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FRIEDRICH SIMONY (1813-1896), HIS CONTRIBUTIONS TO KARST AND CAVE SCIENCE

FRIEDRICH SIMONY (1813-1896) IN NJEGOV PRISPEVEK H KRASOSLOVJU IN SPELEOLOGIJI

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Izvleček: UDK 551.44:929 Simony F.

Karl Mais: Friedrich Simony (1813-1896) in njegov prispevek h krasoslovju in speleologiji

F. Simony, alpinist, naravoslovec in geograf, se je ukvarjal tudi z glaciologijo in speleologijo, še posebej v pogorju Dachstein. Terensko delo je dopolnjeval z lastnimi risbami, ki jih je kasneje uporabljal kot ilustracije pri objavah in predavanjih. Že 1842 je apneniške planote imenoval "kraška območja". Ukvarjal se je s kraško hidrologijo in morfologijo. Pripomogel je k uveljavitvi dunajskega geografskega inštituta, kjer ga je nasledil A. Penck in kjer je študiral tudi J. Cvijić, in sploh k uveljavitvi speleologije v drugi polovici 19. stol.

Ključne besede: zgodovina speleologije, dunajska geografska šola, Avstrija, Simony F.

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F. Simony, an alpinist, naturalist and geographer interested in glaciology and speleology, in particular in the massif of Dachstein. In the field he made the drawings as a scientific documentation and also for the illustrations of lectures and publications. In 1842 he called the alpine limestone plateaus "karstic areas". He studied karst hydrology and morphology. He contributed to the high reputation of the Vienna Geographic Institute, where A. Penck followed him and where J. Cvijić graduated and to the developement of cave science in the second half of the 19th century.

Key words: history of speleology, geographical school of Vienna, Austria, Simony F.

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The beginning

In 1896 Friedrich Simony died in St. Gallen, a place in the Styrian Ennstal, Austria. He was well known as an alpinist, naturalist, geographer and, above all, a scientific explorer of the Dachstein. In this paper we are not going to deal with his main work, the "Region of the Dachstein" (Das Dachsteingebiet), which he was able to complete on the eve of his life as a sort of retrospective view. His work appeared in three numbers between 1889 and 1895. We will look into a very important aspect of his work, i.e. his little known contribution to karst and cave research.

Friedrich Simony's life and work

Simony was born in Bohemia at Hrochuv Tynec (Hrochowtainitz), southeast of Pardubice on November 30th, 1813. He attended Grammar School at Mikulov (Nikolsburg), left school in 1827 and became an apprentice in a pharmacy. As a laboratory assistant he moved from Znojmo (Znaim) to Vienna, where he began his studies in 1833. Having completed his pharmaceutical studies in 1835 he was able to devote himself to natural history, especially in the circle of the "Mining museum" (Montanistisches Museum). In 1840 he joined Franz v. HAUER among others on an excursion to the Gesäuse in the Salzkammergut. In the course of this tour he travelled through the Ausseerland to Hallstatt, ascended the Dachstein plateau as far as the glacier region. He was so fascinated by the area that he studied it throughout his life. He explored the plateau and climbed the peak in summer as well as in winter (first ascent), promoted tourism, made drawings of landscapes, and produced panoramas of the summit region. He conveyed to the world of science the findings from the Hallstatt time, discovered by the pitman J. G. RAMSAUER on the Salzberg at Hallstatt. He drew geological maps, collected rocks, performed systematic depth measurements and measured temperatures in the Salzkammergut lakes, studied glaciers as well as the botany and ecology and many other facts of the area.

With his studies he attracted the attention of the circle of "Friends of Natural Sciences in Vienna" (Freunde der Naturwissenschaften in Wien), which was established in 1846 as a regular meeting around Wilhelm HAIDINGER in the Mining Museum of Vienna. He reported to this society about his field work and thus was able to establish himself in the professional circles of the residential capital Vienna. In 1850, after the foundation of the Geologische Reichsanstalt, SIMONY, as chief geologist, was entrusted with the survey of the Salzkammergut (SIMONY 1850). He was intrested in geology and biological history as well as in general integrative matters of geography. These sciences were of special concern to him, and so he applied himself to promoting them. In 1851 he became professor of geography at the University

of Vienna - a success due to his dedication. From then on he engaged in teaching physical geography and establishing the geographical institute at the University of Vienna. He also played a decisive role in the foundation of the Geographical Society in Vienna (Geographische Gesellschaft in Wien) and the alpine association of Austria (Alpenverein).

In 1885 SIMONY, at 73, introduced his successors into their offices: Albrecht PENCK for physical geography, and W. TOMASCHEK for historical geography. Then he retired. He left to his institute most of his library as well as other material, teaching equipment and posters, which he had constructed himself for his lectures. Further important material from his legacy was given to the Museum of Natural History in Vienna by his son Oskar.

In 1890 SIMONY, at 77, started for his last tour on the Dachstein. After that, with the help of his son Oskar, he devoted himself to the "Dachsteinwerk", which appeared in three parts (numbers) in 1889, 1893 and 1895.

On July 20th, 1896 Friedrich SIMONY died in his 83rd year after "a lingering illness of several months caused by decreptitude" - as it says on his obituary. He was buried in St. Gallen in Styria, where he had mostly lived in his later years and died.

Friedrich SIMONY received numerous distictions due to his success as a teacher and scientist: The title of k.k. Hofrat, privy Councillor of the Imperial and Royal Court, was bestowed on him; he was an honorary member of the Geographic Society of Vienna, of the Austrian Meteorological Society, of the Geographic Society in Berlin and of many other scientific associations. He was a well-known and respected member of Vienna's social circles. In 1877 he received the Grand Medal for Arts and Sciences by crown prince Rudolf and was invited to cooperate in the oeuvre of the crown prince: "The Monarchy in words and pictures" (Das Kronprinzenwerk: Die Monarchie in Wort und Bild).

His private life: Friedrich SIMONY married Amalie KRAKOWITZER from Wels in 1851. On April 23rd, 1852 a son, Oskar, was born, a second son Arthur on Mai 15th, 1854. His daughter, born in 1858, died early.

Friedrich SIMONY's main works

Friedrich SIMONY'S studies and carreer were based on his very own talents and abilities. He was such an outstanding student that he was encouraged and sponsored by his teachers, such as J.F. JAQUIN. His knowledge of botany and geography soon made him an acknowledged "colleague" in the scientific circle of Vienna in the time before March 1848. After having become acquainted with the Dachstein area in 1840 he devoted his studies to the alpine regions. His knowledge of geology enabled him to concentrate on glaciology and related fields. His studies included the observation of water, moraines, sediments as well as suspended sediment transport in water, climate, vegetation and forest development (1876).

The wide range of his interests, the size of his field work and the conveyance of his experience can be seen from his reference list and a catalogue of his graphic works (among others BÖHM 1899, FORSTER 1893, PENCK 1898, recently e.g. GRIMS 1996 and KAINRATH 1993.) The titles of his publications are of general nature and do not easily reveal their contents. In this study SIMONY's earlier reports and publications are used, since they are of great importance for the history of research. Later publication are not dealt with.

Friedrich SIMONY had a remarkable talent for drawing, which he used for the scientific and objective presentation of the landscape. In the field he made sketches and drawings in his diaries, which he could use as illustrations in his lectures and reports. Later on these sketches served as patterns for figures in publications and posters used in speeches and lectures. Documentation was the main concern of his drawing activities, thus he readily included photographic techniques in topographic presentations and used them consequently from 1877 onward.

SIMONY's contribution to karst science and speleology

Friedrich SIMONY was no caver in search of new underground territory, but a natural scientist, who included karst phenomena in his studies. In this paper we present his hardly known contribution to speleology and investigate some topics in detail.

The Koppenbrüller Cave was well known already in the first half of the 19th century. It was mentioned as a rewarding tourist attraction in the guide books (SCHULTES and also SCHADEN 1833). This cave was the only one in the Dachstein area with its entrance at valley level. In this cave SIMONY measured air and water temperatures and watched the variation of the water flow caused by precipitaion and the melting of snow on the Dachstein plateau.

As early as 1842 he used the term "**KARST**" for the alpine limestone massif, noting that the foot of the Dachstein "covers an area of more than 8 square miles / = 460,33 km²/, and its karst like plateau covers a range of 50 to 60 walking hours." He also wrote: "The numerous caves, gorges and crevices inside the mountain, the rugged soil of its plateaus; .. indicate a long lasting fight of the elements .. to which these caves were once subjected." The plateau showed "holes and ridges, which have eaten vertically or slantingly into the rock", giving the whole area "an almost sieve-like aspect". He mentions "the rare appearance of granite foundlings, quartz and crystals on the plateau", indicating "the former presence of a primeval glacier, which might have carried off this rubble from the mountain chain .. of the Hochtauern .. and deposited it .. on the Dachstein." SIMONY characterizes the Dachstein plateau undoubtedly as a karst area, mentioning unnamed Karren, caves and shafts. His view of the crystalline sediments (Augensteine) on the plateau shows that he

assessed their origin much more correctly than it did Eduard SUESS later on, who believed volcanic processes to be responsible.

In a lecture delivered on June 15th, 1846 for the Friends of Natural Sciences he spoke about karst formation in the alpine limestone massifs in particular. He considered the "rolly nature and raggedness of the surfaces of the Dachstein- and Priel-mountains" as a "**type of karst formation**" (HAIDINGER 1847: 55-59). Thus in 1842 and 1846 he used the term **karst** for alpine limestone regions in the modern sense.

Karst springs

Karst springs were of great interest to Friedrich SIMONY. He put down his observations in 1865, characterizing the water flow in the limestone areas from the surface through the "layers, raggedness und hollowing" of the rocks "forcing its way .. deeper and deeper .. until they become formidable water drains" and then surface again in the valley.

As examples SIMONY mentioned (1865) the "Kaiserbrunnen am Wiener Schneeberg", which he regarded as one of the most powerful springs of the Eastern Alps, as well as the "Waldbachursprung", which he called a subterrenean outlet of the "melted snow and ice of the Hallstatt Glacier." He pointed at the seasonal variations of the suspended sediment transport from the glacier region and drew a correlation of the daily variation of the discharge with the differing radiation of the sun on the snow covered plateau. He found out that six hours after the beginning of sunshine the springs started to swell and reached their maximum around 8 or 9 p.m.

Later on, in 1871 (page 26) and 1878 (page 99) he considered the correlation between the Dachstein glaciers and the Waldbachursprung in greater detail: "Although .. there is no doubt that in the bed of the Hallstatt Glacier there exist numerous subterranean outlets, it seems nonetheless.. that most of them flow together .. into one canal, which eventually .. reappears .. at the foot of the Ursprungskogel. Here an icy cold creek appears, the Waldbachursprung .. under a small grove." This clearly formulated subsurface connection between the glacier waters and the Waldbachursprung has been exactly proved today by tracer trials (BAUER 1989). The subterranean passage is not accessable though.

In 1865 (page 189) SIMONY accurately noted the temperatures of the Hirschbrunn springs: Before the snowmelt in spring temperatures were around 5.61°R (=7.00°C), during the snowmelt they lapsed to 4.2°R (=5.25°C), during the summer they varied between 4.2°R (=5.25°C) and 4.6°R (=5.75°C), in autumn between 4.4°R (5,50°C) und 4.5°R (5,62°), whereas they rose in winter up to 5.6°R (7,00°C).

SIMONY focused on the area of the Hirschbrunn-Kessel with its various surfacing springs, comparing temperatures, discharge and water levels, as he

had done at the beginning of his Dachstein research in the Koppenbrüller Cave. He also observed other springs and in the area of the Gosaumühle he found thermal springs not detectable any more. Their temperatures ranged at that time (SIMONY 1865: 190) from 8°R and 17°R (10,00°C and 21,25°C). Furthermore he detected springs below the level of the Hallstatt lake.

He observed that the temperatures of the karst springs did not correspond to the mean annual temperatures at the altitude of their surfacing, which he would have expected. He tried to explain these remarkable deviations with the altitude of the source area. When investigating limestone springs in the area of the upper Traun river he distinguished between "shallow waters of mixed origin" with strong temperature variation and the "real karst waters". He presented a table for the latter (1865: 188), using "Wiener-Fuß" for altitude readings and "Reaumur" far temperatur readings as indices, which have been converted into meters and degree Celcius in the table shown below:

1. (a) Altitude of source (spring) in Vienna Foot	1. (b) Altitude of source (spring) converted in meter	2. Temperatur of springwater in late summer	3. Annual mean temperatur of spring water	4. Annual mean temperture of mountain region
7600 ft	2401 m	1,12°C	—	- 1,50°C
5700 ft	1801 m	2,37°C	—	+ 1,75°C
4500 - 5000 ft	1422 - 1580 m	3,50 - 4,50°C	4,25°C	3,00 - 3,75°C
4000 - 4500 ft	1264 - 1422 m	3,62 - 5,50°C	4,50°C	3,75 - 4,50°C
3500 - 4000 ft	1106 - 1264 m	1,50 - 5,50°C	4,87°C	4,50 - 5,25°C
3000 - 3500 ft	948 - 1106 m	1,75 - 6,25°C	5,12°C	5,25 - 6,00°C
2500 - 3000 ft	790 - 948 m	3,62 - 6,87°C	5,50°C	6,00 - 6,75°C
2000 - 2500 ft	632 - 790 m	5,12 - 7,50°C	6,12°C	6,75 - 7,50°C
1400 - 2000 ft	442 - 632 m	5,37 - 9,62°C	7,25°C	7,50 - 8,50°C

The original descriptions of the columns by SIMONY are the following:

Column 1.: "Altitude of the springs /sources/ in Wiener Fuß" /column 1(a): original footage; column 1(b): converted into meters/.

Column 2.: "Observed spring temperatures in late summer" /notated in half degrees Reaumur, converted into degrees Celsius/.

Column 3.: "Mean annual temperature of all studied springs" /notated in half degrees Reaumur, converted into degrees Celsius/.

Column 4.: "Approximate climatic annual mean of the corresponding altitude" /notated in half degrees Reaumur, converted into degrees Celsius/.

Limestone removal

SIMONY often focused on moraines, rubble and water with suspended sediments in his field work. He called the removal of material and its origin "erosive processes" ("erosierende Kräfte"), summarizing erosion and corrosion in one single term.

He assigned water a special role in the "erosive" ("erosirenden Abtrag") limestone removal, defining it "the omnipresent means of destruction connected with an incessant change of temperature" (1871: 3); in connection with the climate he considered water as "atmospheric erosion". He said that "rain and snow water" served as "chemical solvent, eroding the rocks on the surface." In this way SIMONY expressed and described the origin of karst phenomena: "The whole surrounding area looks as ragged, gnawed at and hollowed as if strong acids had rained on the rocks for centuries." He continues (1871: 5): "The share of atmospheric precipitation in the formation of the terrain must not be underestimated. In any case the latter is being continually 'gnawed off' by the .. corrosion of the surface of the rocks, and .. every crevice rippled by water .. is slowly and continually deepened and enlarged .. to an unmeasurable degree." This limestone removal which was not only mentioned in 1871, is still a prominent topic in modern research!

SIMONY realized that besides the change of temperature of the water there exists another essential influence on the limestone, as he wrote in 1871 (page 10): the carbonic acid, "substantially increasing the effect of atmospheric precipitation, is brought into the system from the air, but is absorbed to a much larger extent from layers of plants and soil. The corrosive power of the water may be increased .. many times .. by carbonic acid." The limestone removal = eroding effect of the biogene carbonic acid from algae and layers of moss was stressed in his later work. In 1869 SIMONY had already written a paper on these "means of destruction in high mountains" and had made it public (1870) in a popular calendar (an almanac with calender and a lot of informativ and educativ items). There are hints to be found in earlier publications.

SIMONY calculated the limestone removal especially for the "Kaiserbrunnen am Schneeberg" (Lower Austria). He said (1871: 43-44) that "25.000 Kubikfuß /= 7.900 m^3/ of solid rock were annually removed by the Kaiserbrunnen as a product of erosion, which corresponds to the volume of a kubicle 29 feet /= 9.16 m/ high". From this he calculated the general surface removal, noting that "in a thousand years a layer of not more than 5/4 Zoll /= 3.29 cm/ would be removed. He tried to compare these rates of removal from the limestone areas with those of the crystalline. He concluded that the surface removal rate by the glaciers was not very substantial. Not a period of a thousand, but hundred thousand years would be required for the big diluvial sediments in the forelands. A remarkable view for that time, which he gained by empirical observation, measurements and calculation.

Karst phenomena, especially karren

Already in his first publications SIMONY gave a realistic presentation of limestone massif morphology in the mountains of Totes Gebirge and Dachstein. He documented the various karst phenomena such as karren, dolines and caves.

He described the phenomenon of karren and made drawings thereof. At first he ascribed the conspicuous formations to the effect of glaciers, he also limited their appearance to the glacier zone. He was of that opinion at the beginning of his research and also later, although he had clearly realized the effect of the water. In 1878 he wrote (on oage 114): "Even if the origin of the karren still seem .. to be doubtful, this question appears to have found .. a sure answer. These strange hollowings are solely the product of the concurrence of melt water from the glaciers and the rubble of the moraines serving as abrasives."

This statement does not correspond with the present state of knowledge and actually differs from SIMONY's other views on karst processes. For, in his above mentioned paper from 1871, he clearly considered the rain- and soil water with its CO_2 to be a driving force for karst processes. However you can see from his drawings that he observed the karren and karren areas correctly and portrayed them in all details. Apparantly he could not correlate the relief of the karren with the effect of the surface removal. In the present it is easier to find different conclusions. His drawings are nonetheless important and correct evidence, such as a sectional drawing of a karren area in his diary, and the drawing Nr.382 from 1844 (Fig. 1).

The caves

Caves are normal phenomena of limestone mountains for SIMONY. Precipitation made its way into the subsoil, as described above, through crevices and "Karrenbrunnen" (karren-pit). Smaller crevices and canals were widenend, and caves developed in the course of time due to subsurface waters, which streamed again through the "canals" to the outer world. Thus he perfectly explained the circle of karst water by the direct connection between sinking surface waters, their subsoil course to the surfacing of the spring.

As to the origin of the caves, SIMONY stated (1871: 11) "that at least a substantial number of them owe their origin their .. continual enlargement .. and also their final collapse to the combined attacks .. of the water." Therefore he must have realized, "that the number of known and accessible caves was infinitely little, .. compared to that of the ones existing. Innumerable caves lie .. inside the mountains ..". Still, about a hundred years later scientists fiercly discussed "caves without entrances" as a "remarkable" phenomenon, although this had been no problem, but a fact in earlier times.

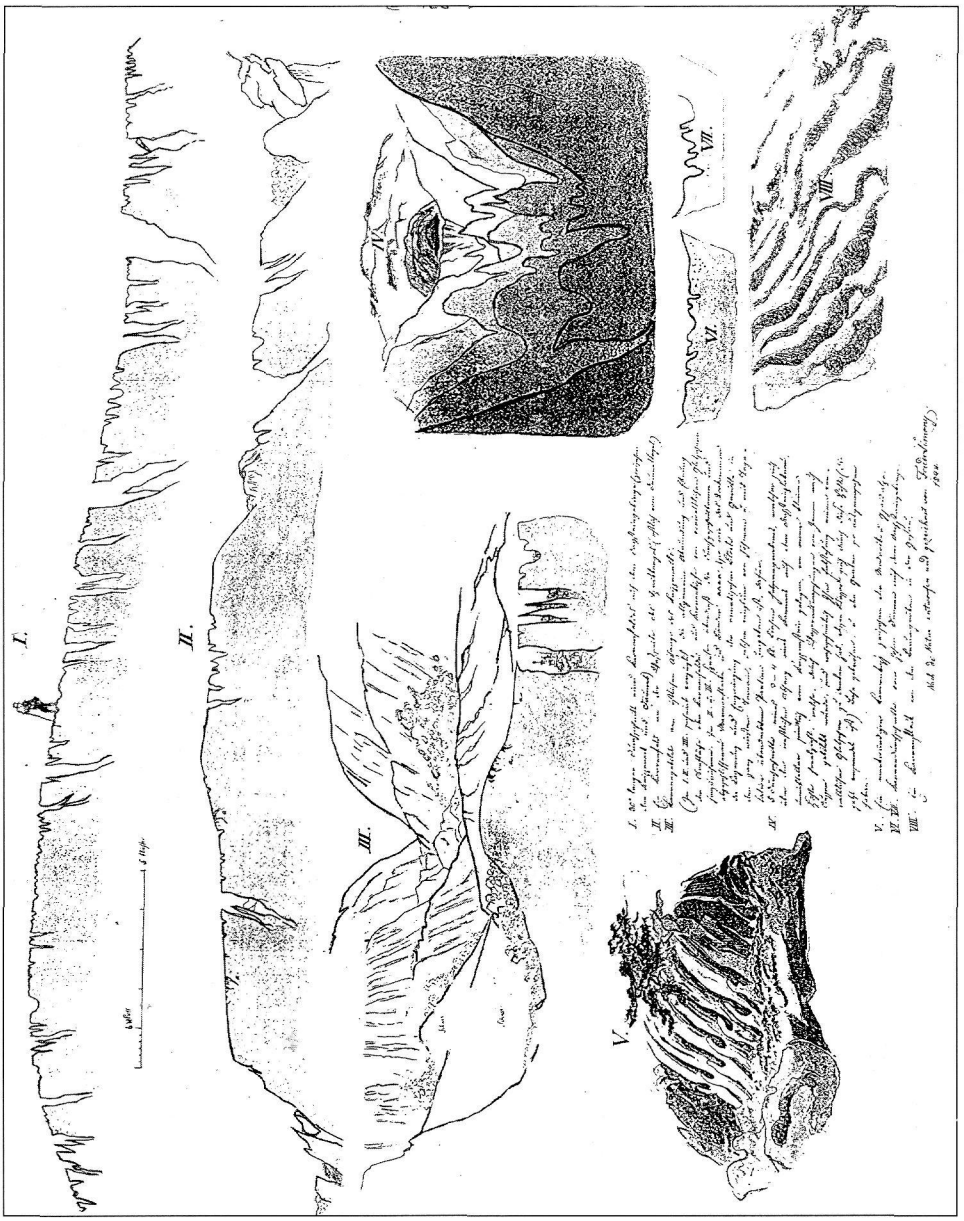

Fig. 1: Karren-Poster by Friedrich SIMONY 1844. Different views of karren in didactic combination with explinanetary legends. See translation on page ***XXX****. Drawing, water coloured, approx. 55x37cm. Archiv des Naturhistorischen Museums Wien: Material SIMONY Blatt Nr. 382.*

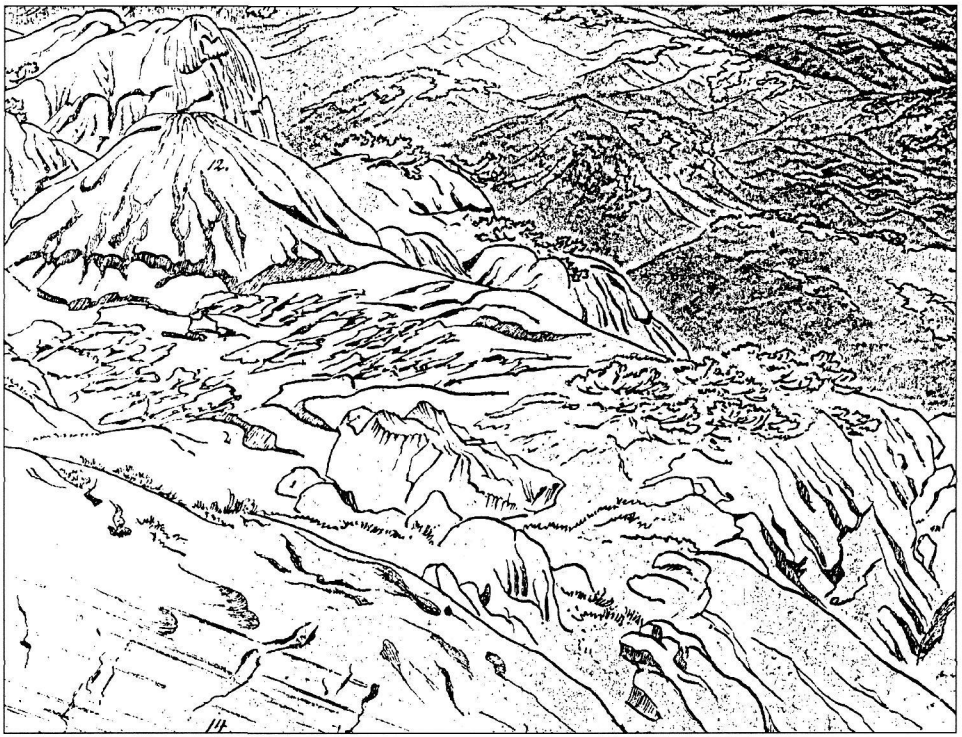

Fig. 2: Presentation of karrenforms: bolder with Firstkarren, "Karrenköpfe" with grooves and subsoilforms. Part of a geater sheet entiteld "Zur Charakteristik von altem Gletscherterrain im Kalk Hochgebirge, Aussicht vom Steige von der Ochsenwieshöhe nach dem Taubenkar (Dachsteinplateau)", made in september 1844. At the side are legends explaining items, with number 12 there are "Karrenköpfe" inscribed. Archiv des Naturhistorischen Museums Wien: Material SIMONY Blatt Nr. 338.

SIMONY named practical examples of the development and collapsing of caves from the Nördliche Kalkalpen. He studied the Almbergloch in the Totes Gebirge and the Thiergartenloch in the Dachstein. He had made drawings already in 1845 (Nr.190) and commented on the development of caves at a meeting of the "Freunde der Naturwissenschaften" (HAIDINGER 1847, GRAF 1979). At that time he had little experience, yet he drew justifiable conclusions on this matter (HAIDINGER 1847: 55-59). He made a distinction between primary and secondary caves, the karst caves belonging to the latter. As to basins, gullies and partly also blind valleys (Sacktäler) he believed them to be formations, which owed "their first appearance to the collapse of large primitive or secondary caves". This opinion can only be agreed to in a few cases.

SIMONY did not consider the caves suitable for tourism, in any case not as shelters for alpinists or hikers. Unfortunately there are no diary notes on the "Gschlösslkirche", which he visited in 1844 and where he found fireplaces as evidence of earlier visits. We are in possession of diaries only from 1847 onward. At the occasion of a later visit he explored the cave more thoroughly and found it apt to be used, to a limited degree, as a shelter for tourists. He wrote (1877: 126 right below): "Although .. our experience generally speaks against the use of caves for touristic purposes, the Gschlösslkirche seems to offer favourable conditions for such usage .. however only if any expensive development is avoided, and only the most necessary equipment should be procured." From this statement we can surmise that SIMONY wanted nature to be changed as little as possible, and not "conquered". Changes should not be noticeable within the cave nor on the outside. This attitude may be regarded as a very first attempt of "soft tourism".

One of SIMONY's studies in caves can be traced from his second diary in 1848 (Nr.1756), containing notes on an excursion to the Loserloch on August 3rd. SIMONY took different temperatures during his ascent, inside the cave

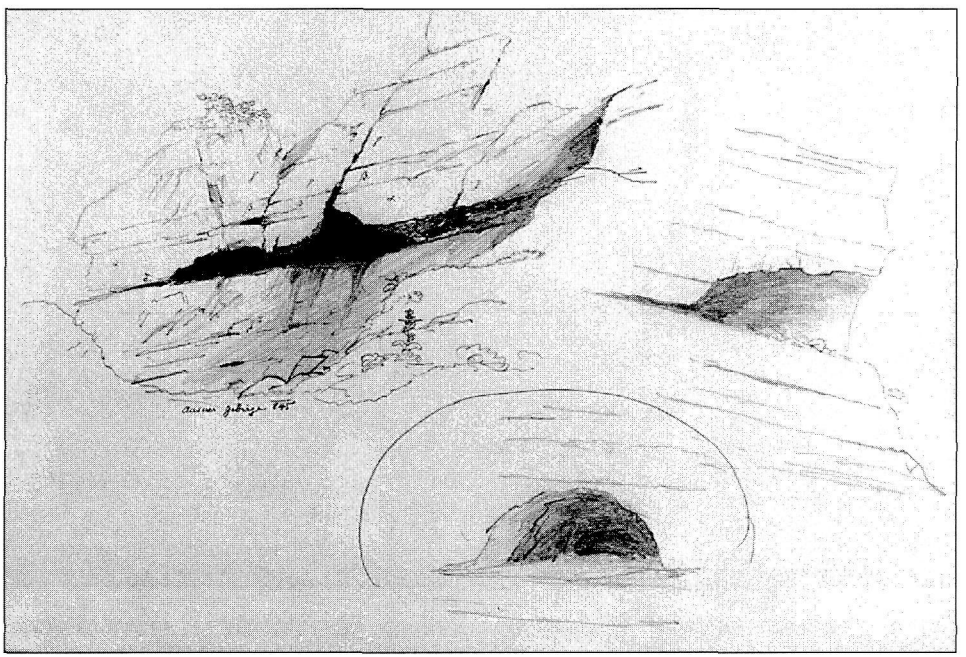

Fig. 3: Drawing according to the speleogenetic questions, "Ausseer Gebirge" = Totes Gebirge, 1845, pencil sketch, approx. 55x37cm; Archiv des Naturhistorischen Museums Wien: Material SIMONY Blatt Nr.190. This sketch is also published by GRAF 1979.

he measured 2.2°R (=2,75°C). He described the chambers of the cave, made a drawing of the entrance area, as well as the way through the cave, producing a horizontal projection as well as a vertical section.

Fig. 4: The great entrance of Almbergloch, Totes Gebirge, Styria. Pencil. "Bleistiftzeichnung nach der Natur von F. SIMONY im Jahre 1845". Archiv des Naturhistorischen Museums Wien: Material SIMONY. This drawing was used on end of the 70ths up to the early 80ths as cover of the local cavers journal "Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in Steiermark".

The graphic work

From the rich fund of drawings by Friedrich SIMONY one item (Nr.382) from 1844 is presented here. It is neither a picture nor a drawing, but a poster - in modern sense. This poster on karren in the high mountains is titled "Profiles and Views of the Karren in the Dachstein Area" (*Durchschnitte und Ansichten von Karren aus dem Dachsteingebirge*). It is made on a sheet of drawing paper, size of 39x54 cm, several water coloured sketches are placed together.

Two sections show karren, ravines of different width cut deeply into the limestone layer (I. and II.). Below to the left we find a view through a "Karstgasse" (III.) Various types of karren have developed in horizontal and steep vertical parts of rocks. Below there is a water color drawing of a "Karrenkopf" (V.) with vegetation on top of it, clearly showing karren. The right side of the poster shows five profile sections of a "Karstgasse"(IV) leaning to the entrance of a cave. The section clearly shows the variebility of karren types. Below there are two more profile sections of karren (VI und VII). The text in between runs as follows:

The original text of the poster in translation:

I.: 30° (=Klafter) long section of a karren field (*Karrenfeld*) in the Dachstein mountains (between Krippeneck and Tenneck).

II.: A karren field on the west side of the Speikberg (east of Däumelkogel).

III.: Karren formations (*Karrengebilde*) on the eastern slopes of the Krippeneck. (In I., II. and III. the rounding and flattening of the surface of karren and karren fields (*Karrenfelder und Karrenköpfe*) seems to be a product of ancient glaciers. In II. and III. the sected marble spots and layers point to that as well as the deposition of erratic boulders and gravel in a vast terrain surrounded by higher areas covered with vegetation.

IV.: 5 sections of a 3-4 Klafter deep rock pit running from a small cave through the western slope of a ridge south of Krippenstein. The cave was formed by water erosion probably as a product of ancient glacier water running through the cave (now filled with sand).

V.: A peculiar *Karrenkopf* between Modereck- and Gjaidalpe.

VI., VII.: Karren sections (*Karrendurchschnitte*) on the high Dürren in the Dachstein.

VIII.: A karren spot (*Karrenfleck*) from the Brunngräben in Gosau.

Composed true to nature and painted by F. Simony 1844.

The sheet Nr.382 was composed apparently for didactic reason to show the variety of karren types. In the large section through the karren fields there is a human figure drawn, also a yardstick of 9 Klafter (= 9,48m) length. The backstage presentation of III. and the several profile sections in IV. try to

present the different appearances of karren in a perspective or geometrical way. These combined illustrations were obviously composed for a lecture on this topic. The conspicuous numbering of each drawing on the poster shows the documentary/didactic purpose of the illustration.

Contributions to glacier speleology and other items of karstology

SIMONY was fascinated by the investigation in glacial areas, also he found interest in glacier caves. His observations thereof date back as far as 1840. At the 4th Int.UIS Symposion on glacial caves a special paper is presented.

It must be mentioned that SIMONY compared his earlier drawing with later photos, to assess the dynamic changes of ice and glacier status. For other comparisons he did not use his material. This was done later by the scientists of the Speleological Institute in Vienna. In the karst research program of this institute, especially from 1950 onward, SIMONY's photos were used for comparative studies of plant development in this karstregion. Georg KYRLE (around 1930), as well as Fridtjof BAUER made new photos in these places. Otto CECH analyzed the dyamics of the vegetation with plant-sociological methods (BAUER 1958). Such investigations are still being carried out.

SIMONY's drawings and photos

His drawings, water color paintings and photos are documents of karst and caves that have not yet been given a satisfactory classification. The bibliography set up by BÖHM in 1899 and of late by KAINRATH in 1993 offer a step for beginning. In SIMONY's graphic work several karst regions are presented. It contains the Polauer Berge, the limestone alpine regions of Lower Austria Styria, Upper Austria, Salzburg, than karst massifs like Schneeberg, Rax, Hochschwab, Totes Gebirge, Dachstein, Schafberg, Tennengebirge, Steinernes Meer, Watzmann, as well as the regions of the southern limestone alps in Carinthia and Krain (Slovenia). Besides that we must mention the pseudokarst areas of the Riesengebirge.

The first karst object drawn by SIMONY was the chasm of the Mazocha in Mähren on a water color painting in 1830. Other karstobjects he draw in the early fieldwork in the Totes Gebirge and the Dachstein. Karren and dolines are shown on gearter pictures with a high exactness, also springwater and caveparts like Waldbach, Hirschbrunn, Kessel, Koppenbrüllerhöhle.

The early drawings and graphic works of F. SIMONY still show a little clumsiness, but SIMONY soon reached great perfection. In order to draw the landscape true to nature he used a frame, and only for the sky and the clouds he permitted himself a certain artistic touch. Later on his drawings became more and more precise and less artistic, as SIMONY refrained from painting the sky and artistic manipulations. On his drawings he made captions emphasizing the documentary character of the pictures. With the help of a drawing

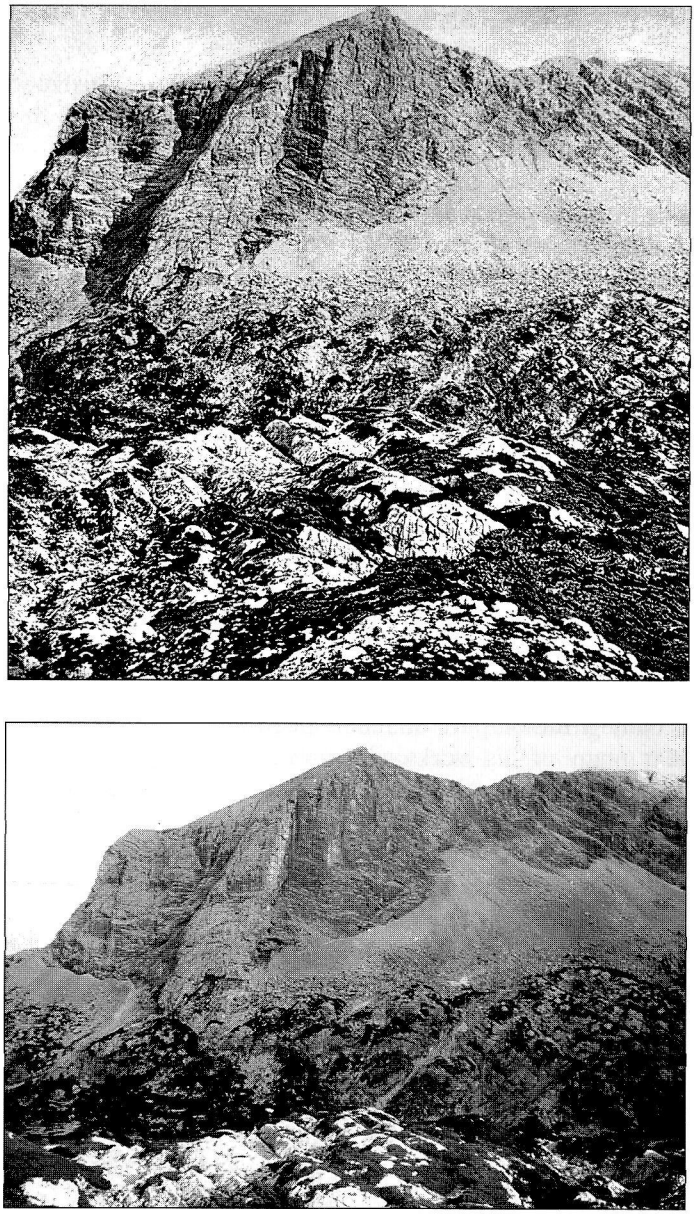

Fig. 5: Taubenkogel, view from Ochsenwieshöhe (1989m), the photograph ***a****: taken by F. SIMONY 1875-08-12 (SIM XXV, SP.J. 35) and* ***b****: by F. BAUER 1955 (SP.J. 481) were used in studies on changes of karst vegetation (O. CECH & F. BAUER).*

aparatus, he had developed himself, and the systematic superelevation of the relief his pictures became purely documentary. This becomes evident when he makes objective pictures from his photos.

Apart from the documentary drawings and photos SIMONY also painted idealizing pictures. On the one hand they were character sketches of landscapes, where he focused on composition and included the portrayal of clouds, on the other hand they were expressive teaching material for his lectures at the university. With his photos he used retouch techniques to stress parts of the pictures that lacked clearness. Thus he emphasized indistinct contours caused by under-exposure or over-exposure, and added suitable skyscapes. He used this kind of picture improvement in his "Dachsteinwerk".

Final remarks

Friedrich SIMONY's speleological works are numerous and were presented in a small scale only. Their high value would favor a closer study of this scientist's achievement. The importance of his research for scientific speleology is only partly known. His publications, drawings and diaries should be studied and presented, as his life's work is practically unknown, but still valuable today.

The results of SIMONY's research had a substantial impact on his colleagues, his students as well as on other contemporaries. His work was reflected in the scientific literature of his time, and its contents became part of common knowledge. Especially the knowledge he conferred in his lectures and speeches was carried on in the educated circles of the 19th century. Therefore references are rarely to be found in contemporary literature. In 1898 Jovan CVIJIC mentioned SIMONY's reports on karren and dolines. Later on, in 1913, BOCK, LAHNER and GAUNERSDORFER refer to him in "Die Höhlen des Dachstein" ("The Caves of the Dachstein"). Recently his work has been recalled to a certain extent. In 1977 SEEMANN gave proper attention to his work of the Dachstein area, and GRAF (1979) to that of the Totes Gebirge. Yet SIMONY's field work is not only important for retrospective, but also for actual research - as introduced and presented by G. KYRLE and Fridtjof BAUER, who compared his pictures with modern ones of the same sites. Today SIMONY's historic material is of great importance for research in the field of speleology. Only a minor part of it has been evaluated so far. In SIMONY's memorial year many of his works will appear accompanying publications and exhibitions. SIMONY's work will be acknowledged to a greater extent, see also the catalogue for the exhibition in the Landesmuseum Linz (SPETA & AUBRECHT 1966, with contributions by Franz GRIMS among others).

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FRIEDRICH SIMONY (1813-1896) IN NJEGOV PRISPEVEK H KRASOSLOVJU IN SPELEOLOGIJI

Povzetek

F. Simony, ob svoji smrti 1896 znan predvsem kot alpinist, naravoslovec in geograf, se je ukvarjal tudi z glaciologijo in speleologijo, še posebej v pogorju Dachstein v avstrijskih Alpah. Terensko delo je dopolnjeval z lastnimi risbami, posnetimi po naravi, ki jih je kasneje uporabljal kot ilustracije pri objavah in predavanjih. Danes je njegovo speleološko delo zelo slabo poznano. Vendar je že 1842 apneniške planote imenoval "kraška območja". Ukvarjal se je s kraško hidrologijo in morfologijo. Tako je preučeval hidrologijo jame Koppenbrüller ter sosednjih kraških izvirov na severnem obrobju Dachsteina, meril je temperature vode in zraka v jamah, preučeval vodni transport trdnega in raztopljenega tovora, intenzivnost korozije tako v kraškem podzemlju kot tudi na površju, itd. Danes lahko ocenjujemo njegovo delo predvsem po njegovih objavah in risbah. S svojim poročanjem v znanstvenih družbah in s svojimi predavanji na univerzi je bistveno pripomogel k uveljavitvi dunajskega geografskega inštituta, kjer ga je nasledil Albrecht Penck, kot profesor fizične geografije, in kjer je končal študije tudi J. Cvijić. F. Simony je bil tisti, ki je v drugi polovici 19. stoletja zelo veliko pripomogel k uveljavitvi in popularizaciji speleologije.