"From Coahuila many masses have been got, but it is extremely probable that all of them were brought from a single district of very small area: the two Nuevo Leon masses have never been examined and had obviously been transported, perhaps from Coahuila or San Luis Potosi.

"In Chihuahua three or four areas are represented: but of the masses found in that State only those of the Huejuquilla group have been examined, and that in a very incomplete way: the recognition of the singleness of the fall of the Huejuquilla group depends almost entirely on the general similarity of appearance of the large masses. If the masses really belong to a single fall, as the available information makes most probable, the maximum dispersion is now 66 miles: but one of the terminal masses, that of San Gregorio, is known to have been transported by the Spaniards on one occasion for 1½ leagues, while according to a tradition current three centuries ago it had accompanied the Indians when they journeyed southward to take possession of that part of Mexico."

2. *Kilauea.*—A letter from Rev. E. P. Baker of Hilo, dated Nov. 5th, speaks of Dana Lake, or a lake occupying essentially its position west of the debris-cone in Halemaumau, as boiling violently all over its surface, so that no crust remains upon it. Jets consisting of successive clots of melted lava from three feet to six, ten and even twenty feet in height were in constant play over it. He had not seen the lake lava so hot at any time during the past ten years.

Mr. Maby, at the Volcano House, about two months previous had reported that on Sept. 9th all activity in Dana Lake ceased, and that there was an outbreak of lava in another place. But three days later, the lake was again active and four other spots in its vicinity had opened.

3. *University Studies;* Published by the University of Nebraska.—This third number of a new and important series consists of three papers: 1st, The determination of specific heat and of latent heat of vaporization with the vapor calorimeter, by H. N. Allen. 2d. The color vocabulary of children, by H. K. Wolfe. 3d. The development of the King's Peace and the English local Peace-Magistracy, by G. E. Howard.

4. *Gesammelte Mathematische Abhandlungen;* von H. A. Schwarz.—The very important Mathematical Contributions of Professor Schwarz during the past thirty years, have been republished in two handsome octavo volumes by Julius Springer of Berlin. The first of these volumes is devoted entirely to his discussions of surfaces of minimum extent. The second volume contains his various papers in Geometry, differential equations, and other branches of the Higher Analysis.

APPENDIX.

Art. X.—*A Horned Artiodactyle* (Protoceras celer) *from the Miocene;* by O. C. Marsh.

It is an interesting fact, that while all existing mammals with horns in pairs are artiodactyles, and none of the recent perissodactyles are thus provided, the reverse of this was true among the early forms of these groups. The *Dinocerata* of the Eocene, a specialized order of ungulates, as well as some of the perissodactyles of both the Eocene and Miocene, had horns in pairs, while no horned artiodactyles have hitherto been known from either the Eocene or Miocene.

A fortunate discovery made during the past season, in the Miocene of South Dakota, proves, however, that before the close of this period, one artiodactyle, at least, was provided with a pair of horns. This animal was apparently a true ruminant, and nearly as large as a sheep. Only a single skull is known, and this, fortunately, is in good preservation, except the extremity in front, which is broken off and lost. In general form and proportions, this skull is of the ruminant type. Its most striking feature is a pair of small horn-cores, situated, not on the frontals, but, on the parietals, immediately behind the frontal suture. These prominences were thus placed directly over the cerebral hemispheres of the brain.

The frontal bones are very rugose on their upper surface, and this rugosity extends backward on the parietals, and to the summit of the horn-cores, as well as between the latter, and along the wide sagittal crest. The horn-cores are well separated from each other, and point upward, outward, and backward, overhanging somewhat the temporal fossæ. They are conical in form, with obtuse summits.

Between the orbits, the frontals are depressed, and marked by two deep grooves leading backward to the supra-orbital foramina. Behind these, halfway to the horn-cores, is a median prominence resembling in shape the corresponding elevation on the skull of the male giraffe. The brain cavity is unusually large for a Miocene mammal. The occiput is very narrow, indicating a small cerebellum, and the occipital crest is weak. The occipital surface slopes backward.

The facial region of the skull is narrow and elongate. On the outer surface of the maxillary, just above the antorbital foramen, there is a deep depression, which probably contained a gland. The usual ruminant fossa in front of the orbit appears to be wanting. The orbit is large, and completely closed behind by a strong bar of bone.

The dentition preserved is selenodont and brachyodont, with only three premolars and three molars. The first premolar is much compressed transversely, and has but a slight inner lobe. The second premolar is triangular in outline, the inner lobe being much more developed. The last premolar has this lobe expanded into a strong cusp, and the crown thus becomes broader than long. The true molars have two inner cusps, each with a basal ridge. The outer crescents have a median vertical ridge. The enamel of the molar series is more or less rugose. There was a wide diastema in front of the premolars.

The posterior nares are situated far forward, the anterior border being opposite to the posterior cusp of the second true molar. The glenoid facet is large and convex, but the post-glenoid process is quite small. The paroccipital processes were well developed, but there were apparently no auditory bullæ.

This skull when entire was about eight inches (200^{mm}) in length. The distance between the orbits across the frontals is about three inches (75^{mm}), and the distance between the summits of the horn-cores, about one and one-quarter inches (32^{mm}). The extent of the premolar and molar series is three and one-eighth inches (80^{mm}), and the width of the palate between the true molars is one and one-quarter inches (32^{mm}).

As the animal represented by this skull is very distinct from any hitherto described, the genus may be named *Protoceras*, in allusion to the early appearance of horns in this group. The species may be termed *Protoceras celer*. The characters now known suggest affinities with the giraffes, but indicate a distinct family, which may be called the *Protoceratidæ*.

The geological horizon is in the upper part of the Oreodon beds of the Miocene. For securing this important specimen, the writer is indebted to his able assistant, Mr. J. B. Hatcher, whose many discoveries in the West are well known.

New Haven, Conn., December 17, 1890.

THE

AMERICAN JOURNAL OF SCIENCE

[THIRD SERIES.]

Art. XI.—*A Solution of the Aurora Problem;* by Prof. Frank H. Bigelow.

The problem of the Aurora to which reference is made, is the question of the location in space of the visible arch and streamers, referred to the surface of the earth, as seen by an observer. This is becoming a matter of more importance than it once was, because the progress of discovery shows that it is one of the indices of the physical connection between the sun and the earth, as communicated through the medium of the ether. It therefore holds the same relative position that light and heat do to meteorological phenomena, or that induction does to magnetic variations. But it has the peculiarity of marking out the paths of the magnetic and electric forces that enter or depart from the earth, for it will be assumed that observations have already settled the fact that the auroral streamers coincide with the direction of the lines of force surrounding the earth, considered as a magnet. If there are any variations from this condition, it will be one of our ultimate objects to discover them, and perhaps the laws governing the same. At present, however, we limit ourselves to the simple case of the problem, namely the heights, and the distance of a ray from the observer. I am sorry to say that, so far as my knowledge extends, after a diligent search, there are no observations on record of the right form, that will enable me to test the theory. It is my object in this paper to explain the solution, and a simple piece of apparatus, in hopes that before long a suitable set of measurements may be made.