unexpected and the unfathomable. But the magic of to-day bears quite as conspicuously as many of the applied arts and crafts the marks of the laboratory and the research room. Nineteenth century magic reflects the evolution of nineteenth century science and can look back with an air of condescending amusement or curious interest upon its old-time antecedents, much as the modern chemist reads the annals of alchemy or the superbly equipped astronomer contemplates the vagaries of the medæival astrologer.

There is, indeed, much to interest the student of science in the elaborate performances of the prestidigitateur and the illusionist; and the interest is two-sided, physical and psychological.

The physical interest centers in the description of the true *modus operandi* of the tasks and the accompanying paraphernalia; the psychological interest in the method of arousing false perceptions and inferences and producing the conviction that the impossible has happened. The student of the psychology of deception takes his place with the audience and observes how readily their attention is diverted at critical moments, how easily they overlook the apparently insignificant but really essential settings of the trick, how the bewilderment increases and the critical faculties lapse as one bit of sleight-of-hand succeeds another. The student of the curious and intricate applications of science must be stationed behind the scenes and observe at times how simple a contrivance evades detection, or, again, how an elaborate combination of mechanical principles is ingeniously applied to produce a startling effect. The main lesson which the psychologist takes away is the importance of the attitude in creating belief, the dominance of cleverly suggested expectation in our sense experience, the readiness with which we substitute inference for observation and go away convinced and deceived. The physicist or the mechanician is quite certain to be impressed with manifold possibilities of mystification which the rapid increase of science brings in its train.

This ably compiled volume will appeal to both types of readers as well as to the more popular interest in mysteries and the processes of deception. It is wide in scope, treating of conjuring tricks of all varieties; of jugglers and fire-eaters; of puppets and shadow dances; of ventriloquism and second sight; of the application of science to stage effects and cycloramas and fireworks; of automatic and scientific toys; of the kinetoscope and the vitascope, and the varied applications of photography; and in addition to all this some interesting information upon the conjuring tricks and performances of olden times. The tone of the descriptions is clear and the volume is well adapted to satisfy the needs of the somewhat heterogeneous class of readers who are likely to consult it. Moreover, the book is distinctly modern, and avoids both the unnecessarily popular and frequently irrelevant style of much of this kind of literature. It comes as nearly within the pale of science as any book with this kind of a purpose can be expected to reach. A valuable bibliography and index add much to its usefulness.

JOSEPH JASTROW.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES—SECTION OF BIOLOGY—NOVEMBER 8, 1897.

THE meeting was called to order by Professor Wilson, the Chairman. Twenty-two persons present. After reading the minutes of the previous meeting, the following program was presented:

Mr. Matthews reported on analyses of spermatozoa in Kossel's laboratory, Marburg. Sperm of *Arbacia*, herring, pig and bull were examined. Herring sperm heads were separated from the tails by Meischer's method, and made free from albumen. They consisted of protamin nucleate, having the formula $C_{40}H_{54}N_{14}P_4O_{27}$, $C_{30}H_{57}N_{17}O_6$. The nucleinic acid appeared identical with that of salmon sperm (Meischer), although the protamin differed from salmon protamin, as shown by Kossel. The sperm tails consisted chiefly of a combination of lecithin, cholesterin and albumen, similar to, but not identical with, similar constituents of salmon sperm tail. The tails contained no nuclein. The heads contained no lecithin nor cholesterin. *Arbacia* sperm contained nucleinic acid, but no protamin, instead of which a histon-like body was present. It is probable that *Arbacia* sperm chromatin is an histon nu-

cleate and more complex than fish-sperm chromatin. Neither bull or pig sperm contain protamin. The author suggests that the simplicity of fish-sperm chromatin is difficult to reconcile with Weismann's hypothesis.

Dr. Bashford Dean, in 'Notes on *Palæospondylus*,' gave a brief reply to Dr. Traquair's recent objections (Pro. Zool. Soc. Lond. March 16, 1897). The author notes:

(1) That the radial-shaped markings of the type specimen are certainly part of the fossil, since they occur in a second specimen now in the possession of Professor Stratford.

(2) That his broader interpretation of the 'unpaired nasal opening' (Traquair) as a naso-mouth ring (as in *Myxine*) was an independent as well as a necessary one, as will appear in the full paper.

(3) That the view of the presence of the radial-shaped markings as the probable supports of paired fins, the relations of *Palæospondylus* to the Marsipobranchs, become even more hypothetical.

Dr. Matthew reported on the status of the Puerco fauna. A review of the Puerco fauna, based on Dr. Wortman's geological observations in the field and the records kept by the American Museum collecting parties, shows that the Upper and Lower Puerco beds do not contain a species in common, and only three or four genera pass through. The two faunas are entirely distinct. Dr. Wortman proposes to call the upper beds the Torregon formation, retaining the name Puerco for the lower beds.

Mixodectes, formerly supposed to be a primate allied to the modern *Chiromys*, is a true Rodent in the first stage of evolution. It has the characteristic Rodent astragalus, very like that of the earlier Sciuromorphs. The incisor is intermediate between the short, rooted spatulate incisor of most modern mammals and the long, rootless scalpriform incisor of the Rodentia. The root is long, but does not grow from a persistent pulp, and the crown is long and pointed, but still retains much of the spatulate shape. The canine and anterior premolars are disappearing, the fourth premolar becoming molariform, and the molars showing some traces of an impending change to a type like that of the Wasatch rodents.

More complete material of many species shows that all the placental mammals were remarkably similar in skeleton structure. They were plantigrade, pentadactyl, with claws or narrow hoofs, short, clumsy limbs and long, heavy tail. Contrary to expectation, the podium and metapodium are not usually arranged in serial order. The carpus is alternating in the four species in which it is known, and the tarsus is serial in only two out of eleven species. Of these two, one is a primate, the other is the ancestor of *Phenacodus* and has an alternating carpus. The direct ancestors of the Perissodactyls and Artiodactyls do not seem to be among the known Basal Eocene species. The Creodont *Clænodon* resembles the modern bears in foot structure as well as in the teeth, and may have been ancestral to them. Considering that such widely different types as the Edentates, Rodents, Primates and Amblypods have been traced to their first beginnings in the Basal Eocene, it may be concluded that the first differentiation of all the Placental mammals took place at the beginning of the Tertiary and not in the Cretaceous as has frequently been stated. Dr. Matthews' paper was discussed at length by Professor Osborn and Dr. Wortman.

Mr. Harrington reported on some observations which he had made on 'Earth Worms during Copulation.' He described an organ which apparently had been usually overlooked. This organ, the spermatophore of some authors, consists of a modified seta, much enlarged at the extremity and functioning, as Mr. Harrington suggests, to force spermatozoa into the seminal receptacles of the other worm.

Gary N. Calkins,
Secretary of Section.

The Academy of Science of St. Louis.

At the meeting of the Academy of St. Louis on the evening of November 15, 1897, Professor F. E. Nipher presented informally some of the results of recent experiments on the stability of a pivotally mounted sheet in an air stream, his experiments having been performed by exposing the pressure planes on the roof of a moving box car.

William Trelease.
Secretary.