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System Earth in geographical sciences

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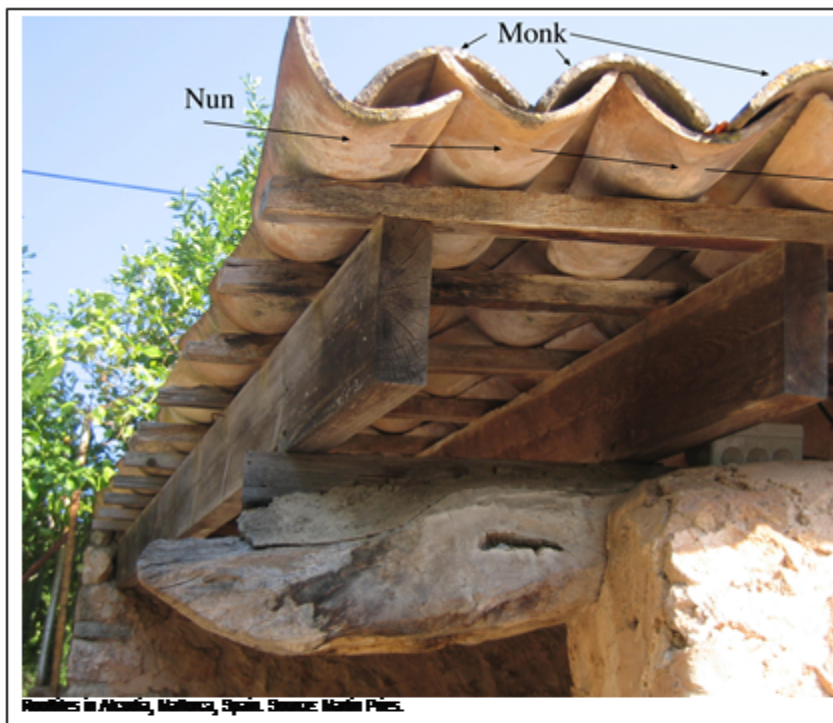
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Geographical research is focused on nothing less than the Earth. Geographers of the 20th century wanted to find out, how spatial systems work, could be explained or even developed. An important theory for geographical research was developed by Alfred Hettner. Since 1894, Hettner was professor for geography in Leipzig. He founded the international well-known magazine "Geographische Zeitschrift". His theory for research implicated the analysis of six aspects of space: geology, morphology, climate, flora, fauna and men. His field of research was to identify single elements in the landscape and their influence on the whole system. He tried to analyse the causality and influence of the six aspects and their significance for instance for the possibilities to make a living, economic abilities and even cultural expressions.

To give an example: the German Ruhrgebiet is well-known for its steel and chemical production. It became the industrial center of Germany because coal was found near the surface. To produce steel, about 3 tons of coal and 1 ton of iron ore were needed, so it made sense to transport the ore to the coal. The river Rhine was used for transporting ore from harbour cities at the North sea to the Ruhrgebiet. Coal had to be refined into coke before using it in the smelting process. Making coke produces flammable gas and tar oil. The gas was used for streetlights, the tar oil was the resource for chemical industries. Geological facts, the good transport system river Rhine, a humid climate to produce food for the workers were the basis for the development of this industrial area.

Another example: typical roof tiles in Mediterranean countries are called monk and nun (see photo). The main characteristic of the structure is the space between the tiles which allows air to flow through. When the hot sun heats up the tiles, air begins to circulate underneath the structure and the fresh air cools down the roof. These tiles are useless in North Europe, because the climate is much rougher, cold, windy and rainy. Wind would blow water or snow under the roof – not the idea of roofs. You can draw a line through countries around the Mediterranean sea. It is defined by

climate and not by culture. South of the line, the positive effects of this construction dominate and the tiles were used, north of it different tiles were used.



Hettner's theory helps to think in systems and to explain many structures of space. But there are no questions of research which help to solve recent problems. Even the structure of space cannot be explained properly any more. Today, steel is produced mostly in harbour cities, food production is no more essential to survive at a spot, and instead of roof tiles we use good isolation and an air conditioner.

Hettner's theory was refused in German geography in the 1960s and almost forgotten. Geographers specialised in for instance economic, touristic, mobility, urban, social, industrial and even feminist geography and used empirical studies to develop proved theories. Statistical methods and the computer seemed to be the solution. In recent years, in many sciences a new scepticism spread out. Pressing human behavior in numbers and figures did not produce satisfying answers. With the idea of postmodernism in philosophy, a new way of thinking in science was recognised as "turn". In cultural geography the "spatial turn" opened the road for qualitative and hermeneutic methods and new questions.

Research was made for instance on cultural behavior of people in different cultures, divided cities, shared space in traffic, aspects of local governance, the symbols of cities, artificial spaces like Las Vegas, how people are affected by natural disasters, global warming or the rising sea level.

All these questions can only be answered by remembering Hettner. The model of the DGfG (German Society for Geography) illustrates this "new" old aspect. [1] It shows that different systems influence natural and human systems. This is not a roll back to Hettner's old theory but a

good argument to keep in mind that problems can only be answered by thinking of Earth as a complex system.

References

[1] In: Deutsche Gesellschaft für Geographie (ed.) 2008: Bildungsstandards im Fach Geographie für den mittleren Schulabschluss. Bonn, p. 11.