Speleology

Peculiar laboratories for the study of evolution, caves fascinate scientists from many disciplines.

Rane L. Curl

It is difficult to think of a science which is more a composite of other disciplines than speleology is. In the United States there are no university departments of speleology; no degrees are granted in speleology; there are no individuals who make a living as professional speleologists (unless the personnel of caves that are national parks are to be so considered), and the only fund that specifically supports speleological research in universities amounts to $100 a year.

The reasons for this situation are not difficult to find. Speleology is the study of a particular environment. However, this environment, unlike the study areas in other composite environmental studies—"space," the Antarctic, and so on—is comparatively rare. Moreover, caves have, throughout human history, produced an emotional reaction, more frequently repelling people than attracting them. Probably the absence of light is critical in this regard. Finally, partly because of their rarity and partly because of their origins, caves do not constitute an economic resource (other than as recreational areas), and thus there is no broad financial support for research.

The object of speleological study is, in the first instance, a subterranean opening, conventionally in the province of geology and geomorphology. The excavation of a cave concerns phenomena in the province of hydrology and fluid dynamics as well as chemistry, and the refilling of these voids by deposition is a concern of mineralogy. But, except for calcium carbonate, the mineralogist here considers a relatively small collection of rare and often unstable substances and structures. The living creatures of caves are also relatively rare and unusual. Because for long ages caves have constituted a constant environment, without light and with a limited food supply, they provide a peculiar laboratory for the study of evolution, and probably, among scientists, it is the biologists and individuals in related disciplines who now study them most closely. The fact that early man (and the animals of his time) lived in the entrances of caves and that men used the interiors for religious purposes provides material for archeology and paleontology.

But the number of professional scientists who are attracted to the study of caves because their discipline leads them in that direction is probably smaller than the number who study caves merely because they find the environment and its contents fascinating. From such mixed backgrounds came the individuals who met in Austria between 14 and 30 September 1961 for the 3rd International Congress of Speleology.

The United States and most countries of Europe were represented in a varied program of sessions and symposia, field trips, committee meetings, and entertainment. The honorary president of the congress was R. Saar, president of the Speleological Institute of the Federal Ministry for Agriculture and Forestry. Also on the organizing committee were presidents H. Spreitzer (director of the Geographical Institute of the University of Vienna), H. Strouhal (administrative director of the Museum of Natural History, Vienna), and J. Vornatscher (president of the Association of Austrian Speleologists) and general secretary H. Trimmel (general secretary of the Association of Austrian Speleologists). It was Trimmel and his assistants to whom the congress participants were primarily indebted for the excellent scheduling and arrangements.

From 18 to 23 September the lectures, sessions, and meetings were held in Vienna, at the university and at the Museum of Natural History. The congress then moved on to Obertraun for the period 24 to 26 September, where the participants visited caves and the Karst research station on the Dachstein Massif. The congress closed in Salzburg on 28 September, after 2 days of meetings and field trips in and around that city. There were additional field trips, before and after the congress, to caves in the vicinity of Graz and Salzburg.

The number and variety of papers presented in Vienna, and the consequent need for simultaneous sessions, made it impossible for anyone to hear all the presentations, but the division by disciplines was in accord with the particular interests of most participants. The symposium on physical speleology had six sessions, at which 33 papers were presented, on the origin and morphology of caves, economic speleology, cave sediments, climatology of caves, caves around the Mediterranean, regional karstology, general karstology, general speleology, and cave concretions and crystallization. Most of the papers dealt with a particular cave or cave area; a smaller number treated of specific cave features.

The relation between cave and surface features was a recurring theme. This was the subject of a symposium on cave origin and landscape, at which five papers were read. There were related symposia, on methods of dating the development of caves and the deposition of cave sediments (three papers) and on studies of the drainage of karst areas, with emphasis on utilization of karst waters and water supply (eight papers).

The symposium on cave fauna and flora of Recent times had three sessions. Nineteen papers were presented, on the microflora of sediments, deposits, and pools; fungi; microflora and mineral deposition; evolution of cavernicoles; cave snails; bat taxonomy; and the spreading of cave fauna in cavernous regions. Organization of a symposium, for the 4th Congress, on the ecological grouping of cave fauna is being considered.

The symposium on cave archeology and paleontology had one session, at which seven papers were presented. The topics discussed were paleontologic speleology, cave and man in times past and present, and cave habitation during the Glacial Age. The papers included reports of findings of mammal remains in Pleistocene deposits and discussions

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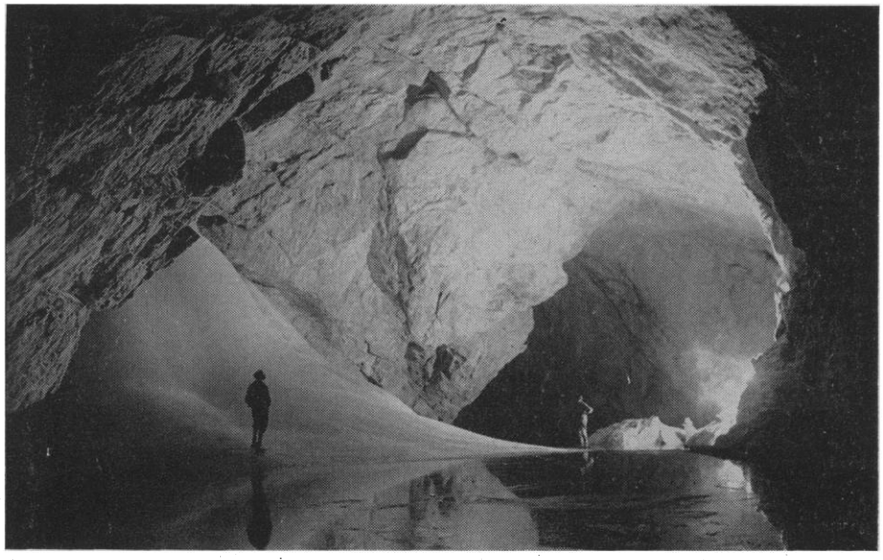
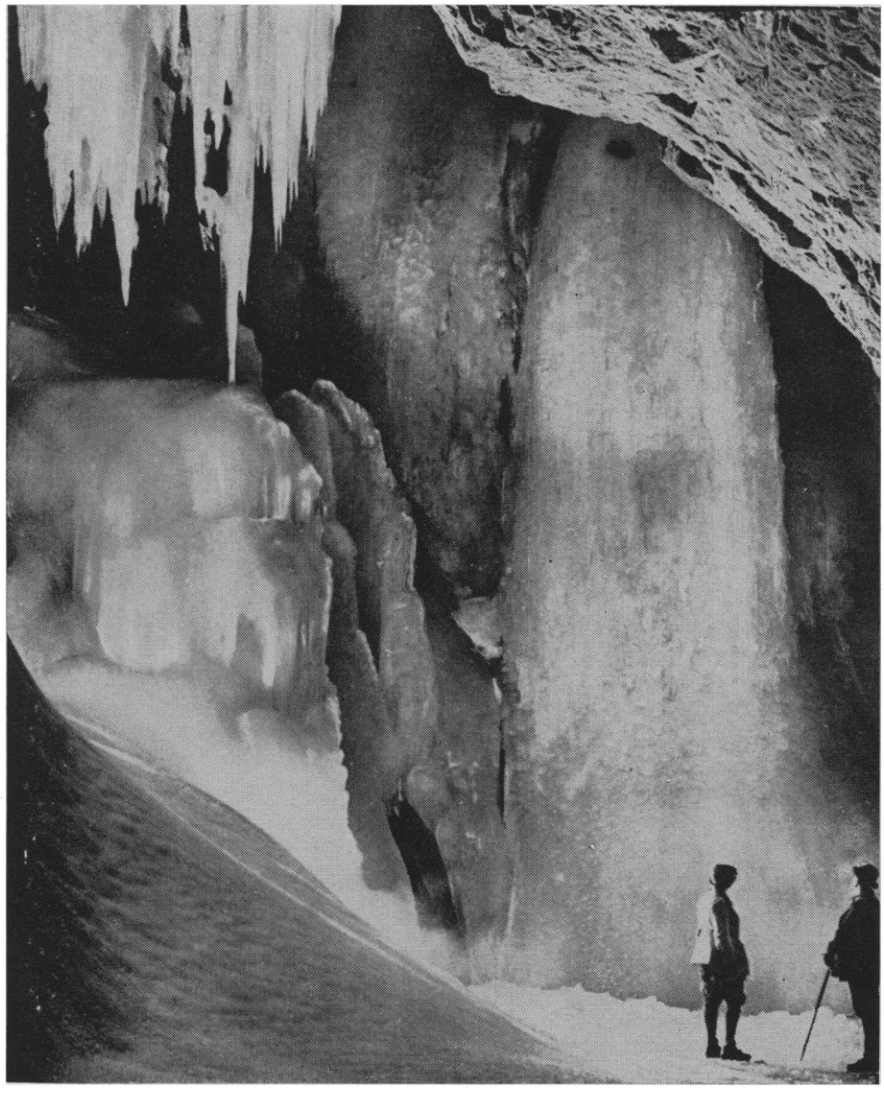


Ice palace, Eisriesenwelt, Salzburg. [Abel]



Hymir-hall, Eisriesenwelt, Salzburg. [Echte]

of Paleolithic cave-wall art and the historical associations between man and caves in Europe. The cave bear in Austria was discussed, and remains of this mammal were displayed at a speleological exhibit opened at the museum in connection with the congress. Apparently man and bear inhabited the same caves at one time or another, and preyed upon each other.

In a symposium on practical speleology, documentation, and exploration techniques, four papers were presented. It was only at this session that speleology's greatest problem came in for discussion—protection of the cave environment from wanton or accidental destruction. State protection of caves in Austria by the Bundesdenkmalamt and the history and success of cave-preservation efforts in Great Britain were discussed. In both cases the emphasis was on the importance of formal protection of caves of significant interest. Problems of use—and abuse—are at present receiving more attention in the United States than elsewhere.

At a fifth symposium, actually a meeting of the Commission on Terminology and Conventional Symbols, five papers were offered; in addition, the commission held two working sessions. An attempt is being made to adopt a uniform international system of map symbols and nomenclature, and the possibility of adopting an international vocabulary for naming cave phenomena is being investigated. The commission hopes to assemble, between congresses, material for an illustrated list of cave phenomena, with terminology in at least the official languages of the congress (English, French, Italian, Spanish, Russian, and German). It may then be seen whether there is hope of carrying standardization further, or whether this is even desirable.

In addition to the symposia there were lectures, with films, on particular explorations (including one under water) and on a method of tracing underground water courses by means of dyed spores. A stereoscopic presentation of views from Križna Jama (Yugoslavia) was particularly well attended. Other events included receptions for the congress participants given by the Bürgermeister of Vienna, Franz Jonas, and by the Bundesminister for Land and Forest Economy, Eduard Hartmann; an evening at the Vienna State Opera; and a tour of the city.

From headquarters in Obertraun at

Ice formations in the Tristan Dome, Dachstein Rieseneishöhle.

the foot of the Dachstein Massif the congress participants visited the Dachstein-Rieseneishöhle (Ice Cave), the Dachstein-Mammuthöhle, the Koppenbrüllerhöhle, and the Karst Research Station at Oberfeld, which is connected with the Speleological Institute of Vienna. The institute is sponsored by the government for the study of the process of karstification, which is responsible for the steady destruction of arable land by loss of soil and vegetative cover and its conversion to a karst, or exposed limestone terrain. At Oberfeld the conditions pertaining to this phenomenon are studied, primarily at an extensive meteorological facility. The fact that this aspect of speleology receives federal support is one reason for the large number of papers on karst phenomena presented during the sessions. Considerable success in interpreting the evidence and explaining the process of karstification has been attained, but halting or reversing the process seems to require halting or reversing a trend in the weather toward aridity. The Oberfeld group is apparently not pursuing study of the plant ecosystems on karst terrain or investigating the possibility of reversing the process by introducing new species or hybrids.

At the final session of the congress, in Salzburg, reports of the commissions on terminology and speleochronology were presented. A commission was formed to document the "largest and deepest caves of the world." The delegates selected Yugoslavia as the host country for the 4th Congress, in 1965, and Greece as the alternative, pending a final decision on the application to the Yugoslav government.

At the final session Kurt Ehrenberg gave a summary talk on karst and cave research in Austria since 1945. He discussed the study of karst phenomena by the Speleological Institute; research on ice preservation in the commercially maintained ice caves, which is sponsored by the regions where ice-cave tourism is of economic importance; and other problems that confront Austrian speleologists. While the Speleological Institute receives federal support, it is almost exclusively concerned with karst, so speleology, the study of caves, has been carried on by caving groups and museum groups. These must provide their own funds and therefore can pursue only a limited research program.

A reception for the congress participants was given by Alfred Bäck, Bürgermeister of Salzburg. From Salzburg the participants made a visit to an ice cave, the Eisriesenwelt—a fitting climax to the congress. The setting of the Eisriesenwelt, in the Tennengebirge above the Salzach river, is spectacular. The cave is known to have some 30,000 square meters of ice surface, with magnificent ice formations, and an additional 40 kilometers of cave passage. It is under the protection of the Austrian National Trust, as are all the caves visited during the congress. One group was conducted through the cave by E. Angermayer, who in 1913 was a member of the first party to scale the 100-foot ice wall near the entrance.

The largest delegations at the congress were from Austria (66), France (26), and Italy (14). Other delegations were from Hungary, Yugoslavia, and West Germany (9 each); Great Britain (8); Switzerland (7); Belgium (3); Denmark, Greece, Czechoslovakia, Lebanon, Morocco, Poland, Spain, Sweden, Rumania, and the United States (2 each); and Vatican State and Katanga (1 each). An additional 58 persons attended.

The proceedings of the congress will be published by the organizing committee. Inquiries should be addressed to Dr. Hubert Trimmel, General Secretary, Third International Congress of Speleology, Obere Donaustrasse 99/7/-1/3, Vienna II, Austria.