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Abstract

Results of a recent detailed geological survey and mapping of the region near Sonceboz in the Jura mountains, Canton of Berne, Switzerland.

In the northern part of this region one observes the transition of the Sonnenberg anticline into the Montoz chain, and in the southern part one finds the eastern continuation of the Chasseral uplift. Between the anticlines of Sonnenberg and Montoz in the north and the Chasseral anticline in the south lies the synclinal valley of the Suze stream.

A. Stratigraphy.

D o g g e r. The oldest formations are the areno-calcareous Blagdeni beds appearing along the deeply eroded crest of the Chasseral anticline. They are overlain by the „Hauptrogenstein" principally made up of oolites (Rogenstein), this being the oldest exposed member in the Montoz anticline. The „Hauptrogenstein" is generally subdivided as follows:

Upper Hauptrogenstein (55 m)
Homomyan Marls (10 m) = Bathonian
Lower Hauptrogenstein (40 m) = Bajocian

The Callovian representing the top of the Dogger is subdivided in:

„Dalle nacrée" (12—14 m) thin bedded spathic limestone
Callovian Marl (8—10 m) sandy marly clay with intercalations of ferrugineous oolite
„Calcaire roux sableux" (18—21 m) spathic oolitic limestone

M a l m. The Oxfordian pinching out southward, consists of the Chasseral chain of marly clay 0,3—0,6 m thick. In the Montoz chain its thickness increases towards the east and can be subdivided in

Renggeri Clay
„Terrain à chailles" (marls with large concretions).

The Argovian is developed in true argovian facies in the whole region and may be subdivided in:

Effinger Beds (blue-grey marl)
Birmensdorfer Limestone (light coloured marly limestone)

The Sequanian shows a most variable lithological composition. The lowest beds consisting of coralline limestone serve as key horizon. They are overlain by a marly series (24—30 m) probably corresponding to the Natica Marl of the lower Sequanian. The middle Sequanian begins with the „Mumienbank", a limestone layer full of giant oolites (up to the size of a walnut). Then follow alternating marls, dense, oolitic and spathic limestones. In the upper Sequanian well bedded and dense limestones lead to the Verena Oolite, a typical chalky-white limestone assumed as boundary horizon against the Kimeridgian. The big series of Kimeridgian (150—180 m) shows a succession of homogeneous thick-bedded limestones ending with the buff Virgula Marls (0,25 m) named after the guide fossil Exogyra virgula Goldf. Where the Virgula horizon is not observable the boundary against the Portlandian is defined by a distinct layer crowded with Nerineas and therefore known as „Grenznerineenbank" (1 m). The thinner bedded limestones of the Portlan-

dian may easily be mistaken for those of the Kimeridgian. Some layers display characteristic dim limonitic stains (Fleckenkalke). Erosive overlap of Eocene age caused the irregular thickness of the Portlandian.

Tertiary. Freshwater limestone and marls observed in the syncline of Corgémont and the southern Tertiary basin of Tavannes are of middle Oligocene age (Chattian = Delémontian). A local limited occurence of lower shell-sandstone east of Tavannes is of Miocene age (Burdigalian). Quartz sands of younger Pliocene or older Quarternary age have been found on the Montagne du Droit.

Quaternary. During the Riss stage of the Pleistocene the whole area was covered by the Rhone glacier. Numerous erratic blocks, remains of moraines and Pleistocene gravels prove the former glaciation.

B. Structure.

The detailed geological survey again shows that the structure of the Jura ranges is more complicated than has been anticipated. Frequently disharmonic folding of Dogger and Malm is observed, in which case the Effingermarl (Argovian) serve both as gliding horizon and medium of compensation. Great faults and overthrusts have not been noted in our area. An interesting zone running north and south in which folds die out or plunge down and are reborn is probably caused by (Older Tertiary?) crossfolding of the Jura mountains trending north and south. In our region the morphological features on the whole correspond to the structure.

The structural elements have been illustrated by a series of sections, a structure map, a tectonogram and two photos. We distinguish:

The Chasseral range enters our area in the west as a compound fold consisting of a main fold and three minor adjacent folds. Of the latter the northernmost is described in this paper for the first time. It shows a crestal thrust fault. In the southwest of Sonceboz the minor folds plunge down into the La Heutte syncline. On the northern part of the Chasseral range, southwards of Sonceboz, a hitherto unknown outcrop of the Sequanian appears on the eroded axis of the second minor fold. The main fold leaves our region in the west as a normal anticline trending ENE, its axis plunging eastwards. In the west of Corgémont the Corgémont syncline forms the broad valley of the Suze creek, rapidly narrowing eastwards. Hence rise, east of Sonceboz, the southern structural elements of the Montoz range.

The Sonnenberg range bifurcates at its eastern end. West of La Tanne the La Rochette anticline bending northwards parts from the main fold and leaves our area. This symmetrical anticline plunges into the Tertiary basin of Tavannes north of the Pierre Pertuis. The main anticline of the Sonnenberg range shows a strong axial pitch towards the Pierre Pertuis depression, here joining the eastwards rising Montoz range. On the southern limb of the Sonnenberg anticline NE of Corgémont disnarmonic folding caused overturning of the strata.

The basin of Tavannes. No structural complications were observed in the southern part of the Tavannes Tertiary basin.

The Montoz range starts in the west with 3 anticlines. The nor-

thernmost, named Grimm anticline, rises east of the Pierre Pertuis and forms the continuation of the Sonnenberg range. The middle one, known as Brahon anticline develops into the true Montoz anticline rising out of the Corgémont syncline. The southernmost anticline (Châtillon anticline) also has its beginning in the Corgémont syncline. Near Brahon the Grimm and Châtillon anticlines join the southern and northern limbs of the Montoz anticline forming one unit. Disharmonic folding caused very complicated structures in the N- and S-limbs of the Montoz anticline. This interesting fact has not been mentioned before.

The La Heutte syncline between the Chasseral and Montoz ranges is separated from its eastern continuation, viz. the Corgémont syncline by the Châtillon anticline forming a cross barrier.

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