



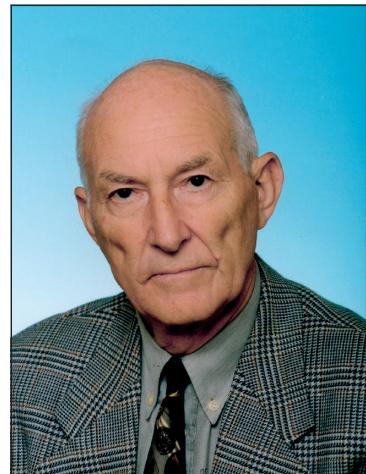
INTERVIEW WITH PROFESSOR JURIJ KUNAVER

FROM LOCAL TO GLOBAL: THE IMPORTANCE OF KARST GEOMORPHOLOGY

cunducted by Janez MULEC

Prof Jurij Kunaver is a renowned geographer and Professor Emeritus at the University of Ljubljana, Slovenia. He conducted pioneering research of the glaciokarst and caves in the Julian Alps and the Upper Soča Valley and became a leading expert in the field of karst geomorphology in high mountains, advancing the understanding of mountain landscapes and their dynamic processes. With a strongly interdisciplinary approach, he combined geomorphology with environmental sciences and education. He was a key figure in geographical organisations in Slovenia, lecturer and mentor for many generations of students, organiser of dozens of national and international meetings and conferences, and editor of numerous scientific and educational publications. He was chairman of the Association of Slovenian Geographers and co-founder of the Association of Geography Teachers and the Geomorphological Society of Slovenia. During his academic career, he focused on field-based research, geomorphological mapping and innovative teaching methods. In addition to his academic work, he actively explored caves and mountains and transferred this passion to his scientific work, scientists and students. Prof Kunaver is an advocate of lifelong learning and remains active even after his active academic career has ended. His legacy includes a profound impact on geomorphological studies, geographic education and public engagement in environmental protection. His influence on the updating of tourist information, especially in the field of natural history in the area of the Julian Alps, particularly in the Upper Soča Valley and Bohinj, has been also noticeable over the last decade.

■ *Prof Kunaver, can you tell us a bit about your academic background? How did it all start, or what or who inspired you to pursue a career in geomorphology?*



Professor Jurij Kunaver

I am the son of one of the oldest Slovenian cavers, Pavel Kunaver, who was a member of the first Slovenian climbing and caving group called the Drenovci. This in itself tells you that I grew up in an environment full of stories about nature, especially about the admiration of nature, its greatness and its unexploredness. Family life was marked by the permanent discovery of Slovenian mountain and karst landscapes. Shortly after the Second World War, I was just old enough to hear a lot about the famous Slovenian caves and karst from my father, who was the head of the natural history club at the Ljubljana Classical Gymnasium, and to visit these places as part of the club. Pavel Kunaver, as one of the founding members of the Cave Exploration Society (1910), and later famous author of hundreds of articles on karst natural history, was involved in the exploration of many new and unknown caves from that time until the beginning of the First World War. He also became famous for his almost two years of exploration of caves in the Trnovo Forest, in the immediate vicinity of the Soča/Isonzo Front, which he carried out together with Ivan Michler, his colleague in the Society, as members of a special military exploration team on the Austro-Hungarian side. Together they explored over 100 caves for the army in that time. Between the two wars, my father did not participate in the research work of the aforementioned society, but after

the Second World War he rejoined it. He brought a good number of young members from the above-mentioned circle into the society, including myself (in autumn 1949). These were the foundations that led me to study geography. And already for my degree I did more than one month of fieldwork in the Slovenian Alps to explore the high mountain karst (1956). The diploma thesis was a pioneering work and bestseller published in *Geografski vestnik*. After graduating, it did not take long before I was offered a position as an assistant professor in the Department of Geography at the University of Ljubljana.

■ *Could you please tell us who in your research career has influenced you the most, both at the beginning and later on, and where your broad knowledge of karst around the world comes from?*

Thank you for this question, because no researcher is self-generated and no researcher is the sole author of his or her findings. I can take this opportunity to say that I owe a great deal of my knowledge and, above all, my experience, to the various well-known karst scientists I have come into contact with at international professional meetings. In our times, this was not as easy as it is today. I also gained a lot from the organisation of the Fourth International Speleological Congress, which was held in Ljubljana and Postojna in the autumn of 1965, and continued with an extensive excursion throughout the Dinaric Karst as far as Montenegro. Among the 400 speleologists from all over the world were eminent karstologists who helped me to travel to different karst areas around the world years later. I owe most of my gratitude for her help and knowledge to the late Professor Marjorie Sweeting of Oxford University, who was my mentor in the 1968/1969 academic year and who put me in touch with other English karstologists and geomorphologists of the time. Since then, I have become more familiar with the Yorkshire karst and, since the spring of 1969, with the Irish Burren karst, where I was invited by Professor Tratman. A long-lasting friendship, especially with the late Marjan Pulina, a legend of Polish karstology and polar studies, who organised trips to the karsts of Norway and Siberia and to Svalbard, was unforgettable. The occasion of visiting Professor Alfred Bögli at his Märenberg (Muotatal) in the Swiss Alps was especially valuable, because it was my first time seeing some glaciokarstic phenomena. I have joined members of the Karst Research Institute in Postojna in visiting some French karst areas and French colleagues in Aix-en-Provence several times. The knowledge we received at such meetings from professor Jean Nicod was extremely valuable.

Also, the impressions from the Canadian glaciokarst together with Castleguard Cave, which we were

able to visit under the guidance of Professor Derek Ford, are still vivid. I have also experienced karst exploration in the company of Ugo Sauro in some of the Italian high mountain karst areas. I have also had many interesting experiences in the Dinaric karst. Among the important role models, I must not pass by our local legendary Ivan Gams. Without the above-mentioned varied field experiences, I as a karst geomorphologist would be as poor as a "church mouse". I would also like to thank on this occasion two karst specialists for their friendly behaviour toward me: first, Philippe Audra from Nice as one of the leading karstologists; second, Bojan Erhartič from Ljubljana, a victim of tragic fate at the very beginning of his scientific career, not to mention many other karst experts and friends.

■ *Part of your research was dedicated to palaeoclimate and palaeotopography. As climate change continues to impact geomorphological processes, what do you think are the most challenging research questions related to its impact on the environment, particularly on vulnerable alpine areas?*

This is not an easy question to answer, even though there is ample evidence of global warming at virtually every turn. I have been most concerned with long-term changes in karst relief in the high mountains, especially since the last glaciation. As in other Alpine areas, we have encountered ice caves, not very common, but some worth observing. For example, I had the opportunity to see an ice cave at 1900 metres in the high mountain karst of Kanin, which is relatively well protected from external influences thanks to its entrance in a 20-metre-deep chasm. Although this chamber is covered with snow every year, sometimes up to the very top, and the ice cave is completely isolated from external influences at least until the beginning of summer, the ice has been retreating relentlessly throughout the whole period of observation, from 1964 to the present day. From this fact alone, it is clear that something is wrong with our climate. The snowfall in the Kanin mountains is also decreasing, similar to what is observed in some parts of the Alps in general. Decades ago, snowfields still covered the shady areas and the bottoms of karst depressions in the second half of summer. Today, there is virtually no snow on the surface of the Kanin mountains between 2000 and 2600 metres in summer. The regime of the karst springs at the foot of the mountain is therefore also changing, and temperatures are rising slightly, at least in summer. In addition to as many observations as possible, I think it is important to convey information about the current alarming snow and water conditions in our Alps to a wider audience as convincingly and effectively as possible.



Exploring the high-mountain karst of Velika vrata (Komna, Julian Alps), a saddle between the Lopučnica Valley and Vrsnik, 1924 m a.s.l., 18 August 2007.

■ We know that you have made and shared many small and large discoveries through your publications and public appearances. Can you share with us an interesting, perhaps unusual event during your exploration and research?

For many years I was one of the few, if not the only, researcher of the high mountain glaciokarst in Slovenia. It is still considered to be a less accessible and less attractive type of karst, with the exception of cavers, who explore deep chasms on Kanin in all conditions. In contrast, there is not so much interest in how the surface glaciokarst landforms and climate interact. In this respect, the most interesting are the karst tables, which are found in both the low and high glaciokarstic regions. I saw them for the first time in Yorkshire in 1969. They were unknown in Slovenia until the mid-1980s; and, Professor Alfred Bögli was the first person who enabled me to see them in an alpine environment. When I walked from Seven Lakes Valley in the Julian Alps to the Velika vrata saddle in the summer of 1986 together with a geomorphologist from Belgrade, it was there that I first saw karst tables on our soil. I was almost as happy as if I had found gold. Some twenty years before that, not far away, I had also found corrosion steps. In a sense, this was a way of defining the most general common features of a particular type of glaciokarst.

■ You actively follow the latest scientific discoveries in your field of interest. How do you see the rapid development of technologies in recent times, including artificial intelligence and its impact on karst research? Researchers have huge data sets from data loggers and the ability to process them and create predictive models. Do you think that fieldwork is still essential to improve our understanding of karst and other natural processes?

I keep up with advances in computer technology and tools as much as I can, but it is remarkable. There is no point in commenting on these advances and their application to karst science, because nobody can do without them today. Which technology to use and how to use it depends on the individual and on the subject. I can only assume that today the researcher is often faced with the dilemma of what to give priority to, which method, which tool, and how to avoid the pitfalls that all these tools and data can contain. Sometimes you get the impression that some analyses of a huge amount of data can be an end in itself. Compared to the past, the researcher today is perhaps expected to do even more, even too much, first to master the technology and then to master the specific problem. This is closely related to the question of the meaning and scope of fieldwork. In geomorphology and geology, I firmly believe that there is no yes-or-no di-

lemma in the field. Terrain is the soul of geomorphology and this cannot or should not be avoided. Drone imagery can make our work much easier, but the terrain has to be experienced by the feet as well as through the eyes. My experience is absolutely in favour of knowing the terrain as well as possible – not once, but many times – because each time we experience the terrain a little differently, if nothing else, in different lighting conditions.

■ *And to conclude our discussion: what unresolved issues in karst geomorphology do you think are still particularly exciting and should be explored further?* This is a difficult question to answer satisfactorily, because karst is abundant around the world and can vary greatly, as can the geological substrate in which it has evolved.

Therefore, my answer can be diplomatic, namely that there is a specific issue that is open everywhere, which we simply cannot know, and that all the karst in the world also has something in common. What it certainly has in common is that no area has been so thoroughly explored that there is nothing else unknown. But we are probably not far from the truth that the overview of the diversity of karst areas and karst types is far from complete. And that there are simply no two karst areas in the world that are exactly the same. Mainly, the interest is in those forms and types of karst that are territorially closest to us and most easily accessible. However, the most attractive karst areas have often been the little visited and remote areas with many unresolved problems. Karst areas are likely to continue to attract attention for a long time to come.

Janez Mulec