

mer was + 21.75 R., which gives a range of 61.25 R., or of 137.8 F. The average temperature in winter at Irkutsk is — 14° 8 R., and the average for summer + 13.1 R. For the whole year the average is — 4 R., indicating that as a whole the gay society of Irkutsk live in a freezing temperature. Farther to the north at Yakutsk the average temperature is — 8.6° R., whilst still farther upon the borders of the Arctic Ocean at Ust Yansk it is — 13.0° R.

(To be continued in our next Number.)

NOTICES OF MEMOIRS.

PROFESSOR TOULA ON THE GEOLOGY OF ST. NICOLAS-BALKAN: Section OSMANICH-AK-PALANKA. (Proceedings of the Imperial Academy of Vienna, April 25th, 1877.)

[Communicated by Count MARSCHALL, F.C.G.S., etc.]

THE central massif is composed of crystalline unstratified rocks, of granite (St.-Nicolas Defile: altitude 1390 mètres), and very extensive dioritic rocks. Azoic rocks, such as clay-slates and gneissic rocks, with intercalations of chloritic and quartzitic schists, appear both on the south, and especially the north slope. In this direction they extend as far as the River Arcer, where they are partly overlain by "Sarmatic" deposits. The Carboniferous sandstones south of Belgradeik, on the northern slope, include organic remains characteristic of the Old Red ("Walchian") sandstones, as *Calamites*, *Annularia*, *Odontopteris obtusa*, Naum., *Cyatheites arborescens*, Brongn.; *Alethopteris gigas*, Gutb., *Tæniopteris abnormis*, Gutb., and *Walchia pyriformis*, Schlth. These sandstones are unconformably overlain by a thick deposit of red sandstones, probably the Bunter or Lower Triassic Sandstones. The Muschelkalk is met with in the same locality. The fossils are: Teeth of *Saurichthys*, *Lima striata*, Schlth., *Pecten discites*, Schlth., *Pecten Alberti*, Goldf., *Ostrea decemcostata*, Mstr., *Retzia trigonella*, Schlth., *Spiriferina fragilis*, Schlth., *Waldheimia vulgaris*, Schlth., and *Entrochites* in abundance. The overlying strata are white sandstones of unascertained age, and white Upper Jurassic limestones with hornstone and *Belemnites*. These limestones occur likewise beneath the Nerinea-limestones of the isolated hill of Rabis. The Jurassics are conspicuously represented south of Belgradez by hard sandstones ("Middle Dogger"), with *Pecten demissus*, Phil., *Monotis elegans*, Goldf., and *Belemnites* (near *canaliculatus*, Schlth.), conformably overlain by fossiliferous, distinctly stratified limestones, containing *Sphenodus macer*, Quenst., *Lepidotus maximus*, A. Wagn., *Aspidoceras orthoceras*, d'Orb., *Perisphinctes polyplocus*, Rein., *Simoceras Doublieri*, d'Orb., *Oppelia Holbeini*, Opp., *Oppelia compsa*, Opp., *Phylloceras tortisulcatum*, d'Orb., *Aptychus latus*, Park., *Apt. Bulgaricus*, sp. nova, *Rhynchonella Agassizi*, Zschn., and *Rhynch.* sp. (near *sparsicosta*, Quenst.).

Cretaceous marls with small *Belemnites* and *Inocerami* are found to a limited extent between Vrbova and Quprén. Middle and Lower

Cretaceous deposits prevail in the southern portion of the chain. The older sediments are represented there only by Palæozoic conglomerates and schists, and by the red sandstones near Berilovce, overlain by limestones and marls with *Orbitulina lenticularis*, two other species of the same genus, *Spongia Vola*, Mich., and other *Spongiae*, one *Craticularia*, one *Sporadiscina*, some Corals and Polyzoa, and fragments of *Ostrea*, *Terebratulina*, *Terebrirostra*, and *Natica*.

Cretaceous sandstones rest on these beds; and beneath them, near Isvor, are fossiliferous, sandy, and locally somewhat oolitic Neocomian limestones, abounding with *Polyzoa* (among them a new species, *Heteropora Isovriana*), together with numerous joints of a *Pentacrinus* belonging to the series of *astralis*, Quenst., abundant spines of *Cidarites*, a *Peltastes* (near *stellulatus*, Ag.), and a new small Crustacean, *Prosopon inflatum*.

Friable Cretaceous sandstones then follow almost to the descent into the Nisova Valley, where Caprotina-limestones, resting on marls with *Pyrina pygmæa*, Ag., appear. Enormous deposits of rolled blocks and gravel cover the slope up to a considerable height.

REVIEWS.

I.—THE GLACIAL PERIOD IN THE SOUTHERN HEMISPHERE. By THOMAS BELT, F.G.S. (Quart. Journ. of Science, July, 1877.)

IN all his former papers on the Glacial Period, the author has dealt mainly with phenomena connected with the glaciation of the northern hemisphere, a great part of which he has travelled over himself, and has therefore been able to bring his personal experience to bear upon the subject; but in treating of the southern, he is obliged to rely for his data on the observations of other geologists. This compilation of the recorded facts that relate to the subject-matter is undertaken, Mr. Belt says, with the view of refuting the idea which seems of late to have arisen in the minds of some geologists, that there is no evidence of a glacial period south of the equator; and to show that the phenomena there found agree with those of the northern hemisphere.

The first authority cited is Prof. Agassiz, whose theories concerning the Amazon valley are considered by the author to be mistaken ones. The Pampean mud, it is argued, owes its origin to the same causes as the loess of Central Europe and the silt of the Siberian steppes, viz. the formation of a freshwater lake through the damming back of the drainage by the advance of the south polar ice up the basin of the South Atlantic; and a similar explanation is hinted at for the plains of gravel and silt in New Zealand.

The icy barriers to these lakes would themselves be melting and so contribute to their formation, and there would, it is maintained, be no more reason for the lakes they caused being frozen than that the Manjalen Sea, which is formed in a similar way, should be so.

This advance of the ice in both hemispheres simultaneously towards the equator would result not from a flow of the ice in that direction, but from ridges being formed which intercepted the moisture travelling