

## c16 Geologic systems < Werner, Flötz >

The truth resides in the rocks. — John Ramsay

There is nothing as sobering as an outcrop. —Francis Pettijohn

(—remarks recalled by Robert Millner Shackleton (1909-2001) and quoted by John Dewey).<sup>1</sup>

The geologic column that has become standard was put together in England, where also Werner's *Geberge* (formations) had their described elevation-of-outcrop correlation with the scenery (**Figure c16.1**). The initial subdivision used Arduino's numbering scheme for rock-time units:

Tertiary: *Eastern coastal plain* – Alluvial.

Secondary: *Midlands* – Flötz (chalk, limestone, shale, coal, and sandstone).

Primary: *Highlands of Wales, Devon & Cornwall* – Transition (graywacke) & Primitive (crystallines).

The problem then became how to subdivide these further.

Locally, distinctive strata could be traced and correlated. One or more of these together with less distinctive conformable strata in a succession comprise a rock unit called a *system*. Systems were originally named for the most distinctive stratum in each. The hope was that systems would prove to have worldwide significance in the Wernerian sense of being lithologically distinctive units that also indicated age. Findings did not support that possibility. However, using the principle of superposition, correlatives of the named systems were found which have fossils that allow the time each records to be recognized globally. The *type area/locality* (stratotype) of such fossiliferous systems is the geographic area where it was first described. Most systems were renamed for their type area. Systems are now defined as *time-stratigraphic units*. *Series* and *stage* are successively lesser subdivisions of a system.



**Laurence Louis (Larry)  
Sloss** (1913-1996)

**Figure c16.1**<sup>2</sup> Physiographic map of England and Wales with areas indicated that, two hundred years ago, were understood in terms of Werner's scheme for recognizing by bedrock composition and elevation his universal geological formations (and economic potential): Alluvial gravel, sand, clay (potteries), Flötz chalk, sandstone, shale, limestone, trap, coal (collieries), Transition graywacke, slate (ore poor), and Primitive granite, gneiss (stannaries).

The systems that were first described by English geologists in the 19th century are now those of the standard geologic column. As these span the entire time for which fossils have been a visible component of the rock record, other systems that have been described elsewhere since, lack priority. In other words, **Sloss'** six "sequences" (*see Topic j24*), which are the most natural subdivisions for time recorded by the fossiliferous strata in North America, could have been the "systems" recognized around the world had the geologic column been pieced together first in North America. But history is what it is. □

