

## SZKOCJA W SZKOCJI (SCOTLAND IN SCOTLAND)



*campaign to restore*

# General Maczek's GREAT POLISH MAP OF SCOTLAND

## SZKOCJA W SZKOCJI

*Janusz Szewczuk describes the building of the Great Map*

On the 3rd November 2004, Prof. Dr Kazimierz Trafas passed away unexpectedly. He was a very colourful character; a person of indisputable authority in cartography and remote sensing, he created many theoretical and practical projects and saw them to fruition. There is one project in his diverse output that has never been acknowledged.

It was in the 1970s; the decade of Edward Gierek [4th First Secretary of the Polish United Workers' Party]. Gradually it became apparent that the PRL [People's Republic of Poland] was becoming open to the world; Coca-Cola became available for the first time. A Swedish company built the hotel "Forum" in Warsaw, Pewex stores began operation [allowing western goods to become available to all]; Polish emigrants visited the motherland more often. At this time Prof. Mieczysław Klimaszewski (director of the Institute of Geography at the Jagiellonian University, rector of the Jagiellonian University) became deputy Chairman of the National Board as well as chair of the Main Board of the Association for Communications with the Polish Diaspora "Polonia". During one of the conventions on the Polish Diaspora, a UK citizen came to the professor of geography with an unusual proposal; the creation of a three-dimensional map of Scotland in a garden.

The idea came from Mr. Jan Tomasiak, a businessman resident in Scotland. He was born in Krakow, became a builder by trade and a UK citizen by choice. After the defeat in 1939 he found his way to England, where he joined the newly organised First Armoured Division under General Stanisław Maczek. He fought his way through France, Belgium, Holland and Germany, on to Wilhelmshaven. At the end of the war he returned to London before moving to Edinburgh. After years of hard work in the hotel industry he became a Hotel proprietor. In the late 1960s he acquired a hotel and estate, "Barony Castle" in the Scottish border county of Peeblesshire, about 25 kilometres to the south of Edinburgh. Barony Castle has over 10 hectares of land on the western side of the Eddleston valley in the Black Barony area that rises 100 metres from the valley floor. Located between the Moorfoot and Pentland Hills; the property included forests, pastures and gardens, and last but not least; there was the splendid castle built in 1536. Why did a Polish man buy a Castle in - for average citizen of Poland - far off Scotland? And why did he need to build a concrete map of Scotland in front of the castle?

The history of the Poles and Polish military organisations during World War II in Western Europe were carefully concealed during the years of PRL. [Communist rule]. From September 1940 until the summer of 1944 and the D-Day offensive, Barony Castle (also known as Blackbarony House, Blackbarony Hotel) became the headquarters of the 10th Armoured Cavalry Brigade commanded by General Stanisław Maczek- later

reorganised to become the 1<sup>st</sup> Armoured Division. After the September Defeat (1939), many Polish soldiers headed to the Castle through Romania, the Near East, Morocco and France avoiding zones controlled by the Third Reich. The Castle became a strategic centre for the defence of Scotland against the anticipated invasion by the Nazis from Norway. The Poles were given the task of defending the shores, patrolling and installing anti-tank obstacles along beaches from Inverness to Berwick. In Barony Castle, the defence plans of the entire UK were created. Defence plans for Scotland were formulated on the special Topographic Map built in the Castle's southern courtyard. The Topographic map was made by Polish engineers from the First Armoured Division in the winter 1940-41 as a tool for strategic planning. The Map's size was about 60 x 50 meters; it had roads and railways marked, as well as small brass miniatures indicating the locations of Army, Navy and Air Force units. After the War many of the miniatures were lost or taken as souvenirs by Polish soldiers. Local residents believe that the Map was built as a proof of gratitude to Scottish citizens.

Jan Tomasik was one of Maczek's troops, billeted at *Barony Castle*, and had seen the huge map of Scotland. Therefore, it was not surprising that after many years he wanted to come back to the place where Polish Armed Forces had been resurrected in this foreign land. In his plans, he wanted to celebrate Barony Castle's part in modern Scottish history and the Polish contribution to it. He wanted to recall the glories of the past as well as to restore the Map of Scotland in the Castle's gardens.

Prof. M. Klimaszewski told his assistants, Kazimierz Trafas and Roman Wolnik, about his conversations with Jan Tomasik. Construction of the Map of Scotland in large scale, in the open air, using unconventional cartographic methods would be an enormous challenge. A young Kazimierz Trafas set about preparing the foundations of the project. He worked on an area, about 50 x 60 meters, of flat ground in the garden positioned on the slopes of Black Barony. This would be the base for the three-dimensional model and would be surrounded by water, just as Scotland is. The entire construction would give the impression of a pool surrounded by trees and bushes with Scotland and the islands (Hebrides, Orkney, Shetland Islands) rising out of the water (the border between Scotland and England would touch the edge of the pool). A scale of 1:10,000 would be required to realise the project on this location. The next consideration was to establish a vertical scale which would accurately represent the height above sea-level, or in this case the pool-level.

Scotland is a hilly country; there are not many high mountains (Ben Nevis - 1343 meters above sea level), but despite its small area and absolute altitude, there are considerable height differences, making it ideal for three-dimensional representation. Using the agreed scale of 1: 10 000, Ben Nevis would be of only 134 millimetres above the level of water in the pool. A newly proposed variant would see a 5-times vertical exaggeration; in this case Ben Nevis would reach 67 centimetres height. This height was deemed ideal; with their cartographic experience, they knew this would be sufficient for the effective visual representation of height.

In Krakow, there were no detailed maps of Scotland. Therefore, the investor would have to deliver the required source material. While studying the terrain relief of Great Britain another project idea was proposed. K. Trafas suggested creating similar, but smaller scale, model of the map. If the large model would fill space of the garden the small one could be installed under the roof, for instance in the Castle's hall. This would allow viewing the map, regardless of weather conditions. Both models were to be made simultaneously.

The first phase of construction of Scotland's model would be completed at Wawel, in Krakow. In May 1974 K. Trafas (shortly after he attained his doctorate), along with R. Wolnik, came to Scotland. They brought with them all their cartographic materials and essential surveying equipment. On arrival, they prepared the site. One metre of soil and subsoil was removed and the bottom of the excavation was carefully levelled. Initially, they installed a local coordinate system, consisting of a multiple set of straight lines (strings) in a repeating axis. The next step was critical: outlining the coastline in the bottom of the excavation. The setting out of the coastline was linked with the simultaneous construction of shuttering that would contain the foundations of the mainland and islands. Once the shuttering was in place; the concrete was poured. The completed boundary was filled in partially with soil and partially with concrete. The height of the coastal shuttering was 50 centimetres above the bottom of the excavation and was regularly checked by theodolite and spirit level. Mr. Robson, who was looking after the Castle, helped with basic building tasks.

After laying out the coastline, which formed the zero level for the basis of the model, levels and height terraces were set up. Theoretically, the number of levels could reflect the number of contours on the source map. Soon it became obvious that the process would take too much time, but their stay in Scotland was only planned to be a few weeks. Due to the lack of time, the number of levels had to be limited to three: 300, 600 and 900 meters

above sea level. Construction of the terraces was undertaken in the same way as the coastline, shuttering and filling. The work was drawing to a close for that year; the last few weeks passed quickly and the constructors had to leave the country that had become so enchanting to them. While Mr. Tomasik was happy with the progress on the map, he realised that nothing more could be achieved until the following summer. Pondering on what had been achieved, he realised that much was still to be done and decided that more map makers would be required to complete the project on time.

The break in construction did have its compensations though; in Scotland Mr. Tomasik had time to consider developing the project to bring it closer to the original than the plans he had previously submitted, and in Poland; Mr. K Trafas turned his attention to the construction of the small model. It has to be remembered that in the mid seventies, pocket calculators had only basic arithmetic functions and limited resolution, colour TVs were huge, bulky and heavy, and the first "Maluchs" [*Fiat 126 Polski*] appeared on Polish roads. At the same time maps were drawn manually with the aid of mechanical "pens". K. Trafas decided to use an innovative approach to the construction of the plaster model of Scotland, using a scale of 1:500,000 (with 5-times vertical exaggeration) and state-of-the-art technology (1974).

Following discussions with colleagues from Technical Academies; he decided that the detailed cartographic data he possessed on Scotland's topography would allow completing the map on a special mechanical moulding machine [*a CNC milling machine of its day*]. The output data was prepared by copying selected contours from the cartographic maps onto a printed circuit board (which were already in use in consumer electronics). The circuit board had contours etched onto it, identical in size and proportion to the maps, electrical contacts were made to allow the application of voltage. In this manner, each contour was represented by a voltage proportional to the height the contour. To the human observer the printed circuit board was a two dimensional representation of the map, to the milling machine the voltages produced a three dimensional topography. The difference in voltage between each contour allowed the machine to carve out the shape of the terrain from a block of plaster, while the spacing between adjacent contours produced an average gradient to produce the slope of the land. This novel mechanical 3D production of a map had a couple of unfortunate drawbacks; some areas needed manual correction to smooth out unwanted sharp edges and the map had to be made in four parts, because the machine could not handle the size of the small model.

The white, plaster block of Scotland was an impressive interpretation of a classic map that could find further uses. However it had one defect – it was difficult to repeat or copy. K. Trafas was aware of this; for each part (quarter) of the map duplicates were made, imprinted (vacuum-formed) in a shrink film, in the same way that 3-d plastic maps are produced today.

In May 1975 Jan Tomasik came to Krakow by hire car; he took the plaster models and plastic imprints to Scotland. He also took more contractors including: Zygmunt Olecki, Jerzy Zelech and Janusz Szewczuk. Once they arrived at Barony Castle, the group proceeded to set the site in order and correct the effects of a 10 month break in work. Ahead of the team lay the most difficult stage of the project - manual sculpting, shaping hills, valleys and setting elevations, around the terraces set out the year before. This method of construction required an artistic eye for the spatial and geometric relationship of the map. On the basis of the contour image of the topographic map it was necessary to visualise the spatial layout of the terrain, and then manually form a block of concrete within that space. To maintain the correct ratio of height; elevations were set out using sets of vertical steel wire rods, trimmed to the correct height. The small number of terraces and the wire rods caused problems with the concrete; due to the limited time for working each batch into shape. Correcting any errors would be time consuming and require the use of "heavy" equipment [*Jack Hammers etc.*]. Construction was carried out by two teams of two men; one forming the basic shape and the other finishing it. A fifth person produced and delivered the concrete to the modelling area. Two types of concrete were produced - "fatter" mix for the lower level and interior [*bulked out by the inclusion of stone and rubble infill*]. A finer mix was used during the finishing of the model, as the surface would be exposed to the elements.

Scotland is a country of numerous rivers and lakes (its famous "Lochs"); during the break in construction (the previous winter) Mr. Tomasik decided that lakes and rivers should be included on the model. The installation of power cables that would pump water through the completed map was undertaken while the modelling work progressed. The idea of including the water network was a great improvement but caused many technical and building problems. The construction of the concrete map bore no resemblance to traditional cartographic methods. Finally, on 24th July 1975 - Jan Tomasik's birthday - modelling was finished and a "topping-out

ceremony” was performed on the top of the model's Ben Nevis. The satisfied sponsor, seeing the entire model, made one final change: the pool (the sea) would become circular rather than rectangular.

In the summer of 1976 K. Trafas and R. Wolnik (the creators of the concrete map of Scotland) visited *Barony Castle* for the last time. Jan Tomasik had lost no time; in the early spring the model was painted by contractors. The forests and urban areas were highlighted; water was pumped into the map, supplying the rivers and lakes. The pool wall was plastered; the last few remaining islands were modeled and the pool would be filled with dyed water so that the observer would focus on the map rather than on the bottom of the pool. It was planned to build a metal footbridge over the model to allow visitors a viewing platform without damaging the surface. K. Trafas made his final farewells to the map of Scotland, *Barony Castle* and Scotland. Jan Tomasik's health was declining and a few years later he passed away. The property of *Barony Castle* has changed ownership several times since. For many years, the fates of the large concrete and small plaster model of Scotland were unknown. According to unverified information, the model was to be restored after years of neglect and open to the public in 2005.

Construction of the model, the concrete map, was a bold and imaginative cartographic venture, even in the context of 21st century digital cartography. Today we deal with many variants on the traditional map: e.g. plastic maps, panoramic maps and anaglyph maps. Each of them aims to provide better representation of the Earth's physical surface. Despite the relatively simple construction; it is rare to find a model of a concrete map in such a large scale located in similar terrain. One final question: should similar models be made in other places such as in the Tatry, Bieszczady, Beskidy [*Polish mountain areas*]? Primarily it would be an educational exercise in geography and cartography, but could also be a tourist attraction.

I dedicate this reminiscence to the memory of those who have passed away: Stanisław Maczek, Mieczysław Klimaszewski, Kazimierz Trafas, Jan Tomasik and my father, a soldier of General St. Maczek.

*Janusz Szewczuk*

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Ryc. 3. Ogólny widok modelu (czerwiec 1975)

Zdł. J. Szewczuk

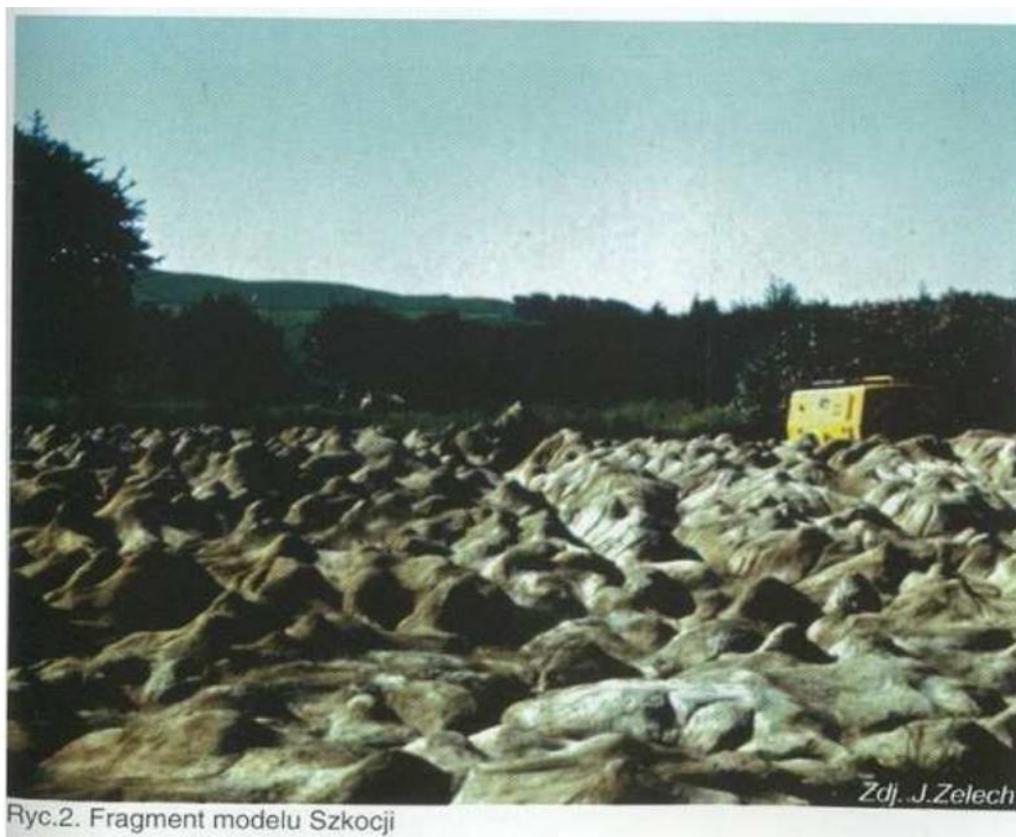
*General look of the model (June 1975). Photo by J. Szewczuk*



Zdj. J.Zelech

**Ryc.4. R. Wolnik i Z. Olecki przy transporcie „tworzywa kartograficznego”**

*R. Wolnik and Z. Olecki during transportation of the “cartographic building material”*



Zdj. J.Zelech

Ryc.2. Fragment modelu Szkocji



Zdj. J.Zelech

Ryc.1. K. Trafas i R. Wolnik w czasie przerwy – w tle zamek Barony Castle

*K. Trafas and R. Wolnik during a break—Barony Castle is in the background*



Zdj. J.Zelech

Ryc. 5. M. Ratoń, R. Wolnik, Z. Olecki i J. Szewczuk – konsultacje na fragmencie modelu

*M. Raton, R. Wolnik, Z. Olecki i J. Szewczuk—consultations on a fragment of the model*