Witkowski (1896), are $C_p = 0.3467$ and $C_v = 0.2467$ cubic-foot atmospheres.

Harvey N. Davis

Cambridge, Mass.

Occurrence of three species of beaked whales of the genus Mesoplodon on the Atlantic coast of the United States

To the Editor of Science: The few specimens of beaked whales of the genus *Mesoplodon* which have hitherto been obtained on the Atlantic coast of the United States have been tacitly assigned to a single species, *M. bidens* (Sowerby). After a detailed study of the material available, I am convinced that three species are represented. These are: (1) *M. bidens,* the species most commonly found in the North Atlantic; (2) *M. europæus,* a species known hitherto only from a single specimen found floating in the English Channel about seventy years ago; and (3) a species which is apparently *M. densirostris,* of which only a few specimens from the Indian Ocean are known.

The name *M. europæus* (Gervais) will probably have to be replaced by *M. gervaisi* (Deslongchamps). The former specific name was originally published in the first edition of Gervais's "Zoologie et Paléontologie françaises" (1846–52) under the genus *Dioplodon.* I have not seen the first edition of this work, but in the second edition (1859) the name is a *nomen nudum.* The species was apparently first described by Deslongchamps in 1866, who renamed it *gervaisi* (*Dioplodon gervaisi*).

An account of the American specimens of this and other genera of ziphioid whales in the National Museum is in preparation, and will probably be published in a few months.

F. W. True

National Museum,
November 5, 1907

Special Articles

Some recent advances in South African paleontology

During the past year a considerable number of new fossil reptiles have been discovered in the Permian and Triassic deposits which are included in the Karroo formation. Three new Therocephalian genera have been discovered in beds which are probably Middle Permian. These are all more or less closely allied to others previously known, and do not reveal much that is new in the general anatomy of the group. In beds which are probably Lower Triassic a new type of Therocephalian has been discovered and named *Arnognathus.* Unfortunately, it is only represented by a dentary bone. The discovery is chiefly interesting from the fact that no Therocephalian has hitherto been got in beds more recent than Upper Permian. It is rather a degenerate form than one leading on to the specialized Cynodonts.

Very much more important than these is the discovery in Lower Triassic beds of the nearly complete skeleton of a small reptile which must be placed in a new suborder. Hitherto we have had no evidence throwing any light on the origin of the Therocephalian reptiles. *Pareiasaurus* and some other of the Cotylosauroid forms seemed to suggest a possible origin among these early types, while one or two points in Mammalian morphology and embryology such as the mammal-like type of the organ of Jacobson in *Sphenodon* seemed rather to favor an affinity with the Rhynchocephalians. The discovery of this new fossil reptile, which is called *Galechirus,* strongly favors the descent of the Therocephalians from an early Rhynchocephaloid ancestor. This new type is about the size of a rat and the following are its most important characters: the dentition is thecodont and homodont, there being no enlarged canine; the lower jaw is very similar to that of the Therocephalians, but there is no enlarged coronoid process; the shoulder girdle is typically Therocephalian, the precoracoid being well developed; the digital formula is 2, 3, 3, 3, 3; the pelvis is plate-like with the ilium directed somewhat backwards; and well-developed abdominal ribs are present. Unfortunately, the temporal region and palate are unknown. The affinities are undoubtedly mainly with the Therocephalians, but in none

of the mammal-like reptiles have abdominal ribs hitherto been found and we may feel quite certain in concluding that in the Anomodonts at least they did not occur, and had they occurred in the Therocephalians it is likely they would have been discovered. The combination of characters seems to point to *Galechirus* being a primitive Therapsidian reptile most closely related to the Therocephalians, but with distinct Rhynchocephaloid affinities. As the American Pelycosaurs are undoubtedly Rhynchocephaloid, it seems not improbable that the common ancestor of the Pelycosaurs and the African mammal-like forms may have been an early Rhynchocephaloid reptile rather than a Cotylosaurian, as some of us had thought.

Another type which I have discovered in the last few months seems in some respects almost as important as *Galechirus* in that it is another "missing link" discovered. A few years ago I pointed out that the old order "Theriodontia" of Owen was an unnatural group including two well-marked divisions—the *Therocephalia* with a Rhyncephalian type of palate, single occipital condyle, simple molars and large angular and surangular bones in the lower jaw, and the *Cynodontia* with a mammalian type of palate, two condyles, complex molars and the lower jaws almost wholly formed by the dentary. The Therocephalians are almost entirely confined to the Middle and Upper Permian beds, the Cynodonts to the Middle and Upper Triassic beds. The new type, which I propose to call *Bauria,* was found in Upper Triassic beds, and while it must be placed among the Cynodonts it shows affinities with the Therocephalians not present in the other known genera. In general shape the skull is not unlike that of *Trirachodon,* but about one half larger than *T. kannemeyeri.* The dental formula is i 4, c 1, m 10 above and apparently the same below. The molars are remarkable by being simple uncusped teeth with flattened tops. There is a secondary palate as in typical Cynodonts, but unlike all previously discovered forms the postorbital arch is incomplete, the postorbital bone not meeting the jugal. The appearance thus produced is very mammal-like. There is apparently no parietal foramen. The squamosal is more like that of the Therocephalians than that of the Cynodonts, and the quadrate is very minute. The occipital condyle is intermediate between that of the Therocephalians and the Cynodonts in that while it is really double the two parts are so close to each other that it is practically single. The lower jaw is almost typically Therocephalian, the angular and surangular being large and the dentary only forming the anterior two thirds of the jaw. While *Bauria* is thus typically Cynodont in the structure of its palate and must therefore be placed in the *Cynodontia,* in the simplicity of its molars, the condition of the occipital condyle, and in the structure of the lower jaw it shows distinct affinities with the more primitive Therocephalians.

In the Lower Triassic beds an imperfect skeleton of a small *Mesosaurus*-like reptile has been discovered. It is less typically an aquatic form and has slender ribs. Abdominal ribs are well developed. The skull, which is imperfectly preserved, is long and pointed and, so far as can be made out, is Rhynchocephaloid in its characters. Until other specimens throw further light on the form it will provisionally be placed in the *Mesosauria.* It has been named *Heleosaurus.*

R. BROOM

VICTORIA COLLEGE,
STELLEN BOSCH, SOUTH AFRICA,
October, 1907

NOTE ON THE FERMENTATIVE REACTIONS OF THE B. COLI GROUP

IN view of the fact that Prescott[1] and others have recorded the presence of organisms resembling *Bacillus coli* on grains, it seemed to us of interest to make a somewhat careful comparison of these forms with intestinal *B. coli* in regard to their power of fermenting carbohydrates. The success of Gordon and Houston[2] in clearing up the relations of the

[1] SCIENCE, N. S., XV., 363; *Medicine,* XI., 20; "Biological Studies" by the pupils of William Thompson Sedgwick, Boston, 1906.

[2] Report of the Medical Officer to the Local