tenance of this is the establishment of their primary hexamerism, and unless very weighty evidence to the contrary should be forthcoming this must now be regarded as accomplished. The facts in support of the relationship may be summarized as follows :—

1. The Rugose corals and the Zoanthid actinians have both a primary hexamerism.

2. The septa in the Rugosa and the mesenteries in the Zoantheæ are added in bilateral pairs at only one region, a vertical zone within the primary exocœles, there being four such regions—middle and ventro-lateral chambers—in the Rugosa, and two—ventro-lateral chambers—in the Zoantheæ.

3. The septa in the Rugosa and the mesenteries in the Zoantheæ are never polycyclic, as in modern corals and ordinary actinians; at most there are only two cycles of septa, large entosepta and small exosepta, disposed in such a manner as could only have been produced in polyps with a mesenterial arrangement similar to that of the Zoantheæ.

4. The presence of a ventral directive fossula in the Rugosa, usually persisting in the fully developed and otherwise perfectly radial calice, can be explained by the occurrence within the living rugose polyp of a single ventral siphonoglyph or gonidial groove, such as is characteristic of zoanthid polyps.

XXXV.—*Notes on the Habits of Tsetse-flies.*

By F. CREIGHTON WELLMAN, Benguella, West Africa.

HAVING recently had opportunity to make some observations on tsetse-flies in the Esupua “fly-belt,” about thirty-five miles inland from the seaport town of Benguella, West Africa, I present here some of my findings. Our knowledge of these flies is as yet very far from complete, and first-hand observations, including mention of the date, habitat, and species studied, should be recorded.

The following notes were a few of them made in November 1904, but most of them date from October 28th and 29th and November 9th and 10th, 1905. The Esupua “fly-belt” is, as I have said, about thirty-five miles inland from the port of Benguella (13° S. on the west coast of Africa) and twenty miles from the city of Catumbella. The fly studied by me is a subspecies of *Glossina palpalis*, Robineau-Desvoidy, which

was last year described in the Ann. & Mag. Nat. Hist. as *Glossina palpalis Wellmani*, Austen (1905) *.

Although the district in which the flies were taken was found to contain some game, including eland (*Oreos canna Livingstonei*), roan antelope (*Hippotragus equinus*), kudu (*Strepsiceros kudu*), the duyker (*Cephalolophus Grimmi*), and Speke's tragelaph (*Limnotragus Spekei*), yet I believe that human blood forms the greater part of their food. This is undoubtedly true over at least a part of the "belt." Along the north bank of the lower Katumbela River from Esupua to a point half a day's march up the river lies the great Benguella caravan-route, near which there is little or no game, but over which constantly pass great caravans of half-naked Bantus. At Esupua one may see half a dozen of these large caravans camping in one place. It is here that the flies are the most plentiful. They hide in the tall grass and sedges near the river, and also on stones, trunks of trees and vines, and among the leaves of shrubs and bushes on the bank. When a native is sent to the river for water the flies rise from their resting-places as he passes and follow him, seeking for an opportunity to bite. On several different occasions I followed natives going to the river to fetch water. One of these I saw bitten twice, three were bitten once each, and seven I did not see bitten at all. The Bantus say that the bite is painful, and I noticed that if a fly settled on a porter's back the man generally slapped himself as it began to insert its proboscis. Some of the specimens I took had abdomens greatly distended with blood. The flies do not always remain so close to the river. The first one I saw in November 1904 was between three and four hundred yards from the river in thin "desert" bush, consisting of *Acacia refeciens* and other thorny shrubs, which afford practically no shade. *Gl. palpalis Wellmani* certainly does not share the dislike for human ordure which has been ascribed to its congeners. I have frequently seen it in and around the filthiest native camps at some distance from the river and from shade, where it had evidently gone for the purpose of sucking human blood. The fly bites most viciously during the heat of the day, and, as I have said, goes considerable distances in search of food. It bites less readily in the evening and early morning. The native blacks claim that it occasionally bites at night. The one observation that I made in view of this statement leads me to suspect that it is

* Ser. 7, vol. xv., April 1905, p. 390.

not true, at least for the time of year mentioned at the beginning of these notes. All three of my visits to Esupua were made during the heaviest rains of the year, which, according to native reports, do not seem to have the effect which has been claimed for them in reducing the numbers of "fly."

I have elsewhere shown that *Gl. palpalis Wellmani* is a disseminator of human trypanosomiasis, and that this disease is unfortunately on the increase in Benguela District.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

April 25th, 1906.—J. E. Marr, Sc.D., F.R.S.,
Vice-President, in the Chair.

The following communications were read:—

1. 'Trilobites from Bolivia, collected by Dr. J. W. Evans in 1901–1902.' By Philip Lake, M.A., F.G.S.

Several horizons are represented by these fossils. Two specimens of *Peltura*, probably from the Upper *Lingula*-Flags, were collected at Cochaiya, about 3 miles north-east of Pata. New species of *Symphysurus* and *Trinucleus*, probably of Arenig age, were found about a mile from Apolo, Province of Caupolican. An indeterminable species of *Ogygia* was obtained from the right bank of the River Caca, in the same province. *Phacops* cf. *arbutus*, *Dalmanites Puituna*, and *D. Maecurua* were collected in the track from Apolo to San José de Chupiamonas, also in the province of Caupolican. The nodules from which they were derived are probably of Lower Devonian age. Descriptions are given of the new species and other forms mentioned. It is worthy of remark that, while the earlier forms show affinities with the contemporaneous European fauna, the Devonian species are much more closely allied to those of South Africa and North America.

2. 'Graptolites from Bolivia, collected by Dr. J. W. Evans in 1901–1902.' By Ethel M. R. Wood, D.Sc.

In black pyritic shales from three localities several specimens of *Didymograptus* were collected: one referable to *bifidus*, one of the type of *affinis*, and one of the *Nicholsoni*-type. *Phyllograptus*, *Glossograptus*, *Cryptograptus*, and *Diplograptus* were also obtained. A pale, silky grey shale shows also rare graptolites, belonging to a species comparable with *Climacograptus confertus*. These forms indicate that both the black and the pale shales belong to horizons in the Upper Arenig rocks (Lower Llanvirn of Hicks).