

In the course of a local study on the Middle Lias in Swabia, he proved himself to be an excellent observer and able palæontologist. He then visited the famous "Jurassic" localities in France and England, and endeavoured to compare not only the main sub-divisions, but also the smallest groups of strata in the different areas by means of the fossil species occurring in them. Setting aside all lithological features, Oppel deduced from his observations a series of palæontological horizons which he termed *Zones*, each of which represented the definite age-limit of some leading fossil type or types. "*A Zone*," he says, "*is characterised as a definite palæontological horizon by the constant occurrence in it of certain species which do not occur in the preceding or succeeding neighbour zones.*"

Oppel accepted Buch's division of the Jurassic system in three main groups as the foundation of his own detailed sub-division. He retained the English term *Lias* for the lowest division, proposed the name *Dogger* for the middle division, and *Malm* for the upper division. These names had already been used in England for rocks of different age; and D'Omalius Halloy had applied *Malm* to a division of the Cretaceous formation. The three main groups were sub-divided by Oppel in eight zones, which agree in the essential features with those suggested by D'Orbigny, and for which he retained D'Orbigny's nomenclature. He, however, modified D'Orbigny's zones in so far as to omit the "Corallien" and "Portlandien," on the ground that they were local facies of the "Oxfordien" and "Kimmeridgien." Oppel's sub-division of the whole Jurassic system embraces thirty-three zones, each of which is characterised by a particular fossil type.

Oppel's admirable work, published in 1856-58, was received very favourably throughout Germany, France, and England, the cordiality of the reception being not a little increased owing to the general regard in which the author was held. In France, D'Archiac took objection to certain points, but Jules Marcou, always ready for a scientific debate, lent ardent support to Oppel, and the controversy soon collapsed. Marcou had previously published a local monograph on the Jura near Salins (1848). In it he had accepted the divisions

compare the Jurassic deposits with one another; in 1858 was attached to the staff of the Palæontological Museum in Munich, in 1860 was appointed Professor of Palæontology, and in 1861 Director of the Palæontological Collection in Munich; died in 1865 from typhoid fever.