

repute will hold an even balance where boundaries are *sub judice*.

In the case of the Chile-Bolivia boundary, it appears that the publisher also considers that Bolivia has no territorial rights which Chile is bound to respect.

Mr. Keane closes his work with an extensive and valuable chapter on Brazil, a country which occupies nearly one-half of the area of South America. His remarks upon the "ethnical elements of the population and their distribution" he considers of value in estimating the probable political future of the Republic. "The triple fusion of aborigines, negroes and Europeans is mainly confined to the Atlantic States between the Amazon estuary and Rio de Janeiro. Then follow the States of San Paulo, Paraná, Santa Catharina and Rio Grande do Sul, with which must be grouped the vast and relatively populous region of Minas Geraes. Here we have no triple fusion, the negro element being everywhere mainly absent; but, as in Spanish America, an amalgam of aborigines and whites . . . which constitute the second section of the Brazilian people, distinguished from the first by the absence of black blood. Lastly, the aboriginal element tends to disappear in the direction of the south, where the white element is continually strengthened by direct accessions from various parts of Europe, but especially Italy, Portugal and Austria."

As to the above quotation, the State of Minas Geraes is the most populous in Brazil, and the negro element is everywhere in evidence; and instead of an "amalgam of aborigines and whites," few of the inhabitants are free from negro blood. Exclusive of the aboriginal tribes, one seldom finds any traces of Indian blood among the Brazilians except in the immediate vicinity of the banks of the main River Amazon.

Notwithstanding a few details where we might disagree with Mr. Keane, he has given us a most useful work of reference; but every reader at all familiar with South American geography will regret that the maps are not more trustworthy. GEORGE EARL CHURCH.

ZONES IN THE CHALK.

ATTENTION was directed in NATURE for April 26, 1900, to Dr. A. W. Rowe's researches on the zones of the White Chalk of Kent and Sussex. Dr. Rowe has since published his observations on the White Chalk of Dorset (*Proc. Geol. Assoc.*, vol. xvii. part i. 1901). Aided in the field as before by Mr. C. Davies Sherborn, the author has made a particular study of the higher portions of the Chalk which commence with the zone of *Rhynchonella Cuvieri*.

Those who are familiar with this portion of the Dorset coast, or have read Mr. Aubrey Strahan's explanatory memoir (published by the Geological Survey), know how faulted and crushed are the strata in many places, and how difficult or impossible of access are many portions of the cliffs. Undaunted, however, by these obstacles, or by the hardness of the Chalk and the trouble in extracting and preserving the often shattered fossils, Dr. Rowe and Mr. Sherborn "have been able to fix, with varying degrees of accuracy, the limits of nearly every zone," and to record from each a characteristic fauna. While confirming the general conclusions of Dr. Barrois, they have amplified our knowledge to a remarkable extent, and have had the satisfaction of determining the presence, hitherto unsuspected in the region between White Nothe and Studland Bay, of the higher Chalk zones of *Actinocamax quadratus* and *Belemnitella mucronata*.

That zones in the Chalk are purely zoological divisions is thoroughly borne out in this paper, and although it is remarked that "nothing but rigid collecting gives one the faintest chance of obtaining the junction between the various beds," it is evident that no more definite

boundary is to be expected between zones than that which in human chronology separates one century from another. Here and there particular flint-bands, the nodular character or the colouring of the Chalk afford local guides for marking approximate junctions or for tracing horizons from place to place amid the complex disturbances of the strata; and these have been carefully noted. Dr. Rowe, indeed, felt some "anxiety to find a lithological feature" whereby to permanently mark the planes of division he took, but this was seldom possible, nor could it reasonably be expected in such a comparatively uniform series of strata. Nevertheless, the results of Dr. Rowe's painstaking work have been in many instances permanently recorded in a series of beautifully executed plates prepared from photographs taken by Prof. H. E. Armstrong. Diagrams accompany these plates to show the positions of the several zones and the limits assigned to them. No higher testimony to the value of zones has, perhaps, ever been given in this country, for the authors have had a veritable geological puzzle to deal with, and they have interpreted it by means of their long experience of Chalk fossils and by assiduous collecting. By these means the knowledge elsewhere gained where the sequence is unbroken has been applied with marked success, and the progressive changes in the life-history of the Chalk have been found to correspond with a precision that could not have been expected in strata deposited under more varying conditions. While the zones are marked out within narrow limits by certain dominant species, yet where these zonal forms are absent the "zones are often as accurately defined by their associated guide-fossils." These are noted with reference to Dorset.

It may be observed that, with the exception of *Marsupites*, *Actinocamax quadratus* and *Belemnitella mucronata*, the dominant forms are not confined to the zones they characterise. The author makes some remarks on the varying position of the layers described as Chalk Rock. No doubt any type of rock may be found at any horizon, but it must be remembered that the limits assigned to Chalk zones are approximate. There is nowhere any real boundary, and even some dominant types may have existed in abundance longer in some areas than in others. H. B. W.

THE ORIGIN AND HABITS OF THE BACTRIAN CAMEL.

OF few of our larger domesticated animals is the origin so buried in mystery as is that of the camels. Till a few years ago, indeed, naturalists were in doubt whether the two-humped Bactrian species was really a native of the countries where it is now kept in a domesticated condition. The probability was, however, all in favour of such being the case; and the recent discovery of remains of fossil camels in several parts of Europe, as well as the occurrence of such remains in Asia, afford strong corroborative evidence that eastern Europe and northern Asia formed the original habitat of the wild Bactrian species.

The subject has recently been discussed in *Globus* for May 2, 1901, by Dr. A. Nehring, of Berlin, who expresses himself in favour of the view that some, at least, of the two-humped camels which roam at liberty over the wastes of the Gobi are indigenously wild animals.

Years ago the occurrence of remains of fossil camels (*Camelus sivalensis*) was recorded by Falconer and Cautley in the Tertiary strata of the Siwalik Hills of northern India. The dentition of this species is numerically the same as in the two living members of the group; and from this circumstance, coupled with the well-known affinity between the extinct fauna of the Siwaliks and that of Africa at the present day, it is not improbable

that the Siwalik camel was the ancestor of the single-humped African species, since, as will be shown below, there is a probability that the ancestor of the Bactrian species had a fuller dental series.

And here it may be well to mention that in adult modern camels there are normally five pairs of cheek-teeth in the lower jaw behind the tusks, or canines. The first pair (the first premolars) are, indeed, somewhat like a canine in form, and are separated by a gap from the canine in front and from the remaining four of the cheek-teeth behind. Of the latter, the last three pairs are the true molars, while the tooth in front of them represents the last of the typical series of four premolars.

Now in the lower jaw of a fossil camel recently described from the Pleistocene Tertiary strata of Rumania, by Herr Stefanescu, under the name of *Camelus alutensis*, there are six, in place of five, pairs of lower cheek-teeth, the tooth representing the third lower premolar being developed. Evidently we have here an ancestral type of camel, and it is noteworthy that, according to Dr. Nehring, this supernumerary living tooth occasionally makes its appearance in living camels, although it is not mentioned in which species. The remains of the Rumanian camel were discovered on the left bank of the Aluta (Olt) river, a tributary of the Danube, not far from Slatina.

Evidently, remarks Dr. Nehring, this Rumanian camel was a member of the steppe-fauna, of whose former existence in central Europe evidence is afforded by the occurrence of fossil remains of the saiga, Kirghiz jerboa and other species now characteristic of the Volga steppes. Another fossil camel has also been described, under the name of *Camelus knoblochi* or *C. volgensis*, from strata in the neighbourhood of Sarepta, on the Volga, and also at the mouth of the Tscheremschan, in the Government of Samara, the number of lower teeth in this species being apparently the same as in modern camels.

As members of the steppe fauna, these Rumanian and Russian fossil camels were almost certainly the ancestors of the living Siberian species; and since the Rumanian species has a larger number of lower teeth than the still older Siwalik camel, it is manifest that the latter cannot have been the progenitor of the Bactrian species. Hence the reason for regarding it as the ancestor of the single-humped camel of Africa. The Russian camel-remains, it may be added, were found in association with molars of the mammoth.

Remains of camels have also been found in the Pleistocene strata of Oran and Ouen Seguen, in Algeria; and certain remains from the Isle of Samos have recently been assigned to the same genus, although the reference requires confirmation. The Algerian Pleistocene camel was doubtless the direct ancestor of the living African species, which it serves to connect with the extinct *C. sivalensis*.

With regard to the camels of the Gobi, which, as already mentioned, Dr. Nehring regards as truly wild, it is interesting to note that some years ago Dr. Langkavel described them as being much smaller than the domesticated breed, not, indeed, much superior in size to a horse with relatively slender limbs. Observations in confirmation of this statement are, however, urgently required; and any travellers who may visit the Gobi neighbourhood would do service to science if they would bring back skins and skeletons of the wild camels.

Nothing is more remarkable in connection with the Bactrian camel than its capacity for standing extremes of heat and cold, provided always that the climate be dry. Herr O. Lehmann (*Zeitschr. wiss. Geographie*, 1891, p. 27), for example, writes as follows:—

"The most severe winter cold of Asia cannot prevent the presence of the camel. In west Siberia, from the Kirghiz steppe to the neighbourhood of Lake Baikal,

are camels found. . . . In Semipalatinsk the mean winter temperature falls to $-21^{\circ}9$ C.; the most intense registered between the years 1854 and 1860 was $-49^{\circ}9$. During his journey Przewalski experienced the most intense cold without losing a single camel. Throughout his whole journey across the Mongolian plateau he daily encountered a temperature of -37° Again, in Zaidam, where camel-breeding establishments exist, a night temperature of $-23^{\circ}6$ was observed, which in November was intensified to $-25^{\circ}2$. In the neighbourhood of Tarai-nor, on the 50th parallel of north latitude, the Burjats keep numerous camels, which even in winter are allowed to wander about without the slightest protection. . . . Here the camel reaches the 50th parallel, westward of Lake Baikal, on the Upper Yenisei, where the Samoyeds keep both reindeer and camels. Here, indeed, the breeding-area of the camel overlaps that of the reindeer."

In regard to its capacity for heat, the same author records the following observations:—"If the degree of cold that the Bactrian camel can withstand is wonderful, not less remarkable is the heat it can undergo. In the Gobi Desert Przewalski took the temperature of the ground in summer and found it to be $62^{\circ}5$ C." R. L.

NOTES.

WE regret to see the announcement of the death of Prof. W. Schur, professor of astronomy in the University of Göttingen.

THE Antarctic exploration ship *Discovery* was inspected by the King and Queen at Cowes on Monday. Their Majesties were received by Sir Clements Markham, K.C.B., who presented Commander Scott, who in turn presented the officers of the ship and the scientific staff. The King showed great interest in the laboratories and the instruments for scientific work, which were explained by Mr. George Murray, F.R.S., who accompanies the ship to Melbourne, and Dr. H. R. Mill, who will go as far as Madeira in order to start the oceanographical observations on the way out. The ship left Cowes on Tuesday, with hearty wishes for a voyage free from calamity and fruitful in scientific results.

WE understand from the *Irish Naturalist* that Prof. A. C. Haddon, F.R.S., intends to resign the chair of zoology at the Royal College of Science, Ireland, which he has occupied since 1880, in order to devote more time to anthropological work.

THE death is announced, at San Francisco, of Dr. H. W. Harkness, known for his contributions to entomology and botany. For several years Dr. Harkness was president of the California Academy of Sciences, to which institution he presented his large collections of specimens of cryptogams.

THE *Express* states that Profs. Haeckel, Conrad and Fraas, of Jena, Halle and Stuttgart Universities respectively, announce that the sum of 1500*l.* has been placed at their disposal as a prize for the best work on the question, "What do we learn from the principles of the theory of heredity in reference to the inner political development and legislation of States?" Manuscripts must be in German and sent not later than December 1, 1902, to Prof. E. Haeckel, Jena.

ACCORDING to a *Times* correspondent, Dr. Berson and Dr. Suering, who made a balloon ascent from Berlin on July 31 and descended near Kottbus in the morning of the following day, succeeded in reaching an altitude of more than 10,300 metres. It was impossible to ascertain the greatest altitude attained, as both the aeronauts lost consciousness in consequence of the rarity of the air. The minimum temperature registered was -40° C.

WE learn from *Science* that, aided by a special fund presented by a friend of the American Museum, Prof. Osborn recently sent out two expeditions especially in search of fossil horses—