

FUN AND GAMES IN LEARNING HOW TO READ MAPS

Hans-Uli Feldmann
Bundesamt für Landestopographie

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What is a map?

A map is a form of graphic communication designed to convey information about the environment. It provides a scaled-down view of reality, extending the observer's range of vision so that he sees before him a picture of a portion of the earth's surface. A major function of maps is to assist in the determination and understanding of geographical or statistical phenomena located in their natural spatial relationships.

Today, maps are an integral part of daily life. It is difficult to avoid being confronted with maps even during the daily routine. We find them in the morning paper, where small black-and-white maps serve to locate and explain some significant contemporary event. At home in the evening similar colored maps face us on the television screen, for instance for the weather forecast.

In the early days of mapmaking, maps were simple in content, doing little more than locating coastlines, rivers, hills and settlements, and they were easily understood. Today, however, maps have become increasingly complex - due partly to improved reproduction methods and technology and partly to the wealth of information to be mapped - and they are therefore sometimes extremely difficult to analyze.

The limitations of maps

One of the important things to understand about maps is that however great their degree of sophistication, they are subject to unavoidable restrictions. One of these is selectivity: unlike aerial photographs which record everything seen by the camera, maps are selective views and the compiler has to decide which features he would like to include and which must be omitted. Any map is therefore a generalized, subjective view of reality. Natural features have to be represented with different, sometimes abstract lines, symbols and colors.

Thus it is very important that each map is supplied with an easily understandable legend. Unfortunately, map legends are often too abstract for amateurs. Here three examples:

- Swiss National Map series (legend printed on the back of the map because of lack of space, and only monochrome to keep the costs down. The color of the different symbols is mentioned in writing). A better solution is the separate leaflet Conventional Signs which features the symbols for the scales 1:25 000, 1:50 000 and 1:100 000 in their true colors.
- Topographic map series 1:50000 of Germany (leaflet with symbols shown in combination with their "map-surrounding", sometimes documented with a bird's-eye-view).
- Topographic atlas of the Grand-Duchy of Baden, Germany, 1:50000, published 1835 -1854 (legend and size of lettering in the form of a map - an interesting example of how they tried to solve this problem 150 years ago).

Learning how to read maps

There is no witchcraft involved in reading maps, but some practice is required just the same. As with all things in life, it is easier when map-reading skills are learned early and in a playful manner. The use and handling of maps comes naturally and the dread of becoming lost never even arises. The individual steps in the learning process, however, should be adapted to the abilities of the student. Map reading should always be fun!

The greatest problems encountered when learning how to read maps are:

- the unusual vertical perspective
- the third dimension in the representation of hilly terrain
- the small scale, making it hard to judge distances

- the often abstract symbols

For getting started there are all sorts of aids which in the last few years have been supplemented by electronic media. The emphasis here will be on the conventional aids because map reading is ordinarily learned in groups, and for terrain interpretation it normally takes place outside. Computers for map-reading courses on CD-ROMS are usually not available for general teaching in primary schools and in poorer countries.

Teaching concepts

In Swiss schools, children are about ten years old when they are confronted with their first map-reading lessons. At the age of 12 to 15, they get some experience in orientation running. Some of them also join the scouts where map reading is quite an important part of their field exercises. And last but not least, in the army (which is compulsory for every able-bodied Swiss male), there are additional contacts with topographic maps. The result is that quite a lot of the Swiss can't hike or drive without consulting a map, which of course is profitable for map producers such as the Swiss Federal Office of Topography. No other country prints such large editions per sheet as Switzerland does.

The first lessons should be devoted to converting objects into a symbol. A child should have fun in learning the different symbols. Games such as Memory are a suitable method, whereby the skill of memorizing is trained at the same time. Here the player has to search for pairs of map symbols printed on small squares of cardboard. The cards are laid on a table face down and the player is allowed to turn over two cards only. If the two do not match, he has to put them back and memorize their shape and position (Figure 1).

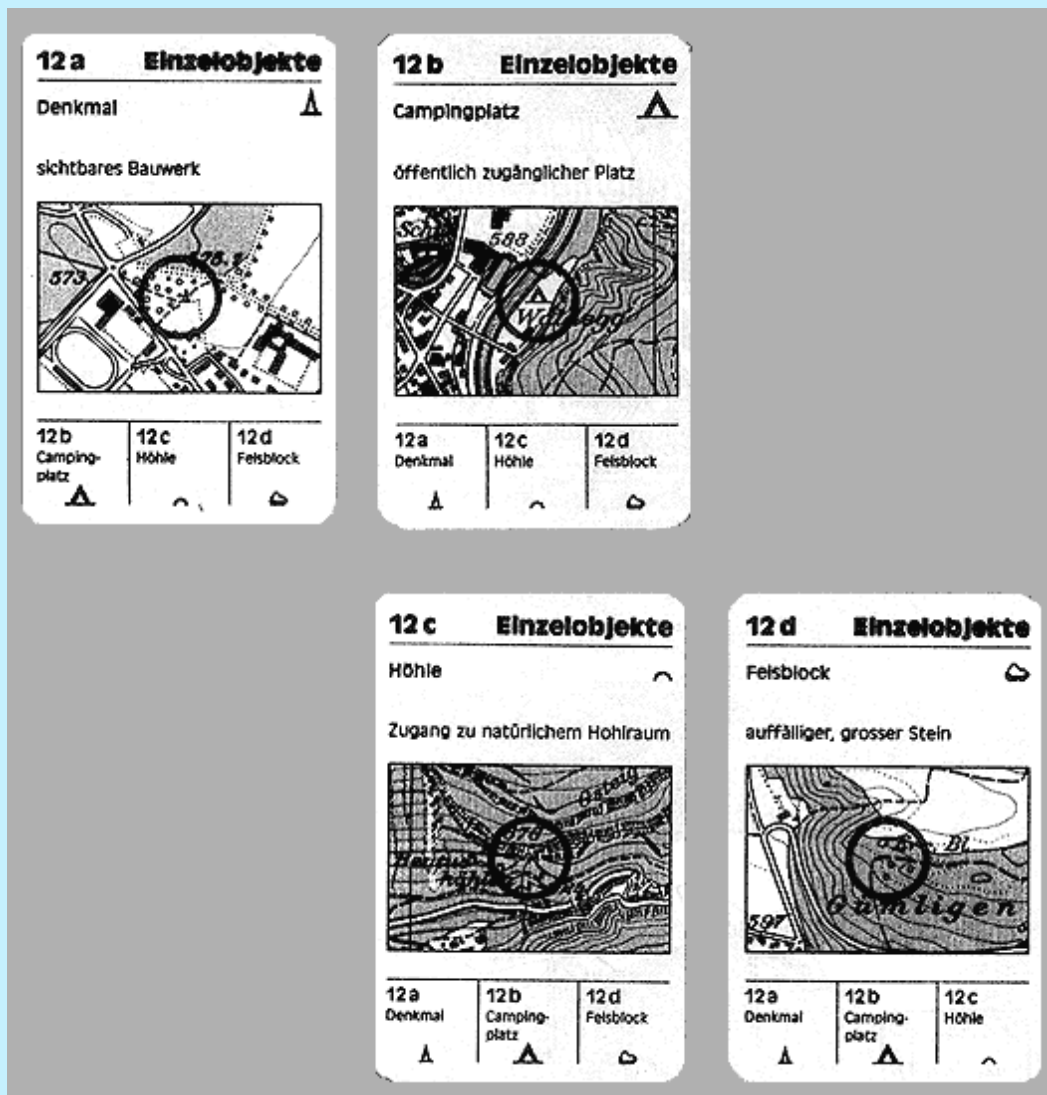


Figure 1: Quartet card game (Swiss Federal Office of Topography, Wabern). 52 conventional signs of the National Map series 1:25 000.

The next lesson should show the function or representation of a symbol on the map. An isolated symbol is often too abstract. In combination with its natural surroundings, however, it can be understood much more easily. Another practical card game called quartet shows the different symbols in groups or families of four. Examples of such groups are roads, railways, boundaries, buildings, vegetation features. Each card always shows all 4 symbols which look similar but have a different meaning. A dotted line, for instance, can represent a boundary, a stone fence, a dry creek bed or a shooting range.

A further exercise could be finding the differences, where two similar map images are compared. The analysis of individual symbols and their interpretation is a good exercise for groups.

A first experiment to test the learned material could be to have each child draw his way to school. The results are very interesting because the individual, subjective perception of each child comes to light. Dangers and special incidents like a barking dog or a road crossing characterize the representation and provide results that even adults could not develop better.

Converting three-dimensional terrain into an artificial, two-dimensional map often causes immense problems. The following lessons and exercises can be applied:

- drawing cross sections based on contour lines
- making a relief model (modeling clay or cardboard) - placing streams logically on contour line maps
- interpreting a digital height model

In Swiss schools map reading is often taught in combination with orienteering competitions. This sport was developed in Scandinavia about 80 years ago. The point is to get from start to finish on foot in the shortest possible time with the aid of a map and compass. Each competitor must pass previously designated stations in a particular order.

A special type of international map has been created for orienteering races. Forests are left white, open or built-up areas are yellow. For competition races the scale is usually 1:15 000, in mountainous areas sometimes 1:10 000. For beginners, large-scale maps at 1:1 000 or 1:2 000 are often made of school yards where children can get their first practical experiences in more or less familiar surroundings. It is important that children experience a sense of achievement. It doesn't make sense to ruin a child's motivation and joy with difficult runs at this point (Figure 2).



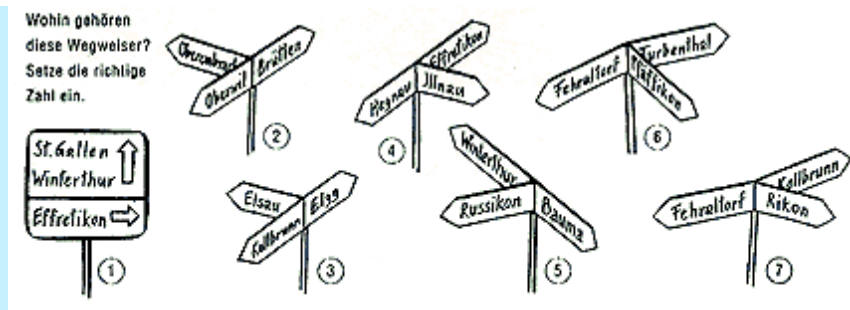


Figure 2: Karten lesen - Wege finden (sabe Verlag, Zurich) Exercise book for students, page 37.

Later on, more difficult races can be carried out in neighboring forests. Different variations could for example be using natural features (such as streams, ditches or forest boundaries) as so-called guidelines, scoring competitions (running to as many posts as possible in a given time), races with one point of origin and different rays leading from it (using a compass) or races where the analysis of possible circumnavigation routes of obstacles is essential. Two very difficult exercises for map reading are walks or races using a map showing only contour lines, or one on which certain areas have been cut away or blacked out. One has to find his way with the aid of only very few details.

Children should be motivated to racing individually as soon as possible. Experience shows that at this age they are usually not able to help each other and that normally the better ones take the lead and the weaker ones follow along without improving their own ability.

It is of importance that school-aged children begin with large-scaled maps that are photographically enlarged. Children up to 14 years old and adults over 40 usually have trouble reading small-scaled maps due to physiological reasons.

Our newest teaching aid for map reading is a CD-ROM with a professionally created program called Swiss Map Trophy, which can be used by children as well as adults. The trophy can either be won on foot, in which case a topographic map at the scale 1:25 000 is used, or by car, where the road map at the scale 1:200 000 is used. The drive takes you through beautiful countryside, or you hike over passes and summits to enjoy breathtaking panoramas. All map reading aspects like scale, contour intervals, directions, distances, symbols, colors and styles of type are cleverly packaged into learning steps (Figure 3).

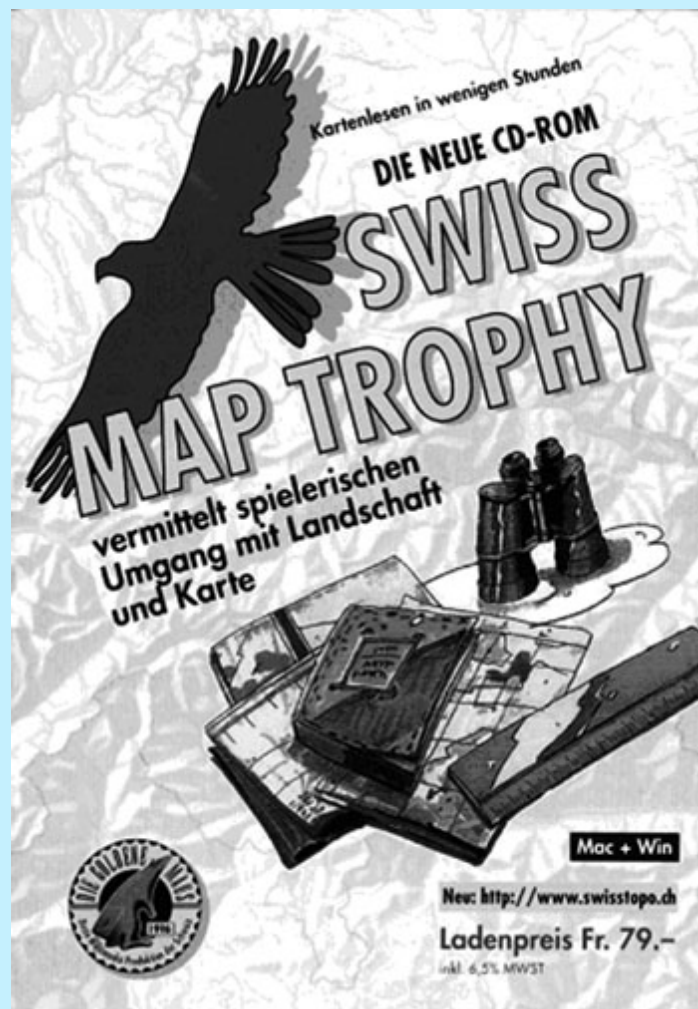


Figure 3: Swiss Map Trophy (Swiss Federal Office of Topography, Wabern). The set consists of a CD, two maps, leaflet "Conventional Signs" and "rapex" an instrument for measuring coordinates. Screen shot of the map reading game 1:200 000.

The average inexperienced map user consults an atlas primarily to find place-names and thus rarely uses any other than general or political maps. Having learned the ability to read topographic maps, interpreting other thematic maps such as street maps, city maps, economic maps, aeronautical charts or geological maps should pose no further difficulties - on the contrary! If the user knows how to deal with topographic maps, he only needs an initial impulse to become aware of the different types of analytical and synthetic maps that exist. But most important is that a motivated map reader is now able to analyze which one of two different maps is more reliable, and he becomes aware of the accuracy and actuality of a map. Finally, it can be said with confidence that a map is chosen not for its low price tag but for its quality.

References

Conventional Signs. A free leaflet (size A5) containing all symbols for the National Map series of Switzerland 1:25 000, 1:50 000 and 1:100 000. Languages: German, French, Italian, English. *

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*All items marked with * are available at: Swiss Federal Office of Topography, CH-3084 Wabern.*