a meeting of the American Institute of Electrical Engineers, *i. e.*, that such a rise in candle power is due to an improvement of the vacuum of the lamp during the early part of its life, is commented upon. Some of the earlier examinations of the increase in candle power and improvement in vacuum by the authors of this paper seem decidedly to confirm this explanation by Mr. Howell; but subsequent tests, referred to in the addition to the paper made in January, 1895, are not so favorable to that hypothesis. The authors suggest that the rise in candle power may possibly have been due to a change in the surface of the filament causing the emissivity for heat to decrease, since that would raise the light emitted, as well as the number of candles per watt; but they declare that they have not yet discovered whether such change in heat-emissivity takes place. The methods of carrying on the investigation, both electric and photometric, are explained in sufficient detail, and the whole is a valuable contribution to the subject. T. C. M.

NOTES AND NEWS.

ENTOMOLOGY.

Dr. T. A. CHAPMAN has been publishing in the Entomologists' Record of London, and has now completed, a paper of no great length but of much importance, on the classification of butterflies, based on the structure of the pupæ, and a comparison of the same with the pupæ of the lower lepidopterous families. He places special emphasis on two points hitherto entirely neglected: The relative freedom of motion of the middle joints of the abdomen, and the relation of the parts on the head on dehiscence. His conclusions are that the Papilionidæ (excluding the Pierinæ) are the nearest relatives of the Hesperidæ (which agrees with all latest researches), but further that the Lycænids "should no longer be regarded as in any way intermediate between the Papilionids and Nymphalids; rather should the Lemoniidæ and Lycænidæ be regarded as a branch which developed from the primæval butterfly (above the Hesperids) in one direction, whilst the Papilionids arose and branched to the Pierids and Nymphalids quite independently. Another point is that the Pierid separated from the Papilionid at a very early stage of the evolution of the latter, and that the Nymphalid almost immediately thereafter separated from the Pierid." These conclusions are borne out by many facts in the structure of the other stages and especially render the position of the Libytheinæ less anomalous.

BRUNNER VON WATTENWYL has just published his Monographie der Pseudophylliden, the last large group of Orthoptera that has specially needed monographic treat-