emanations. The conception of 'mineralizing agents' was defined, and it was shown that they may be active in magma, liquids and gases as well as in the reaction of gases on solids. A better term is desirable for deposits formed above the critical temperature of water than the variously used word 'pneumatolytic.' Contact metamorphic deposits are probably directly caused by the action of igneous emanations from cooling magmas, chiefly water, on the surrounding rocks at a temperature above the critical point.

W. C. MENDENHALL,
*Secretary.*

CLEMSON COLLEGE SCIENCE CLUB.

THE club held its regular monthly meeting on Friday evening, January 16. The following papers were presented and discussed:

'The Salient Points in the Bacterial Analysis of Milk,' by Professor H. Metcalf. This paper described the conventional methods of milk analysis and was fully illustrated by experiments.

'Prescription Milk,' to which the first paper served as an introduction, was presented by Professor C. O. Upton. The treatment of this subject was based entirely upon the speaker's experience in the Walker-Gordon Laboratory Co., where the production of milk for clinical use is made a special work.

CHAS. E. CHAMBLISS,
*Secretary.*

## *DISCUSSION AND CORRESPONDENCE.*

### ORTHOPLASY, ETC.

IN SCIENCE, November 21, p. 820, Professor Conn treats 'Organic Selection' as a synonym of 'Orthoplasy,' stating that Professor Baldwin has prefered the latter term. In the work of Professor Baldwin reviewed (pp. 151, 152) we find these definitions:

*"Organic Selection:* The perpetuation and development of congenital variations in consequence of individual accommodation.

*"Orthoplasy:* The directive or determining influence of organic selection in evolution."

On p. 173 we read: 'The theory of evolution which makes general use of organic selection is called Orthoplasy.' Orthoplasy is, therefore, not identical with organic selection, but its result.

I will take this opportunity to suggest a couple of terms:

*Directive Characters.*—Those characters which may be useless or harmful to the individual at the time of their development, but lead to after-effects which are the cause of survival, or are at least beneficial. Example: a wandering or migratory habit might be the cause of much hardship, but in the long run might lead the individual (if he survived the early stress) to exceptionally favorable conditions. Human emigrants often illustrate this course of events.

*Directive Individuals.*—Those individuals which may be useless or harmful to the race during their lifetimes, but lead to after-effects which are the cause of race-survival, or are at least beneficial. Example: many reformers, such as the abolitionists, have by their actions weakened the nation to which they belonged, for the time being; but the ultimate results have been highly advantageous.

T. D. A. COCKERELL.

EAST LAS VEGAS, N. M.

## *SHORTER ARTICLES.*

### ON THE PRIMARY DIVISION OF THE REPTILIA INTO TWO SUB-CLASSES, *Synapsida* AND *Diapsida.*

SINCE 1867 there has been a slowly progressive movement toward the classification of the reptiles by the number of arches in the temporal region of the skull. The leaders have been Günther, in the separation of the Rhyncocephalia from the Lacertilia, Cope, in the union of the Archosauria and separation of the Cotylosauria, Baur, Smith Woodward and Broom in the suggested division of reptiles into two groups according to the presence of one or two temporal arches. Broom in 1901 went so far as to assign a phylogenetic value to this distinction.

Without learning until a few days ago of Broom's paper* the writer had been for some time studying the value of this idea. Classification by single characters, such as the above,

* Through a review kindly sent the writer by Franz Baron Nopsca, Jr., and received February 7, 1903.

has proved short-lived in so many cases that *a thorough comparison of all parts of the skull and skeleton* seemed absolutely necessary, and was undertaken by the writer with the valuable aid of Dr. J. Howard McGregor. It was found that the grouping suggested by the temporal arches is confirmed by a large number of characters unnoticed hitherto in this connection. On December 29, 1902, a joint-paper * was presented before the American Association in Washington in which the Reptiles were subdivided into two sub-classes as follows:

| SUB-CLASS *Synapsida*.† | SUB-CLASS *Diapsida*. |
|---|---|
| *I. e.*, Primarily with single, or united temporal arches. | *I. e.*, Primarily with double or separated temporal arches. |
| *Cotylosauria.* | *Rhyncocephalia:* |
| *Anomodontia:* | *Proganosauria.* |
| *Dicynodontia.* | *Pelycosauria.* |
| *Cynodontia.* | *Mesosauria*, etc. |
| *Gomphodontia.* | *Dinosauria.* |
| *Theriodontia.* | *Ichthyosauria.* |
| *Placodontia.* | *Phytosauria.* |
| *Testudinata.* | *Pterosauria.* |
| *Plesiosauria.* | *Squamata:* |
| | *Mosasauria.* |
| | *Ophidia.* |
| | *Lacertilia.* |
| | *Crocodilia.* |
| Giving rise to the Mammalia from some unknown member of the Anomodontia. | Giving rise to the Birds through some unknown type transitional between Proganosauria and Dinosauria. |

In the ancestral *Synapsida:* (1) The roof of the skull is solid (Cotylosauria), or there is a single large supratemporal opening, the infratemporal opening being rudimentary or wanting; (2) the squamosal is large, coalescing with the prosquamosal and more or less covering the quadrate; (3) the quadrate is reduced and never movable; (4) the coracoid and procoracoid are separate, or united by suture; (5) the phalangeal formula is 2, 3, 3, 3, 3 or less than 2, 3, 4, 5, 3.

In the ancestral *Diapsida:* (1) The roof of the skull is open, with two temporal arches and openings; (2) the squamosal is small, frequently separate from the prosquamosal; (3) the quadrate is large, free and secondarily movable; (4) the coracoid and procoracoid are early coalesced into a single bone; (5) the phalangeal formula is 2, 3, 4, 5, 3–4.

These are the most striking of a series of characters which separate these groups. The grounds for placing the orders of Reptiles as they are in the above table will require fuller statement elsewhere.

HENRY F. OSBORN.

* Read before the biological section of the New York Academy of Sciences, February 9, 1903.

† The names *Protherosauria* (for *Synapsida*) and *Archosauria* (for *Diapsida*) were used in this communication. The former was abandoned because of its similarity of sound to *Proterosauria* Seeley. The latter was abandoned because Cope proposed *Archosauria* as a superorder to include only two-arched forms, whereas *Diapsida* is given *sub-class* rank and made to include the *Ichthyosauria, Phytosauria* and *Squamata.*

## *SCIENTIFIC NOTES AND NEWS.*

DR. WILHELM WUNDT, the eminent psychologist, has been elected an honorary member of the Academy of Sciences of St. Petersburg.

PLANS have been inaugurated in Great Britain to secure by subscription a portrait of Lord Rayleigh. The treasurers are Sir Andrew Noble, Sir Oliver Lodge and Professor Arthur Schuster.

DR. A. E. ORTMANN, of Princeton University, has accepted the position of curator in invertebrate zoology in the Carnegie Museum, Pittsburgh.

M. EDMOND PERRIER has been appointed professor of comparative anatomy and M. Pierre Marcellin Boule, professor of paleontology in the Paris Museum of Natural History.

DR. M. VON RUDZKI has been made director of the observatory at Cracow in place of Professor Karlinski, who has retired.

PROFESSOR FORSYTH, of Cambridge University, was elected president of the Mathematical Association which held its annual meeting in London, on Saturday, January 23. The Association has 351 members.