chiefs receive rich presents. It is true the Nubians are not so philanthropic in their seribes, but in respect to the Niam-Niams, nothing can be said against them, as hostilities would destroy the object they have in view. The buried ivory cannot be discovered by any divining rod ; there are no cattle to be stolen ; and the women and children always hide themselves at once, and in time, in the impenetrable thicket of the woods, so that no booty is to be obtained in slaves. It is, therefore, however improbable it may sound, the Niam-Niams who, entirely through their horrible lust for human flesh, commence the war. "Flesh, flesh !" is their war-cry, and a few female slaves, at least, who have lost their way in fetching water, are sacrificed to their cannibalism.

The journey back was commenced by the same route. On touching upon Uando's territory once more, alarming rumours reached us. It was said that this chief had brought out the whole of his force of warriors to bar our passage ; in fact we discovered that the first villages we came to were deserted ; armed Niam-Niam warriors lurked everywhere in the tall grass, and approached within range of our guns. But they did not show themselves particularly desirous of entering into hostilities with us. At one of the next villages, where Abu Tsammat received from the head man some ivory which he had left behind him upon the outward journey, several Niam-Niam men pressed their services upon us as guides or parlementaires. I was fully convinced of the existence of treachery, and vainly endeavoured to persuade Mohammed to seize some of these spies, and hold them as hostages. He had to repent it bitterly. After a short time they proved themselves to be assassins sent out by Uando, as the chief fondly imagined that the caravan would fall into his possession upon the death of the leader. Mohammed rode in front upon his mule ; close behind him came the Niam-Niams. I followed a few paces behind them, and carried my gun myself, whilst Mohammed, according to custom, had his carried after him All at once I heard shots, and saw Abu Tsammat fall from his saddle covered with blood. One of the Niam-Niams had given him a thrust with his spear ; the assassins made off, and were lucky enough to escape, notwithstanding the shots that were sent after them, as there could be no question of pursuing them into the thicket. At the next village halt had to be made for the purpose of rest. The place was almost entirely in flames, and an entrenchment was made from the *débris* of the houses. Fortunately, the wound of the leader of the caravan, although a very severe one, it having been increased by drawing out the barbed point of the spear, was not very deep. With a number of entomologist's pins which I happily possessed, I managed to sew it up, and in three days' time the wound was nearly closed, and would have been soon completely healed if Mohammed could have kept himself quiet. During our enforced stay at this place we were frequently alarmed by demonstrations on the part of the enemy, but they could not summon up resolution to attack us seriously.

Busier times soon followed. The most serious part of the journey was the passage across the rivers, which, although we now followed a more easterly direction in order to avoid several of them, was occasionally used by the Niam-Niams for an attack upon us. The noise and shouting may well be imagined, when for instance a female slave completely disappeared with her burden in the flood, the beating of the Nubian soldiery, the clatter of the pumpkin shells and kettles ; all this increased by a hail of arrows hurled by unseen hands from the adjacent thickets. However, we passed through without any loss ; the enemy did not venture upon approaching near enough to hurl his costly iron projectiles, but contented himself with bamboo arrows with heads of hard wood. Another division that was allied to us, but which had separated itself from us on the outward journey, was not so fortunate, as whilst it was endeavouring to join us upon the return journey, it was attacked during the passage over the river by an overwhelming force: The leader and several of the soldiers were killed outright, others were severely wounded, so that the company was compelled to leave many valuable articles behind, in order to get out of the swamp as quickly as possible, and thus secure its retreat. After a very fatiguing march, I thus at length reached Seriba Tsabbo once more, where I intend resting for some weeks to recruit my strength, and to complete my collections and correspondence. Upon the road I had to cross once more the river Tondji, the passage of which I have made so frequently. As there is an utter lack of boats, all the baggage has to be conveyed on little rafts, each of which is steered by a swimming negro across the raging torrent. I can only express satisfaction with the result of my journey, although the direct distance travelled was not very great, being from here to Munsa's town about seventy-five German miles. I became acquainted with races, which, until very recently, had never come into contact with European and Oriental civilisation in the slightest degree, and who had developed for themselves a perfectly independent state of cultivation, so strange and uncommon that one imagined himself in a new world when among them. Not a scrap of European clothing, not a single glass bead remains with Mombuttu to remind one of the connection opened up by Mohammed Abu Tsammat a few years ago. Extraordinary to relate, there was no trace whatever to be found there of the great lake mentioned by Piaggia, and previously by von Heuglin, although we met with various tribes of the Niam-Niams, and were well supplied with interpreters. I have naturally laid down my route carefully, have made a collection of words of the different languages spoken by the races visited by me, and have taken the dimensions of numberless individuals, amongst others, several of the Acku dwarfs, whom I met at the court of Munsa, and one of whom I took away with me as my faithful attendant. The remains of the Mombuttu feasts furnished several skulls for my collection. The booty in plants was also a very extensive one. I have made up my mind, upon important grounds, to remain here for another year, and to make another journey into the Niam-Niam country, but this time by a westerly route, in order to clear up several remaining doubts as to the geography of this country, which was never traversed before me by a single European.

G. SCHWEINFURTH

SCIENTIFIC SERIALS

Poggendorff's Annalen, 1870, No. 8—The following are the contents of this number: (1) "Thermochemical Researches" (sixth, seventh, and eighth parts), by Julius Thomsen. This forms the conclusion of Thomsen's researches into the thermal effects of the neutralisation of acids, and ends with a collective statement of results. The experiments relating to what the author calls chemical "avidity" are likely seriously to modify commonly-received views of chemical action, showing as they do that the heat of combination between acids and bases is not a measure of their tendency to combine. (2.) "Researches relating to Electrical Discharge," by W. von Bezold. Experiments relating to the propagation of sudden electric waves in branched conductors. The author finds, among other results, that the velocity of such waves is independent of the material of the conductor ; his experiments also indicate the existence of electrical phenomena analogous to the reflexion and interference of waves. (3.) "On the Electro-motive Force of the Voltaic Arc," by W. von Bezold. Edlund has shown that the electric light plays the part, not merely of a resistance interposed in the circuit, but also of an inverse electro-motive force. Von Bezold attempts an explanation of this fact, founded on the consideration that the discharge between the carbon-points must be periodic instead of continuous, and therefore their difference of tension a variable magnitude, whose maximum exceeds the electro-motive force corresponding to the resistance of the arc and the mean strength of the current. (4.) "On the Theory of the Electrophorus Machines and of the Supernumerary Conductors," by P. Riess. (5.) "On the Specific Heat of Water in the neighbourhood of its maximum density," by L. Pfaundler and H. Platter. The authors determined the specific heat of water between 0° and 11° C. by mixing weighed quantities at known temperatures between these limits, and observing the temperature of the mixture. From their results, they calculate an empirical formula containing the fourth power of the temperature. Taking the specific heat at 0° as 1, they find that at 1°·25 it is only 0·9512, while at 6°·75 it is 1·194, and at 11° it is again as low as 1·0298. (6.) "Acoustical Studies of Flames," by E. Villari. The author found that the tone of a vibrating tuning-fork was reinforced when brought near to a large gas-flame. When the flame, which was thus thrown into sympathetic vibration, was looked at through radial slits in a rapidly revolving opaque disc, it was found that, if the rate of rotation of the disc bore the proper relation to the rate of vibration of the fork, the flame appeared to be divided by stationary bands showing alternate maxima and minima of brilliance. When the rate of vibration was changed, but all other circumstances remained unaltered, the distance between the bands was found to vary inversely as the rate of

vibration. (7.) "On the ratio of transverse contraction to longitudinal extension," by Heinrich Schneebeli. The author has applied Kundt's mode of measuring the length of stationary waves to the comparative measurement of the rates of the torsional and longitudinal vibrations of steel rods, and hence to the determination of the ratio between the transverse contraction and longitudinal extension produced by stretching forces: the mean results agree closely with those obtained by Kirchhoff and Okatow, as well as by Everett (Phil. Trans. 1867), from experiments on flexure and torsion. (8.) "On the compensation of an optical difference of path," by J. L. Sirks. An investigation of the condition under which the interference tints produced by polarised light passed through a thin plate of crystal can be achromatised by a compensating plate of selenite. (9) "Rejoinder to Dr. Most," by L. Boltzmann, relates to the second law of thermodynamics. (10.) "A contribution to the doctrine of Molecules and to the theory of Electricity," by C. Lorenz. An attempt to calculate the absolute number of molecules in a milligramme of water, founded upon Weber and Kohlrausch's absolute measurement of the electro-chemical equivalent of water and on the difference of potentials required for its electrolysis. (11.) "A contribution to the theory of Terrestrial Temperature," by O. Frölich. A discussion of Poisson's expression for the internal temperature of the earth at small depths below the surface, as a function of the time and the superficial temperature. (12.) "Remarks on the 'Bohemian Diamond,'" by Prof. V. L. von Zepharovich. The author states that only *one* diamond (not several, as has been implied in some reports) has been found in Bohemia; that this was discovered in a workshop in Dlaschkowitz, where pyropes (garnets containing chromium) are ground and bored with the help of diamonds; and that it is not yet ascertained how it came to be among the pyrope-sand in which it was found. (13.) "A remarkable stroke of Lightning," by Dr. J. G. Fischer. By examining the position of the magnetic poles in various pieces of iron and steel which were magnetised by the passage of the discharge, the author ascertained that the direction in which the negative electricity passed was downwards into the ground. (14.) "On the ratio of the specific heat of air at constant volume to its specific heat under constant pressure," by Dr. Witte. The author concludes, on experimental and theoretical grounds, that this ratio is not constant, but is a function either of the temperature, or of the pressure, or of both. (15.) "On the minimum of prismatic deviation," by A. Kurz. (16.) "An easy mode of preparing a liquid for the production of Plateau's Equilibrium-figures without weight," by Rudolph Böttger.

The *American Naturalist* for December opens with a paper on the Flora of the Prairies, by Mr. J. A. Allen, in which he gives an interesting sketch of some of the peculiarities of the primitive flora of the Upper Mississippi prairie in northern Illinois, and central and western Iowa, not inaptly termed "the Garden of the West." He remarks that the breaking and turning of the soil at once exterminates a number of the previously dominant species, and instead of lingering as troublesome weeds, the more hardy exotics that through man's influence assume an almost cosmopolitan habit, usurp their places, the cereals, the cultivated grasses, and the noxious weeds of the old world, thoroughly crowding out the original occupants of the soil. Dr. W. Stimpson follows with an article on the Distribution of the Marine Shells of Florida; and Mr. A. S. Packard with one on the Borers of certain Shade trees. Spring time on the Yuron, by Mr. W. H. Dall, gives an account of the sudden advent of summer in that territory. Mr. A. S. Collins on the Impregnation of Eggs in trout-breeding will be interesting to pisciculturists in this country, explaining the principle of a new process pursued at the trout ponds in Caledonia, N.Y. The usual space is devoted to reviews and miscellaneous intelligence, and we have some further details of papers read at the Troy meeting of the American Association.

The *Journal of Botany* for January has increased the amount of its contents by a rearrangement of its type, without any corresponding increase in price. We are glad to observe that it is intended to devote the journal more exclusively in future to British botany, thus supplying a want long felt by workers in this department. In the present number there are several articles of interest, including a description (with plate) by Mr. Worthington Smith, of a new species of fungus gathered in Messrs. Veitch's cool fernery at Chelsea; Observations on the genus *Pottia* (of Mosses), by Mr. W. Mitten; a few notes on Mr. H. C. Watson's Compendium of the "Cybele Britannica," by the Hon. J. L. Warren; and a Monograph of the genus *Xiphion*, belonging to Iridaceæ, by Mr. J. G. Baker. There is also a useful epitome of Dr. M'Nab's important paper on the "Transpiration of Aqueous vapour by Leaves," to which we have already referred; and the column of short Notes and Queries will be found interesting and valuable.

SOCIETIES AND ACADEMIES

LONDON

Zoological Society, January 3. — Professor Huxley, F.R.S., V.P., in the chair.—Prof. Flower exhibited and made remarks on a mounted skull of the Common Sturgeon (*Acipenser sturio*), from the Museum of the Royal College of Surgeons, in which the cartilaginous portions had been replaced by a wooden model. — Mr. Tegetmeier exhibited and made remarks on a specimen (in the flesh) of a female of the Great Bustard (*Otis tarda*), which had been killed on the 29th ult. near Feltham, in Middlesex.—Mr. Gould exhibited and made remarks on a skin of Lady Rosse's Touraca (*Musophaga rossiæ*), just received in a collection of birds from Loanda.—Mr. Wallace read some extracts from letters received from his brother, Mr. J. Wallace, containing remarks on the habits of a species of Lizard (*Phrynosoma*) and Rattlesnake (*Crotalus*), as observed in California.—A tenth letter was read from Mr. W. H. Hudson, on the ornithology of Buenos Ayres. — A letter was read from Mr. E. P. Ramsay, giving particulars respecting the habits of the new Australian Mud-Fish (*Ceratodus Forsteri*).—The Secretary read extracts from some correspondence between himself and Mr. G. W. des Vœux, Administrator of the Government of Santa Lucia, as to the best method of destroying the Poisonous Serpents (*Craspedocephalus lanceolatus*) found in that island.—Mr. Sclater exhibited and made remarks on the horn of the male Rhinoceros, which that animal had torn off in the Gardens on the 10th August last. —Mr. Flower read some notes on the skeleton of the Australian Cassowary (*Casuarius australis*), in which the differences between the skull of that species and *C. galeatus* were pointed out. Mr. Flower's observations were based on the skeleton of this bird, transmitted to Mr. Sclater by the Messrs. Scott, of the Valley of the Lagoons, Queensland, and now in the Museum of the Royal College of Surgeons.—A communication was read from Mr. Andrew Murray, containing some notes on the structure of the young of the Sterlit (*Acipenser ruthenus*).—A communication was read from Mr. George French Angas, containing descriptions of thirty-four new species of shells from Australia. —A joint communication was read from Dr. G. Hartlaub and Dr. O. Finsch, on two collections of birds from the islands of Savai (Navigator group) and Rarotonga (Hervey group). Several new species were described in this paper, the most remarkable of which was a new form, allied to *Gallinula*, from Savai, proposed to be called *Pareudiastes pacificus*.

Geological Society, December 21. — Mr. Joseph Prestwich, F.R.S., President, in the chair. "On Lower Tertiary Deposits recently exposed at Portsmouth," by C. J. A. Meyer, F.G.S. The author described some exposures of Lower Tertiary deposits made during excavations for the "Dockyard Extension Works" in Portsmouth Harbour. The thickness exposed, exclusive of alluvial deposits, amounted in all to 127 feet. The beds dip S.S.W., or nearly south, 2½ to 3 degrees. The author grouped them under the following divisions, in ascending order:—

1. Clays and sands with pyrites, 36 feet.
2. Argillaceous sands with *Dentalium*, 25 feet.
3. Sands with *Lingula*, 8 feet.
4. Clays with *Cyprina* and sandy clays, 55 feet.

The author indicated the fossils contained in each of these divisions, remarking upon the range of some of the species, and upon the apparent mixture of London clay forms with others usually regarded as characteristic of higher or lower beds which occurs especially in the "*Lingula* sands." He suggested that, as the species found here present some slight differences from those occurring in other deposits, the difficulty might be got over on Darwinian principles. The author considered that the fossils did not furnish any satisfactory evidence of the true position of these beds; but, from stratigraphical evidence, he regarded them as being included in group 3 and part of group 4 of Mr. Prestwich's section of the Whitecliff strata in the Isle of