not *Rytina; Chiromys,* not *Chieromys* or *Cheiromys.*

Purely consequential recommendations (*e. g., Tatu* for the tatous, *Lasiurus* for the American hairy-tailed bats), are not inserted in the list.

Notes to the List

1. *Cercopithecus* has been invariably used for the gueonons up to 1911, and its transfer to the tamarins only depends on Gronovius, a doubtfully binomial writer.

2. *Daubentonia* is almost unknown to general writers, the use of *Chiromys* having been nearly universal.

3. The names objected to are both known in connection with other animals, and the use of either of them for the paca is most confusing.

4. Technically *Dasypus* ought to be transferred to the tatous.

5. *Echidna* has been used by all classes of writers. It would have to be withdrawn from ichthyology.

6. The use of *Cynocephalus* involves a particularly objectionable transfer.

7. An early reference by Pallas in connection with *Oryx gazella* makes it advisable to affix the name *Gazella* to the gazelles before it is attempted to be used for the gemsbucks.

8. The transfer of the name *Callithrix* from the titi monkeys (*Callicebus*) to the marmosets is highly confusing. The name should be dropped altogether.

9. *Hippotragus* has been widely used; *Ozanna* is practically unknown.

10. The use for the mountain chinchillas of *Vizcaccia,* the vernacular name of *Lagostomus,* is most objectionable.

11. By the technical rules *Nycteris* would have to be transferred to the American hairy-tailed bats (*Lasiurus*).

12. *Hydrodamalis* is almost unknown to writers of any class.

13. Specific name (*satyrus*) to be fixed as well as generic, the original *Simia satyrus* Linn. being a chimpanzee.

Signed: KNUD ANDERSON, ANGEL CABRERA, EINAR LÖNNBERG, R. LYDEKKER, PAUL MATSCHIE, OLDFIELD THOMAS, L. L. TROUESSART.

C. W. STILES,
Secretary International Commission

SPECIAL ARTICLES

THE IONE FORMATION OF THE SIERRA NEVADA FOOTHILLS, A LOCAL FACIES OF THE UPPER TEJON-EOCENE

ONE of the numerous problems of California geology is the correlation of the Tertiary (the superjacent series), of the Sierra Nevadas with the Tertiary of the Coast Ranges. Many geologists have written on the age of the auriferous gravels and their associated formations since the time of Whitney, but the age of these formations is still in question and their relation to the marine deposits of the Coast Ranges is unproved.

While collecting during the past two years for the department of paleontology, University of California, the writer has had opportunity for the study of the relationship of the Ione of the Sierra Nevadas with the marine Eocene of the Coast Ranges. His conclusions are based upon visits to four typical Ione localities, viz., Marysville Buttes, Sutter Co., Cal., vicinity of Oroville, South Table Mountain, Merced Falls, and the type locality near the town of Ione in the Jackson Quadrangle.

The conclusion from this study is that the Ione, in part at least, is marine and of Tejon-Eocene age. Marine fossils have been found in the upper portion of the Ione formation at Marysville Buttes, Oroville, South Table Mountain, Merced Falls and Ione. Apparently the same faunal zone, the *Siphonalia sutterensis* zone,[1] is represented.

In the study of the Eocene of the Marysville Buttes the writer's conclusion was that "the supposed marine Ione of Marysville Buttes is evidently Eocene." In the "Note on the Faunal Zones of the Tejon Group," the strata beneath the Older Basalt of Oroville South Table Mountain which Lindgren mapped as Ione, were correlated with the Eocene of the Marysville Buttes. Several of the fossils obtained from the strata beneath the Older Basalt were identical with those of

[1] Dickerson, R. E., "Fauna of the Eocene at Marysville Buttes, California," Univ. of Calif. Publ. Bull. Dept. Geol., Vol. 7, pp. 257–298, 1913. "Note on the Faunal Zones of the Tejon Group," Univ. Calif. Publ. Bull. Dept. Geol., Vol. 8, p. 23, 1914.

the Marysville Buttes. After visiting these two localities the writer was inclined to the belief that the Ione and Tejon had been confused in these places. Conclusive evidence has recently been obtained in the type locality of the Ione which demonstrates that this formation at that place is also merely a local facies of the Tejon-Eocene.

Turner[2] recognized three lithologic members in the Ione at its type locality:

(1) The lower portion, a white clay, resting upon this; (2) a white or red sandstone, and (3), then a light gray, clay rock. He described it as follows:

Along the western border of the metamorphic rocks is a series of nearly horizontally stratified, light-colored sediments, which were deposited in the waters that covered the Great Valley at the time the older auriferous gravels with interbedded pipe-clays accumulated in the river beds of the Sierra slope. This formation attains its maximum development in the area of the Jackson sheet. The lower portion of the series, composed largely of white clay, is well-exposed around Ione, whence the formation takes its name. Farther south the white clays are overlain by sandstone, above which is a fine-grained clay rock. The lower, white clay is in places quite free from grit and is used in making pottery. Other portions are sandy. The formation contains iron-ore and coal seams. The sandstone is used for building purposes. It is usually white, but at one quarry a brick-red variety, colored by finely disseminated hematite, is obtained. At other localities it is rusty and contains pebbles of white quartz, passing into a conglomerate. A peculiar hydrous silicate of alumina occurs abundantly in the sandstone in the form of cream-colored, pearly scales.

The clay rock occurring above the sandstone is light-gray, but usually more or less discolored. The fracture is, as a rule, irregular and the rock frequently contains minute, tubular passages. Under the microscope it is seen to be composed of fine particles of feldspar and fine discolored sediment, with occasional quartz grains. Analyses of two specimens gave 59 and 72 per cent. of silica and 4.8 and 1.6 per cent. of alkali.

The succession of white clay, sandstone and clay rock may not be constant throughout the entire area mapped as belonging to the Ione formation.

[2] Turner, H. W., Jackson Folio, California, U. S. Geol. Surv., p. 2, 1894.

It has been suggested that the white clay of the lower beds are formed from rhyolitic tuffs, in which case eruptions of rhyolite must have occurred at the beginning of the Ione epoch.

The thickness of the Ione formation is known partly by natural exposures, partly by boring. In Jones Butte the strata, protected from erosion by a lava cap, are 200 feet thick above Coal Mine No. 3. A boring at the mine is said to have penetrated sandy clay to a depth of 800 feet below the coal seam, which is 60 to 70 feet below the surface. Thus the Ione beds appear to be more than 1,000 feet thick at this point.

To the east of Buena Vista Peak the series has a visible thickness of 600 feet. The tableland south and southwest of Buena Vista is chiefly composed of the Ione formation, overlain by rhyolitic and andesitic tuff and Neocene shore gravels. The lower clay occurs at the east base of the tableland, and a patch of Ione sandstone caps Waters Peak, a little farther east, which has an elevation of about 900 feet.

The relation of the sandstone to the clay rock is finely exposed on the south side of the Mokelumne River, by the bridge north of Camanche. Here the sandstone forms the lower part of the bank of the river. The upper surface of the sandstone has a gentle westerly dip, and a little west of the bridge reaches the level of the river, which at this point is about 175 feet above sea-level. East of the bridge it rises at an angle of about 1°, reaching an altitude of 1,000 feet on the flat ridge just north of Valley Springs Peak. Along the banks of the Mokelumne west of Lancha Plana this sandstone attains a thickness of more than 100 feet.

Turner in describing the Neocene shore gravels states their relationship to the Ione as follows:

The most striking evidence of nonconformity, however, may be seen at the red sandstone quarry three miles southeast of Buena Vista. Here the Neocene shore gravels rest unconformably on the smooth, waterworn surface of the sandstone, which is red where quarried, but white at the northern end of the exposure. Waterworn bowlders of the white sandstone may be seen in the gravel. Southwest of the quarry the ridge is capped for a distance of more than a mile with the same gravel, which half a mile from the quarry contains a layer of andesitic detritus. At the extreme southwestern end of the ridge is a body of similar gravel, which also rests plainly on sandstone of the Ione formation.

All the localities described by Turner have been visited. At the last-mentioned locality, "the red sandstone quarry three miles southeast of Buena Vista," the writer obtained *Venericardia planicosta* new variety. *Meretrix hornii* Gabb, *Psammobia cf. hornii* (Gabb), *Glycimeris* sp., *Crassatellites* sp., *Turritella merriami* Dickerson, *Natica* sp. and *Clavella* sp. The *Venericardia planicosta* found here is the variety with the obsolete ribs. All of these forms were collected from the sandstone five to ten feet beneath the Neocene shore gravels. While the fauna is limited in species, it is typical of the uppermost, the *Siphonalia sutterensis,* zone of the Tejon. The sandstone member in this vicinity, with a dip of only one degree toward the west, attains a thickness of 250 feet. It rests upon the clay, an altered rhyolitic tuff which is only fifty to one hundred feet in thickness. This in turn rests upon the steeply tilted eastern dipping Mariposa slates of the bed rock series. The same sandstone occurs on the hill east of Buena Vista Peak, and with about the same thickness. A half mile east of this hill the lower clay member becomes appreciably thinner and is only 25 to 50 feet thick. On Waters Peak one half mile further east, the clay member and a good part of the sandstone member are missing and only the massive upper fifty feet of the sandstone member is found resting upon the eroded surface of the Mariposa slates.

The third member, the clay rock recognized by Turner, appears to the writer to be merely a decomposition product of a rhyolitic tuff. A rhyolitic tuff rests directly upon the sandstone member in the vicinity of Buena Vista Peak. The writer's opinion is confirmed by an examination of the strata as exposed in Jones' Butte. A clay rock was found resting upon the sandstone member. In certain places this rock was found to be an unaltered rhyolitic tuff.

From the above description it is seen that this formation appears to have been deposited by a sea which transgressed from the west. Two or more of the three members of the Ione are very persistent over the Jackson Quadrangle, the Lodi Quadrangle, the Sacramento Quadrangle, the Sonora Quadrangle, and they can be recognized readily by their lithologic characters, low westerly dip, and stratigraphic position beneath the andesitic tuffs and upon the Mariposa slates or other members of the bed rock series.

Until these three members were studied at the type locality, the relationship of the small area south of Merced Falls, which was mapped by Ransome and Turner as Tejon, to the adjoining Ione tuffs and clays was obscure. The clays, sand and tuffs exposed one mile west of Merced are lithologically identical with those of the lowermost member, and the red sandstone mapped as Tejon, found here, is identical with that of the second or sandstone member of the Ione of the type locality. The same condition evidently prevailed here as in the area between Waters Peak and Buena Vista Peak, that is, a deposition along the shore line of a rapidly transgressing western sea. In this sandstone, casts of *Cardita planicosta,* var. *hornii,* with obsolete ribs were found near the top. The authors of the Sonora Folio, Messrs. Turner and Ransome[3] describe this as follows:

"*Tejon formation.*—The only rocks referable to this period are a few isolated patches of light-colored sandstone which occur capping some low hills in the southwest corner of the quadrangle. South and southeast of Merced Falls are two level-topped buttes capped by this sandstone, which rests almost horizontally upon the nearly vertical edges of the Mariposa slates. The basal bed is crowded with angular fragments of the slate and with abundant pebbles of white vein quartz, while the upper beds are composed of a light-colored quartzose sandstone with frequent bands of small quartz pebbles. Marine fossils (*Venericardia planicosta*) are fairly abundant in the upper bed at the west end of the butte that lies one mile south of Merced Falls. These sandstones are overlain to the west by the light-colored sandstones of the Ione formation. The two series are probably not absolutely conformable, as the Ione beds transgress onto the rocks of the Bed-rock series farther north."

[3] Turner, H. W. and Ransome, F. L., Sonora Folio, U. S. Geological Survey, p. 2, 1897.

The above-mentioned sandstones, instead of "being overlain to the west by the light-colored sandstones of the Ione formation," are in reality stratigraphically higher. These sandstones have been worn away from most of this area and only a few residuals remain.

After this great erosion, andesitic tuffs and tuff breccias covered all. During the Pleistocene and Recent time much of the andesitic material has been removed re-exposing the older rocks beneath.

The Ione has been repeatedly correlated with the Auriferous gravels of the Sierras and the upper portion with the rhyolitic tuffs. It can no longer be doubted that the Ione is of the same age as the Rhyolitic tuff and the Auriferous gravels, and since the Ione is clearly Tejon-Eocene, the Auriferous gravels, their correlative, must be upper Eocene, at least in part and the land equivalent of the marine Tejon.

Roy E. Dickerson

The Increase in Permeability of the Frog's Egg at the Beginning of Development and the Preservation of the Life of the Egg [1]

Three years ago, it was observed that the unfertilized frog's egg could be made parthenogenetic by a momentary electric shock, and reasons given for supposing that the electric shock (or the spermatozoon in normal fertilization) increased the permeability of the egg.[2] Recently, I proved this supposition to be correct. The permeability of the unfertilized egg to NaCl was found to have increased on stimulating the egg with an electric shock (which caused it to begin normal development).

Several methods were tried for the quantitative estimation of sodium ions, but the results with such small quantities would not be considered trustworthy had they not tallied with the more certain results on the determination of chlorine ions with the nephelometer, and only the latter will be described here. The technique was as follows:

A "pregnant" female of *Rana pipiens* was washed in alcohol and then in water, pithed and opened. The eggs were removed from the oviducts without mechanical injury or contamination with blood or lymph. These eggs were washed 10 minutes in a large volume of H_2O[3] and divided into two exactly equal masses. Each mass was placed in 30 c.c. of H_2O and allowed to remain for 30 minutes while the jelly swelled. The water that had not been taken up by the jelly was analyzed and the $Na+$ and $Cl-$ found to be the same for both lots. Then lot 1 was stimulated by an electric shock from clean platinum electrodes[4] and lot 2 used as a control. 20 c.c. of H_2O were added to each lot and at the end of one hour this water was analyzed. There was more $Na+$ and $Cl-$ in the water from the stimulated eggs than the control, the ratio of $Cl-$ being 10 to 7. This is a very small difference, but it must be remembered that the salt in diffusing out of the egg is held for some time by the "fertilization membrane" and the thick jelly surrounding the egg. Consequently 30 c.c. of H_2O were added to each lot and allowed to remain eight hours to give time for the salts to diffuse through the jelly. There was now found three times as much $Cl-$ that had diffused out of the stimulated eggs as had diffused out of the control. Whether this increase in permeability is the *cause* of development has not been determined, but it is not restricted to the frog's egg, since I found the same true of the sea urchins' egg,[5] a fact which has been confirmed by Gray[6] at Plymouth.

The unfertilized frog's egg placed in fresh or distilled water continues to swell until death ensues. This death is probably caused by the swelling, and the latter by the osmotic pressure of the soluble substances contained within

[1] Preliminary note.

[2] McClendon, Science, N. S., Vol. 33, p. 629.

[3] H_2O means water redistilled in quartz.

[4] In about one minute all of the eggs had turned the black pole upward; 3 hours later the first cleavage began.

[5] McClendon, *Amer. Jour. Physiol.*, 1910, Vol. 27, p. 240.

[6] Gray, *Jour. Marine Biol. Assn. U. K.*, 1913, Vol. 10, p. 50.