**THYSANURA,** the name applied by P. A. Latreille to the primitive wingless insects known as springtails and bristletails. Sir J. Lubbock (Lord Avebury) separated the springtails as a distinct order, the Collembola, and by many students this separation has been maintained. It is better, on the whole, to regard the Thysanura and Collembola as sub-orders of a single order, the Aptera (*q.v.*). The Thysanura are recognizable by their elongate feelers and tail-processes *(cerci). Campodea (q.v.) Machilis* and *Lepisma—*to which belongs the “ silver­fish ” *(q.v.)—*are the best known genera. (See also Hexapoda and Aptera.)

**THYSSAGETAE,** an ancient tribe described by Herodotus (iv. 22, 123) as occupying a district to the north-east of Scythia separated from the Budini by a desert seven days’ journey broad—perhaps the Voguls. From their land four rivers flowed into the Maeotis, but as one of them, the Oarus, is almost certainly the Volga, there must be some mistake about this. They seem to have held the southern end of the Urals about Ufa and Orenburg. (E. H. Μ.)

**TIAN-SHAN,** or Celestial Mountains, one of the most extensive mountain systems of Asia. In the widest accepta­tion, the system extends from the E. edge (in about 67° E.) of the Aral-Caspian depression in the W. to the great bend of the Hwang-ho (about 103° E.) in the E. The Chinese geographers, however, appear to have confined the term to that part of the system which falls between the conspicuous mountain-knot of Khan-tengri (80° 11' E. and 42° 13' N.) and the Otun-koza or Barkul depression in 92°-93° E., where the northern ranges of the system abut upon the Ek-tagh Altai; and this conception and limitation of the term are more or less accepted by some Euro­pean geographers, *e.g.* Dr Max Friedrichsen and G. E. Grum- Grshimailo. On the other hand P. P. Semenov (or Semyonov), one of the earliest scientific explorers of the system, applies the name to the ranges which lie immediately west of Khan-tengri, including Khan-tengri itself. The Tarbagatai Mountains and their north-western continuation, the Chinghiz-tau, are some­times considered to belong orographically to the Altai system; but there are good reasons for regarding them as an independent range. Excluding these mountains, the northernmost member of the Tian-shan system is the Dzungarian Ala-tau in 45°- 45° 30' N. The southernmost range is the Trans-Alai, or rather its W.S.W. prolongation, Peter the Great Mountains in Karateghin (Bokhara), though some geographers *(e.g.* Max Friedrichsen) assign both the Alai and the Trans-Alai Mountains to the Pamirs.

*General Orographical Description.—*The Tian-shan consists almost everywhere of “ sheaves ” of parallel ranges, having their strike predominantly east and west, with deflexions to the W.S.W., west of Khan-tengri and to the E.S.E., east of 92° E., thus describing as it were a wide flattened arc open to the south. The principal constituent ranges are accompanied by another set of ranges which break away from the main axes in a westerly or even in a north-westerly direction. In the east, where the system is narrowest, the predominant feature, at least as far west as 87° E., the longitude of the Bagrash-kul, is the Pe-shan swelling, with its flanking ranges, the Chol-tagh on the north and the Kuruk-tagh on the south. North of the Chol-tagh and west of Barkul and the depression of Otun-koza (alt. 2390 ft.) the principal constituent ranges are the Bogdo-ola, continued west and north-west in the Iren-khabirga, the Talki Mountains and the Boro-khoro, flanking in succession the great depression of Dzungaria on the south. South of this last line of elevations comes the depression of Kulja or Ili, cutting deep and far into the outer edge of the great plateau of central Asia. This again is bordered on the south by another series of ranges, the Narat Mountains and the Tömurlik-tau. The last bifurcates into the Trans-Ili Ala-tau and the Kunghei Ala-tau, skirting the north shore of Lake Issyk-kul. The west continuation of the Kunghei Ala-tau is the Alexander range, which in its turn bifurcates into the Talas-tau and the Kara-tau, this last stretching far out into the desert beside the Syr-darya. South of Lake Issyk-kul, which appears to be a hollow of tectonic origin, runs the Terskei Ala-tau, separating the lake from the high valley of the Naryn. On the south side of the Naryn valley comes the Kokshal-tau, called also in part the Boz- adyr, striking south-west from the Khan-tengri knot and terminating in the Terek-tau (40° 30' N. and 74°-76° E.), at which point the system again bifurcates, the Ferghana Mountains running away from it towards the north-west until it, or rather its prolongation the Uzun-tau, strikes against the Talas-tau. From this latter point, again, the Chotkal-tau strikes away to the south-west, screening the

valley of Ferghana against the Aralo-Caspian desert. The other arm of the bifurcation, situated farther south, and beginning at the Terek-tau, is double; it consists of the Alai and Trans-Alai ranges, continued westwards in the Karateghin, Zarafshan, Hissar and Turkestan ranges, though orographically the Trans-Alai ought probably to be described as the border-ridge of the Pamir plateau. Thus the Tian-shan is as a whole narrowest in the east and spreads out fan-like in the west.

*Khan-tengri and the Central Tian-shan.—*The peak of Khan-tengri, which according to Max Friedrichsen’s observations is not so high as had generally been supposed, being 22,800 ft. instead of 24,000 ft., stands, not on the main watershed of the central Tian-shan, but on a spur which projects front the watershed towards the south west. The loftiest summit on the actual watershed, according to G. Merz­bacher, is a peak to which he has given the name of Nicholas Mikhail­ovich ; its altitude he puts at 20,670 ft. But the general altitude of the crest of the watershed he estimates at about 16,500 ft., and it is overtopped by peaks *(e.g.* Dr von Almasy’s peak Edward VII.) rising 3000-3500 ft. higher.

Closely connected with the Khan-tengri knot are the Khalyk-tau on the east, and on the west three diverging lines of elevation, namely the Terskei Ala-tau or Kirghiz Ala-tau, overhanging the south shore of Issyk-kul; the Kokshal-tau, stretching away south­west as far as the Terez Mountains between Kashgar and Ferghana; and, intermediate between these two, the successive ranges of the Sary-jas, Kulu-tau, and Ak-shiryak. The snowy chain of Khalyk- tau is highest in the north and west and sinks gradually towards the south and east. The highest parts of the range have generally an east-west strike and the range itself is continued east in the Kokteke (12,300 ft.), with the Kui-kuleh pass at an altitude of 11,500 ft.

From Issyk-kul there is a sharp rise of 6000-9000 ft. to the snow­capped ridge of the Terskei Ala-tau, the peaks of which ascend to 15,000-16,500 ft. and even reach 18,000 ft. At this part the system as a whole has a breadth of 150 m. The Terskei Ala-tau forms a sharply accentuated, continuous, snow-clad range. According to I. V. Mushketov it is continued westwards in the Son-kul (alt. 9,500 ft.) of Baron Kaulbars, the Kara-kol, and the Suzamir-tau, until it abuts upon the Talas-tau. The country immediately south of the Terskei Ala-tau consists “ of broad, shallow basins running east and west in *en echelon* pattern, and lying at 10,000 ft. Between them and bordering them run from five to seven ridges as broad as the basins and rising by gentle slopes to 13,000-16,000 ft. The ridges rise by long, gentle slopes to flat summits, where often for many miles the sky-line is an almost straight crest, from which the rounded slopes of pure white snowfields descend towards the basins. The crest line is notched by high passes only 1000-2000 ft. below the top of the crest. Oftener the summit of the ridge is broken into individual mountains, broadly flat-topped and of nearly equal elevation. . . . (Since late Tertiary times) erosion has had but little effect in altering the country from the state to which it was brought by the uplifting and warping of the old peneplain. The result of these geological changes is that, although the internal structure of the Tian-shan region is highly mountainous, its external appearance, or in other words its geographical aspect, is that of a plateau.” @@1 The passes over the Terskei Ala-tau and the plateau country to the south lie at great altitudes—at 13,560 ft. in the Kulutau; at 13,800 in the Bedel pass, 12,400 in the Kubergenty, at 12,600 in the Terekty, and at 14,440 in the Jan-art pass—all in the Kokshal- tau; the Terek pass at 12,800 ft., and the Turugurt at 12,730 ft., both in the Terek range; the Barskoun at 12,000 ft., the Suka or Sauka at 11,650 ft., and the Jauku at 14,000 ft. in the Terskei Alatau; and the Tez at 11,800 and the Akbel at 12,000 ft., both in the Sary-jas; while the pass of Muz-art, on the east shoulder of the Khan-tengri, necessitates a climb of 12,000 ft. or more. The snow­line on the Terskei Ala-tau runs at 11,500 ft. The summits of the Kulu-tau or Kyulyu-tau reach 13,700 to 14,750 ft.; those of the Ak-skiryak 15,000-16,000 ft., overtopping by some 2000-3000 ft. the plateau or highland region which forms the water­parting between the Tarim basin on the east and the Syr-darya catchment area on the west. The Kokshal-tau, which consists of several parallel ranges, is truly alpine in character and bears large glaciers, which send out polyp-like arms into U-shaped valleys, behind which the mountain peaks tower up into sharp-cut, angular “ matterhorns.” The loftiest range is that to the north, which exceeds 16,000 ft., and the altitude increases generally from west to east as far as the Bedel pass in 78° 30' E., where the road crosses from Ak-su and Uch-Turfan to the valley of the Naryn and Ferghana. At its south-western extremity the Kokshal-tau merges in the Kokiya Mountains (16,000-18,000 ft.), which at their other end are met by the Alai Mountains and the Terek-tau.

*Eastern and Northern Tian-shan.—*The mutual relations and exact orographical connexions of several of the ranges east and north of the Khan-tengri group are not yet elucidated. The region east of the Barkul-Hami route was in part explored in the closing years of the 19th century, by P. K. Kozlov, V. A. Obruchev, the brothers G. E. and Μ. E. Grshimailo, V. I. Roborovsky and Sven Hedin. The system is known there locally as the Barkul Mountains and the

@@@1 Ellsworth Huntington, in *Geog. Journ.* (1905), pp. 28 seq.