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<title>20 years of speleothem paleoluminescence records of environmental changes: an overview</title>
<abstract>This paper discusses advance of the research on Speleothem Paleoluminescence Records of Environmental Changes after it have been first introduced by the author 20 years ago. It is demonstrated that most of the progress in this field was made in result of the operation of the International Program "Luminescence of Cave Minerals" of the commission on Physical Chemistry and Hydrogeology of Karst of UIS of UNESCO. Potential, resolution and limitations of high resolution luminescence speleothem proxy records of Paleotemperature, Solar Insolation, Solar Luminosity, Glaciations, Sea Level advances, Past Precipitation, Plants Populations, Paleosoils, Past Karst Denudation, Chemical Pollution, Geomagnetic field and Cosmic Rays Flux variations, Cosmogenic Isotopes production and Supernova Eruptions in the Past, Advances of Hydrothermal Waters, and Tectonic Uplift are discussed. It is demonstrated that speleothems allow extremely high resolution (higher than in any other paleoclimatic terrestrial archives) and long duration of records. Some speleothems can be used as natural climatic stations for obtaining of quantitative proxy records of Quaternary climates with annual resolution.</abstract>
<keywords>Speleotherms, paleoluminescence, environmental records.</keywords>
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<title>Influence of solar luminosity over geomagnetic and climatic cycles as derived from speleothems</title>
<abstract>We observed cycles presented in a luminescent solar insolation proxy record from a speleothem from Jewel Cave, South Dakota, US. We found cycles of orbital precession with periods of 23 and 19 ka and of obliquity of 41 ka and many others from non- orbital origin in this sample. We determined the Solar origin of the cycles with durations of 11500, 4400, 3950, 2770, 2500, 2090, 1960, 1670, 1460, 1280, 1195, 1145, 1034, 935, 835, 750 and 610 years. It was done by their detection both in proxy records of speleothem luminescence, D14C and the intensity of the geomagnetic dipole. It is well known that the main variations in the last two records are produced by the solar wind. The most intensive cycle discovered in this record has duration of 11.5 ka. It is not of orbital origin. It was found previously to be the most intensive cycle in the D14C calibration record and has been interpreted to be of terrestrial origin because "it is too strong to be of solar origin". Our studies suggest that it should be a solar cycle modulating the geomagnetic field and 14C reversed production as the other solar cycles do.</abstract>
<keywords>luminescence, 14C - dating, geomagnetism, solar luminosity.</keywords>
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<title>Activators of luminescence in speleothems as source of major mistakes in interpretation of luminescent paleoclimatic records</title>
<abstract>This work summarizes the main results of the operation of the International Program "Luminescence of Cave Minerals" of the commission on Physical Chemistry and Hydrogeology of Karst of UIS of UNESCO in the field of activators of speleothem luminescence. It discusses Activators of Luminescence in Speleothems as a source of major mistakes in the interpretation of luminescent paleoclimatic records. It demonstrates the existence of 6 types of luminescence of speleothems and cave minerals in dependence of the type of the luminescence center and its incorporation in the mineral. 24 different activators of photoluminescence of speleothem calcite and 11 of aragonite are studied. This paper demonstrates that it is impossible to produce reliable Paleotemperature or Past Precipitation records from luminescence of speleothems without establishing the organic origin of the entire luminescence of the particular sample.</abstract>
<keywords>luminescence, speleothems, paleoclimate.</keywords>
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<title>Surface cover infiltration index: a suggested method to assess infiltration capacity for intrinsic vulnerability in karstic areas in absence of quantitative data</title>
<abstract>Karst is a hydrogeological environment of importance not only for its water resources potential but also for its scenic and economic potential, thereby increasing the intensity of human impact. The uniqueness of karst in this regard stems from its high sensitivity and vulnerability to imposed

pressures and its distinctive response to these pressures. Therefore, a clear definition and formulation of the concept of intrinsic vulnerability is essential for the design of vulnerability and/or management criteria of the karstic system as a resource. In this regard, the recharge rate, the amount of water passing through the unsaturated zone into the aquifer, is among the principal attributes of the intrinsic vulnerability. Where data and measurements are available for even large areas, recharge can be evaluated quantitatively on the basis of field measurements and the water balance equation. However, particularly for countries suffering from lack of essential data for a quantitative evaluation of the net recharge rate, the recharge can be estimated using some derived parameters such as the so called Surface Cover Infiltration Index proposed in this paper. The DRASTIC method which is modified by using SCI, soil thickness and precipitation, allows the unique hydrological behavior of karst to be considered by redistributing of the intrinsic vulnerability values on the basis of hydrologic connections between neighboring cells. Following a detailed description of the SCI index and the modification of DRASTIC method for karst aquifers, a case study carried out to demonstrate this method is presented in this paper whose objective is to discuss and thus elaborate the suggested methodology. The Olimpos National Park area was selected because the great variation in lithology, landuse and topography. It was found that the relative vulnerability may vary particularly in the neighborhood of the highly vulnerable cells covered by carbonate rocks. The methodology was applied using ARC-GIS software. All spatial features used in computations were classified by the appropriate functions built into the software.</abstract>
<keywords>karst, hydrogeology, vulnerability.</keywords>
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<title>Evolution of Golpazari-Huyuk karst system (Bilecik-Turkey): indications of morpho-tectonic controls</title>
<abstract>e polje were completely clogged and the polje turned out to be a lake in late Pliocene-Early Pleistocene. The third phase consists of a re-arrangement of drainage pattern and related geomorphologic processes mainly controlled by tectonic movements during Early Pleistocene. Consequently, surface drainage started in the Golpazari lake. Meanwhile Sakarya river incised its bed through the fractured carbonate rocks, capturing also the Huyuk depression complex. </abstract>
<keywords>geomorphology, tectonics, hydrogeology, karst evolution, Turkey.</keywords>
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<title>Disaggregation modelling of spring discharges</title>
<abstract>Disaggregation models are basically divided into three main groups: temporal, spatial and temporal-spatial. The focus of this paper is the application of temporal disaggregation models to disaggregate the seasonal flow in some large time intervals to sub-seasonal flows in some shorter time intervals. Two basic models are applied: the original model of Mejia and Rousselle and the corrected extended Lin model one-stage disaggregation. The flow totals from some karstic springs are used. Data for five springs in different areas of Bulgaria for the aims of the study are executed. The synthetic data generation for the chosen spring stations for a new realisation of thirty years is obtained. The multi-variate lag-one auto regressive model (AR(1) model) is applied for generation of the annual flow sequences. The Lin model single- site is performed for thirty years generation period. The Lin model is an improvement compared to the original extended model. The new Lin approach succeeds in the preservation of the additivity as well as the moments. Applying the Lin model one-stage disaggregation results in consistent model parameter estimates. As a second step in the research multi-site disaggregation schemes are also applied.</abstract>
<keywords>disaggregation models, karstic spring discharge.</keywords>
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<title>Comparative estimate of resistance to drought for selected karstic aquifers in Bulgaria</title>
<abstract>Effective management of water resources requires adequate knowledge of groundwater system including the influence of climate variability and climate change. The drought of 1982-1994 in Bulgaria has led to important decrease of springflow and lowering of water levels. Therefore, groundwater demonstrated its vulnerability to drought. The purpose of this paper is to determine relative resistance of selected aquifers in Bulgaria to a prolonged decrease of recharge to groundwater. The drought resistance indicator has been defined for some karstic aquifers based on the method proposed in report of BRGM. The data from National Hydrogeological Network located in the National Institute of Meteorology and Hydrology were processed. For the aim of this study, time-series of discharge for karstic springs were used. Stations with significant impact of human activity on groundwater were eliminated. The results show that most of studied aquifers in Bulgaria have moderate and weak resistance to the drought. They are vulnerable to droughts and need good management for effective use of groundwater resources.</abstract>
<keywords>karst, aquifer, drought, resistance.</keywords>

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<title>Paleocollapse structures as geological record for reconstruction of past karst processes during the upper miocene of Mallorca Island</title>
<abstract>Paleocollapse structures and collapse breccias are one of the major features for paleokarst analysis and paleoclimate record. These are affecting the Llucmajor and Santanyí carbonate platforms. These platforms, of southern and eastern Mallorca respectively, are a good example of progradation reef platform in the western Mediterranean. The Santanyí platform is constituted of two sedimentary units, both affected by paleocollapse structures: (1) The Reef Complex attributed to the upper Tortonian-lower Messinian; (2) Santanyí Limestone attributed to the Messinian. There are abundant paleocollapse outcropping in the Reef Complex and Santanyí Limestone units. These structures have been produced by roof collapse of caverns developed in the underlying reefal complex. According to the genetic model, the origin of same paleocollapse structures may be related to early diagenetic processes controlled by high-frequency sea-level fluctuations. During the lowstands of sea level, fresh water flow or mixing zone might have created a cave system near the water table by dissolution of aragonite in the reef front facies and coral patches existing in the lagoonal beds. During subsequent rise and highstands of sea level, inner-shelf beds overlaid the previously karstified reef-core and outer-lagoonal beds. Increase of loading by subsequent accretion of the shallow-water carbonate might have produced paleocollapse structures by gravitational collapse of cave roof. Morphometric and structural classification of paleocollapse is based on geometric and structural criteria according to the type of deformed strata and strata dip. Paleocollapse structures can be classified according to geometric section, size of the paleocave and lithification degree of the host rock when collapsed. Breccias are classified as crackle, mosaic and chaotic types. In same paleocollapse the type of breccias present a vertical and lateral gradation, from crackle in the upper part, to chaotic in the lower part of the paleocollapse. Chaotic breccias grade from matrix-free, clasts-supported breccias to matrix-supported breccias. Relationship with high frequency of sea-level fluctuation, facies architecture, classification features and products permit to enhance a general paleoclimatic framework.</abstract>
<keywords>Breccias, paleoclimate, paleocollapse, paleocave, Upper Miocene.</keywords>
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<title>Trace elements in speleothems. A short review of the state of the art.</title>
<abstract>A state of the art of the research on trace elements of speleothems is given. First studies focussed on problems such as the colour of speleothems and the aragonite problem. Insitu studies and studies oriented towards a better understanding of vadose hydrology brought new insights in the controls on trace elemental composition of speleothems. Recent studies deal with microscale analyses and annual and intra-annual chemistry changes. Further in-situ studies should be performed to further differentiate influences, such as climate, soil/weathering and local hydrology in order to better constrain possible transfer functions between the surface and a speleothem.</abstract>
<keywords>speleothems, trace elements, color, paleo-envirnment</keywords>
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<title>Cave temperatures and global climatic change.</title>
<abstract>The physical processes that establish the cave temperature are briefly discussed, showing that cave temperature is generally strictly connected with the external climate. The Global Climatic changes can then influence also the underground climate. It is shown that the mountain thermal inertia causes a delay between the two climates and then a thermal unbalance between the cave and the atmosphere. As a consequence there is a net energy flux from the atmosphere to the mountain, larger than the geothermal one, which is deposited mainly in the epidermal parts of caves.</abstract>
<keywords>Global Climatic Change underground, cave temperature, cave climate, cave thermal capacity, underground-atmosphere thermal interaction</keywords>
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<title>The role of the environmental archaeologist in the study and reconstruction of cave palaeoclimate</title>
<abstract>Man and environment are engaged in a continuous battle to impose themselves on one another. The results are found in environmental modifications or climatic oscillations and, as far as man is concerned, in the different character of cultural remains. Man responds to environmental changes by migrating or evolving technological innovations, both of which leave important remains that the archaeologist is called on to recognise and interpret during and after an excavation. They both also reflect the sociocultural responses to climatic stress. This paper refers to a specific case study, caves, which housed man and his activities from the very early prehistoric period, and focuses on the importance of interdisciplinary research among all the sciences which are involved in palaeoclimatic reconstruction.</abstract>
<keywords>environmental archaeology, paleoclimate, caves, Greece.</keywords>
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<title>Minerogenesis of volcanic caves of Kenya</title>
<abstract>Kenya is one of the few countries in which karst cavities are scarce with respect to volcanic ones, which are widespread throughout the whole country. The great variability in lava composition allowed the evolution of very different cavities, some of which are amongst the largest lava tubes of the world. As normal for such a kind of cave, the hosted speleothems and cave minerals are scarce but important from the minerogenetic point of view. Anyway up to present no specific mineralogical research have been carried out therein. During the 8th International Symposium on Volcanospeleology, held in Nairobi in February 1998, some of the most important volcanic caves of Kenya have been visited and their speleothems and/or chemical deposits sampled: most of them were related to thick guano deposits once present inside these cavities. Speleothems mainly consisted of opal or gypsum, while the deposits related to guano often resulted in a mixture of sulphates and phosphates. The analyses confirmed the great variability in the minerogenetic mechanisms active inside the volcanic caves, which consequently allow the evolution of several different minerals even if the total amount of chemical deposit is scarce. Among the observed minerals kogarkoite, phillipsite and hydroxyapophyllite, must be cited because they are new cave minerals not only for the lava tubes of Kenya, but also for the world cave environment. The achieved results are compared with the available random data from previous literature in order to allow an updated overview on the secondary cave minerals of Kenya.</abstract>
<keywords>Kenya, volcanic caves, cave minerals</keywords>
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<title>Caves and Karsts of Northeast Africa.</title>
<abstract>At least potentially karstifiable rocks cover much of the surface of Egypt and northern Libya. Study of caves and other karstic features of this region has been hampered by lack of roads, rapid disintegration of the surface of friable, poorly consolidated limestone, wind-blown sand and other factors. Interbedding with marly aquicludes hampers speleogenesis locally. Calcareous and evaporite karsts are present, however, and their waters are important albeit generally limited resources. Large quantities of fresh water are lost through submarine springs downslope from Libya's Gebel al Akhdar range; the caves and karst of that range may be among the world's greatest. A recent attempted compendium of caves and karsts of Egypt and Libya contains several important errors; the supposed 5+ km Ain Zayanah Cave does not exist and the Zayanah System includes several smaller caves. The Bir al Ghanam gypsum karst of northwest Libya, however, has caves up to 3.5 km long. In Egypt, the Mokattam, South Galala, Ma'aza, Siwa and Western Desert karsts and the "White Desert" chalk karst of Farafra Depression are especially important. Qattara and nearby depressions may be karstic rather than structural in origin. Unique Wadi Sannur Cave is the world's largest gour and a potential World Heritage site. Little knownsandstone karsts or pseudokarsts in southwestern Egypt may contain analogues of features recently identified on Mars. The well-publicised Uweinat caves of northwestern Sudan are talus caves.</abstract>
<keywords>Egypt, Libya, Sudan, caves, karst</keywords>
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<title>Martel's routes in Mammoth cave, Kentucky, 1912.</title>
<abstract>Martel's own copy of the Hovey 1912 guidebook to Mammoth Cave has his routes marked faintly in pencil on the printed cave plans. These plans are reproduced here, with his routes indicated on them. He generally followed the four standard tourist routes which now included Kaemper's 1908 discoveries to Violet City, but instead of visiting the Maelstrom he went to Hovey's Cathedral and Gerta's Grotto.</abstract>

<keywords>Mammoth cave, History, E.A. Martel, Max Kaemper</keywords>
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<title>Contribution to the speleology of Sterkfontein cave, Gauteng province, South Africa.</title>
<abstract>The authors present more data about the speleological aspect of the Sterkfontein Cave, famous for its bone breccia which yielded abundant hominid remains. They also briefly review the previous voluminous studies by numerous authors, which are mainly dealing with the paleontology, stratigraphy and sedimentology of the breccia. The present investigations were oriented to hitherto poorly investigated aspects such as detail mapping of the cave, its country rock stratigraphy and recording the underground extension of the basal part of the breccia body. The cave consists of a complex network of phreatic channels, developed along joints in Neoarchaean cherty dolostone over a restricted surface of 250x250m. The combined length of all passages within this area amounts to 5,23km. The system extends over a height of about 50m and the dry part of it is limited downwards by the water-table appearing as numerous static pools. The fossiliferous breccia (= Sterkfontein Formation) forms an irregular lenticular mass 75x25m horizontally by 40m vertically, which is included within the passage network. It crops out at surface and in the cave, and resulted from the filling of a collapse chamber, which was de-roofed by erosion. The present investigation confirmed that the cave and the Sterkfontein Formation are part of a single speleogenetic event. The breccia resulted from cavity filling by sediments introduced from a pit entrance, whereas many of the phreatic passages around it, which are developed at the same elevation, were only partly filled or remained entirely open up to present. This filling took place mainly in a vadose environment. Taking into account the age of the Sterkfontein Formation (>3,3-1,5 My, from base to top), the geomorphic evolution of the landscape and the context of other caves in the region, it seems that the cave might have started to form 5 My ago. It has been continuously developing up to present as a result of a slow drop of the water-table.</abstract>
<keywords>Sterkfontein cave, South Africa, History, Geomorphology, Speleogenesis</keywords>
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<title>Human impact on Karst: the example of Lusaka (Zambia).</title>
<abstract>Lusaka, the capital of Zambia with over 2,000,000 inhabitants, is built on an extensive plateau composed mainly of schists and dolomitic marbles, constituting a very important aquifer that provides the city with almost half of its drinking water needs. Recent demographic growth, leading to uncontrolled urban expansion, and mismanagement of the water resource and of urban waste has lead, in the past 20 years, to an overexploitation of the aquifer and to a generalised water quality depletion, putting in serious danger the future social and economical development of the capital. This third world city has, for these reasons, become a terrifying example of human impact on a vulnerable karst environment, and if no measures will be taken in the very near future, quality of life in the city will be at serious risk.</abstract>
<keywords>Zambia, karst, hydrogeology, pollution, remediation</keywords>
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<title>Littoral dripstone and flowstone-non spelean carbonate secondary deposits.</title>
<abstract>Speleothem-like dripstone and flowstone deposits can form in the non-spelean environments of marine notches on tropical carbonate coastlines. Hereby termed "littoral dripstone" and "littoral flowstone" to distinguish them from genuine cave deposits, they reflect the basic speleothem types: draperies, stalactites, stalagmites, and columns. Nevertheless, these formations lack the luster and crystallinity of cave analogues, and are not nearly as well-developed, dense, and massive. They are composed of layered microcrystalline aragonite and calcite, are generally highly porous, and invariably overlie dissolutional and bioerosional karren. Because true speleothems, often found in the remnants of solution voids breached by coastal erosion, are also commonly present in the modern littoral environments on tropical carbonate islands, they could be confused with littoral dripstone and flowstone deposits. The distinction between the two is crucial, because the true speleothems are indicators of karst cave paleoenvironments, while littoral dripstone and flowstone are contemporary parts of the modern coastal landscape.</abstract>
<keywords>speleothem, marine notch, littoral cave, secondary deposits, aragonite, calcite</keywords>
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<title>Tree-mould caves in Slovakia.</title>
<abstract>Four tube-shaped caves are described in this work, which origined in consequence of weathering the trees. Their length ranges from 5.8 to 17 m. All of them occur in neovolcanic rocks of Middle Slovakia, in epiclastic andesite conglomerates, breccias or in the tuffs. Some other caverns are close to the entrance of this caves, however they are inaccessible for a man. Thin rim of silicates (opal or chalcedony) occurs in some of them.</abstract>
<keywords>caves, tree-mould, opal, chalcedony, andesite, weathering</keywords>
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<title>The distribution of Radon concentration in caves.</title>
<abstract>Radon concentration in caves is known to vary within an extremely wide range. Here the distribution of the average values of radon concentration is examined and a power law describing is identified, i.e. radon concentration has a fractal dimension D=1.26. This fact means that concentrations are not grouped around a mean value, a characteristic common to many other phenomena.</abstract>
<keywords>Caves, Radon</keywords>
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<title>Subsidence hazards in different types of karst: evolutionary and speleogenetic approach</title>
<abstract>The typology of karst, based on distinguishing the successive stages of general hydrogeologicali evolution, between which major boundary conditions and the overall circulation pattem change considerabliy, gives a natural clue, properly to classify and tie together karst breakdown settings, speleogenetic styles and breakdown development mechanisms. Subsidence hazards vary substantially between the different karst types, so that classifying individual karst according to typology can provide an integrated general assessment. This provides a useful basis for selection and realization of region- and site-specific assessment schemes and management strategies. Intrastratal karst types, subjacent karst in particular, are most potent in generating subsidence problems. Exposed karst types, especially open karst, are the least likely to pose subsidence hazard problems, despite them being recognized more obviously as karstic areas. </abstract>
<keywords>karst types, karst subsidence hazard assessment, karst breakdown mechanisms</keywords>
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<title>The engineering classification of karst with respect to the role and influence of caves</title>
<abstract>The engineering classification of karst defines various complexities of ground conditions, in terms of the hazards that they provide to potential construction. Karst is divided into five classes (from immature to extreme). The three key parameters within the classification are caves (size and extent), sinkholes (abundance and collapse frequency) and rockhead (profile and relief). As one component of karst, caves are a hazard to foundation integrity, though natural surface collapses over caves are extremely rare. A cave roof is normally stable under engineering loading where the roof thickness is greater than 70% of the cave width. Construction can proceed over or around caves that are known. The main difficulty is finding unseen voids; ground investigation in mature karst may require extensive borehole probing, and microgravity is the most useful geophysical technique.</abstract>
<keywords>engineering classification of karst, subsidence hazard</keywords>
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<title>Cave breakdown by vadose weathering</title>
<abstract>Vadose weathering is a significant mechanism for initiating breakdown in caves. Vadose weathering of ore bodies, mineral veins, palaeokarst deposits, non-carbonate keystones and impure, altered or fractured bedrock, which is intersected by caves, will frequently result in breakdown. Breakdown is an active, ongoing process. Breakdown occurs throughout the vadose zone, and is not restricted to large diameter passages, or to cave ceilings. The surfaces of disarticulated blocks are commonly coated, rather than having fresh broken faces, and blocks continue to disintegrate after separating from the bedrock. Not only gypsum, but also hydromagnesite and aragonite are responsible for crystal wedging. It is impossible to study or identify potential breakdown foci by surface surveys alone, in-cave observation and mapping are essential.</abstract>
<keywords>vadose weathering, cave, breakdown, collapse</keywords>
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<volume>31 (1/4) - 2002 [Implications of speleological studies for karst subsidence hazard assessment]</volume>
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<title>Karst breakdown mechanisms from observations in the gypsum caves of the Western Ukraine: implications for subsidence hazard assessment</title>
<abstract>The term karst breakdown is employed in this paper to denote the totality of processes and phenomena of gravitational and/or hydrodynamic destruction of the ceiling of a karst cavity and of the overlying sediments. It refers not only to the existence of a surface subsidence (collapse) feature but, first of all, to the "internal" (hidden in the subsurface) structures that precede development of a surface form. This study reports and discusses the results of direct mapping and examination of breakdown structures in the gypsum karst of the Western Ukraine, at the level of their origin, i.e. in caves. The accessibility of numerous laterally extensive maze cave systems in the region provided an excellent opportunity for such an approach, which made it possible to examine the relationship between breakdown structures and particular morphogenetic or geological features in caves, and to reveal stages of breakdown development. It is found that breakdown is initiated mainly at specific speleogenetically or geologically "weakened" localities, which classify into a few distinct types. The most of breakdowns, which are potent to propagate through the overburden, relate with the outlet cupolas/domepits that represent places where water had discharged out of a cave to the upper aquifer during the period of transverse artesian speleogenesis. Distribution of breakdown structures does not correlate particularly well with the size of the master passages. Several distinct mechanisms of breakdown development are revealed, and most of them proceed in several stages. They are guided by speleogenetic, geological and hydrogeological factors. The study confirms that a speleogenetic approach is indispensable to the understanding of breakdown pre-requisites and mechanisms, as well as for eventual subsidence hazard assessment. Direct observations in caves, aimed both at speleogenetic investigation and breakdown characterization on regional or site-specific levels, should be employed wherever possible.</abstract>
<keywords>karst subsidence, karst breakdown mechanisms, gypsum caves, speleogenesis, subsidence hazard assessment</keywords>
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<authors>Vjacheslav Andrejchuk - Alexander Klimchouk.</authors>
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<title>Mechanisms of karst breakdown formation in the gypsum karst of the fore-Ural region, Russia (from observations in the Kungurskaja cave)</title>
<abstract>The fore-Ural is a classical region of intrastratal gypsum karst. The intensive development of karst in the Permian gypsums and anhydrites causes numerous practical problems, the subsidence hazard being the most severe. Mechanisms of karst breakdown formation were studied in detail in the Kunguskaya Cave area. The cave and its setting are characteristic to the region and, being a site of detalied stationary studies for many years, the cave represents a convenient location for various karst and speleological investigations. Breakdown structures related to cavities of the Kungurskaya Cave type develop by two mechanisms: gravitational (sagging and fall-in of the ceilings of cavities) and filtrational/gravitational (crumbling and fall-in of the ceilings of vertical solution pipes, facilitated by percolation). The former implies upward stoping of the breakout roof and cessation of the process at some height above the floor of the cave due to complete infilling by fallen clasts. This mechanism cannot generate surface deformation where the overburden thickness exceeds a certain value. The latter mechanism implies that breakdown will almost inevitably express itself at the surface, most commonly as a sudden collapse, even where the thickness of the overburden is large. These mechanisms resuit in different appearance, distribution and further evolution of the respective surface forms, so that subsidence hazard assessment should be performed differently for these types of breakdown. The conclusions reached by this study are representative for the region, although some of them bear more general validity for intrastratal karst conditions. This study underlines the ultimate importance of speleological investigations to the understanding of karst breakdown mechanisms.</abstract>
<keywords>gypsum karst, karst subsidence, subsidence hazard, cave breakdown, speleogenesis, Ural region</keywords>
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<title>Collapse dolines and deflector faults as indicators of karst flow corridors</title>
<abstract>The paper concerns collapse dolines, which appear to be one of the best-defined surface karst phenomena. Despite this appearance, one may find quite different views in the literature, and some of the aspects of their morphogenesis have been overlooked completely. Among these aspects the most obvious is the question of the ongoing development of the closed depression. Five of the most common collapse doline types found in Slovenia are considered in terms of general systems theory, leading to a conclusion that cave roof collapse remains the crucial event in a collapse doline's development. However, the collapse event itself may be relatively subdued in terms of the volume of free fallen mass involved. Some types of collapse dolines appear along particular types of faults that function as a kind of screen; these faults are termed deflector faults. They are marked by collapsing within the caves, and by "active" collapse dolines on the surface. Existence of deflector faults is an indicator of flow corridors in the close neighbourhood.</abstract>
<keywords>collapse dolines, cave breakdown</keywords>
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<title>Stability appraisal of the Medvedova Konta pothole</title>
<abstract>Until 1956 the underground details of areas around Pokljuka were practically unknown due to the area's non-karstic outward appearance. However, the presence of karst phenomena on this Alpine plain is undoubtedly indicated, primarily by the absence of a surface drainage network. A mathematical model was made of the Medvedova konta pothole, in which two different sets of material properties were used, corresponding to the Triassic limestone that forms the bedrock under the greater part of Pokljuka. The model simulates the gradual thinning of the ceiling of the underground hall, from the surface downwards, until its collapse. The paper presents a stability appraisal of the Medvedova konta pothole in Pokljuka.</abstract>
<keywords>Medvedova konta pothole, stability appraisal</keywords>
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<title>Collapse above the world's largest potash mine (Ural, Russia)</title>
<abstract>This paper reports the results of the study of a huge collapse that occurred in June 1986 within the area of the 3rd Berezniki potash mine (the Verkhnekamsky potash deposit, Ural). Processes that took place between the first appearance of a water inflow through the mine roof and the eventual collapse are reconstructed in detail. The origin and development of a cavity that induced the collapse are revealed. Two factors played a major role in the formation of the collapse: the presence of a tectonic fold/rupture zone with in both the salt sequence and the overburden (the zone of crush and enhanced permeability), and the ductile pillars mining system.</abstract>
<keywords>collapse sinkhole, potash mine, Ural region, Russia</keywords>
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<title>Karstology and the opening of caves during motorway construction in the karst region of Slovenia</title>
<abstract>The nature of karst makes constructing a roadway across karst areas a complex task, which is why karstologists take part in motorway construction across Slovenia's karst. Working with planners, karstologists select the best route on the basis of preliminary research. Then they carry out regular karstological monitoring of the construction, to study newly discovered karst phenomena, mostly caves, and also help builders overcome the challenges of karst in a way that will preserve nature as much as possible. During the recent construction of a section of motorway, more than three hundred caves were encountered within a sixty-kilometre stretch of road. Varied tectonic and lithostratigraphical conditions make it even more difficult to predict the cave locations in advance. Various types of cave reflect the development of the aquifer due to the lowering of the groundwater level and of the karst surface. All caves are explored, and the sediments and flowstone in them studied, in an attempt to preserve the most important ones. Caves are an important part of Slovenia's natural heritage, and research contributes new knowledge about the morphology and development of the karst region. Knowledge of unroofed caves and their traces on the karst surface provides a distinct advantage in planning new road sections. Expertise derived from recent experiences enables these features to be detected on the karst surface before the earth moving begins.</abstract>
<keywords>motorway construction in karst, karstological monitoring, unroofed caves</keywords>
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<title>Subsidence hazards as a consequence of dam, reservoir and tunnel construction</title>
<abstract>Considering all man-made structures in karst areas, dams, reservoirs and tunnels are the most vulnerable in relation to induced subsidence and caverns. Reservoirs that are located entirely or partially on karstified rocks covered with unconsolidated sediments are especially subsidence-prone. As a consequence of induced subsidence a number of reservoirs in karst areas failed and were never fully filled. Such subsidence formation is very damaging because the development is unpredictable and practically instantaneous. Reservoirs in karst areas may fail to fill despite an extensive site investigation programs and sealing treatment. Every problem is unique and past experiences are never repeated. This review focuses on the meaning and consequences of selected prominent examples, but the conclusions reached are valid for subsidence problems related to man-made structures in general.</abstract>
<keywords>karst, karst subsidence hazard</keywords>
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<title>Karst subsidence in South-Central Apulia, Southern Italy</title>
<abstract>Subsidence in the karst of Apulia (Southern Italy), one of the classical karst areas of Italy, is described in this paper. The carbonate rocks that make up the geological structure of the Apulia region are affected by subsidence, which is of different type and intensity depending upon geological, topographical, and hydrogeological conditions. In particular, we discriminate between inland subsidence and coastal subsidence. Inland subsidence is generally restricted to the presence of individual cavities, either empty or partly or totally filled with deposits produced by dissolution of soluble rocks underground. Locally, such subsidence can cause severe effects on anthropogenic structures above. The coastal plains of Apulia, particularly the southernmost part (Salento Peninsula), show interesting karst subsidence. Here the main feature is the development of compound sinks extending for several thousands of square metres, or the formation of individual, mostly circular, dolines along the coastline. Occurrence of one or the other of the above features seems to depend upon topographical conditions, and also upon their relationship with sea level oscillations.</abstract>
<keywords>karst, subsidence, sinkholes, subsidence hazard, Southern Italy</keywords>
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<title>Studies on the cranial osteology of the blind catfish Horoglanis krishnai Menon (Pisces, Clariidae)</title>
<abstract>Horaglanis krishnai Menon is a blind catfish inhabiting the dug- out wells at Kottayam, Kerala, South India. Studies on the cranial osteology of the fish show that the bones on the skull are firmly articulated. The frontoparietal fontanella is very large so that the cranium virtually lacks a roof. The sphenotics and alisphenoids are hardly recognizable and the orbital bones are entirely lacking. In osteological features H. krishnai closely resembles Uegitglanis zammaroni. But in H. krishnai the orbital bones are further reduced or even absent. The fontanella is larger than that of any other known catfish. These two species must have evolved from the same ancester and have taken up nearly identical ways of life. The difference between the skeletons of these two appears to be largely dependent on the relative size of the frontoparietal fontanella. Its greater development in H. krishnai brought about a suppression or reduction of some of the bones clearly visible in Uegitglanis. It would appear that the modification initiated in Uegitglanis gatered momentum in Horaglanis. These two fishes form a group distinct from clariids and bagrids but form a connecting link between the two.</abstract>
<keywords>Horaglanis krishnai, cave fishes, osteology</keywords>
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<title>Classification of terrestrial subterranean fauna of volcanic substrates in the Canary Islands</title>

<abstract>A system is proposed for classifying the species occurring in the hypogean environment in relation to their ecological and evolutionary characteristics. The ecological criteria utilized relate to the preferred habitat of the animals (the epigean, endogean or hypogean environment) and the evolutionary criteria specify the grade of adaptive modification in three characteristics: reduction of eyes, amount of pigmentation and extent of elongation of the appendages. The object of developing this classification is to provide a system appropriate for those regions - such as those with volcanic rocks - in which the cave faunas include elements originating in different environments, and in which the species show very variable adaptive grades, depending primarily on the antiquity of the island or other distinct geological zone, where they are found.</abstract>
<keywords>cave fauna, Canary islands</keywords>
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<title>The distribution of plants in Scoska Cave, North Yorkshire, and their relationship to light intensity</title>
<abstract>The flora of a small limestone cave was investigated. A total of 59 species was recorded (4 algae, 3 lichens, 47 bryophytes, 4 ferns, 1 angiosperm) making it bryologically the richest cave in Britain and one of the richest in Europe. All but nine of the species had been recorded from other European caves. Species-richness declined irregullarly from the entrance (relative irradiance with respect to open sky 12%) to 34m depth (rel. irradiance 0.004%). Bryophytes were found at 0-16m depth where relative irradiance declined to 0.2% and only algae were encountered at 34m depth. While irradiance, which declined exponentially, was the major factor controlling plant distribution, substratum characteristics and surface moisture were also important.</abstract>
<keywords>caves, flora, bryophytes, light</keywords>
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<title>Biogenic speleothems: an overview</title>
<abstract>The idea that speleothems may be somehow influenced by living organisms is rather old, but specific studies have only started in the last few decades and presently there are only a couple of systematic papers on this topic. The role of micro-organisms is perhaps the best investigated even if it is not fully understood, while studies over upper organisms and speleothems in a cavern environment are scarce and details are not always given on the involved genetic mechanisms. The aim of the present paper is to give an updated overview on these topics in order to enhance the interest of the scientific community. In fact the complex biochemical reactions involved in the development of the different cave deposits, though still not well understood, clearly have an interest and an importance far exceeding the simple speleogenetic interest. </abstract>
<keywords>Chemical deposits in caves, micro-organisms, plants, upper animals</keywords>
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<title>Studies on certain aspects of behaviour in the blind catfish Horaglanis krishnai Menon</title>
<abstract>Horaglanis krishnai is a blind catfish inhabiting the dug-out wells at Kottayam, Kerala. This fish has great zoogeographical importance as a similar blind clariid, Uegitglanis zammaroni is found only in the artesian wells of the former Italian Somaliland. Studies on certain behavioural aspects of the fish in captive conditions showed that, this fish even though is blind, exhibited a high degree of thigmotactism. Locomotion, comfort behaviour, feeding and light sensitivity of the fish were studied under laboratory conditions. Though the fish is totally blind and histological study did not reveal the presence of any light sensitive structures, the fish is found to be sensitive to light stimulus. It is a predator. Under laboratory conditions it unerringly snapped up food organisms. This is obviously facilitated by the high degree of development of the tactile and olfactory sense organs.</abstract>
<keywords>Horaglanis krishnai, cave fishes, behaviour</keywords>
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<title>Deposition of calcium carbonate in karst caves: role of bacteria in Stiffe's cave</title>
<abstract>Bacteria make a significant contribution to the accumulation of carbonate in severa! natural habitats where large amounts of carbonates are deposited. However, the role played by microbial communities in speleothem formation (stalactites, stalagmites etc.) in caves is still unclear. In bacteria carbonate is formed by autotrophic pathways, which deplete CO2 from the environment, and by heterotrophic pathways, leading to active or passive precipitation. We isolated cultivab!e heterotrophic microbial strains, able to induce CaCO3 precipitation in vitro, from samples taken from speleothems in the galleries of Stiffe's cave, L'Aquila, Italy. We found a large number of bacteria in the calcite formations (1 x 104 to 5 x 109 cells g-1). Microscopic examination, in laboratory conditions at different temperatures, showed that most of the isolates were able to form calcium carbonate microcrystals. The most crystalline precipitates were observed at 32°C. No precipitation was detected in un-inoculated controls media or in media that had been inoculated with autoclaved bacterial cells. X-ray diffraction (XRD) analysis showed that most of the carbonate crystals produced were calcite. Bacillus strains were the most common calcifying isolates collected from Stiffe's Cave. Analysis of carbonate-solubilization capability revealed that the non-calcifying bacteria were carbonate solubilizers.</abstract>
<keywords>bacteria, calcium carbonate precipitation, karst cave</keywords>
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<title>Development, management and economy of show caves</title>
<abstract>The problems concerning the development of show caves are here considered by taking into account different aspects of the problem. A procedure to carry out an Environmental Impact Assessment (EIA) has been established in the last decade and it is now currently applied. Such an assessment starts with a pre-operational phase to obtain sufficient information on the undisturbed status of a cave to be developed into a show cave. Successively a programme for its development is established with the scope to optimise the intervention on the cave at the condition that its basic environmental parameters are not irreversibly modified. The last phase of the assessment is focussed to assure a feedback through a monitoring network in order to detect any unforeseen difference or anomaly between the project and the effective situation achieved after the cave development. Some data on some of the most important show caves in the world are reported and a tentative evaluation of the economy in connection with the show caves business is eventually made.</abstract>
<keywords>Environmental Impact Assessment, Show Caves</keywords>
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<title>Revision of a few hypotheses on speleogenesis</title>
<abstract>Quite often, as we know better karst phenomena and the evolution of the karst environment, several hypotheses on speleogenesis appeared to be flimsy. Some of these hypotheses, concerning processes playing a part in the creation of karst forms, exceed the limits of their field. Others suggest hydraulic mechanisms, and interventions of geological or geographical factors likely to be questioned. Hypotheses relating to the evolution of karst, as well as the classification of karst types, suffer from the lack of an analytical approach. However, some of these hypotheses still have an important place in the current vision of speleologists and karstologists.</abstract>
<keywords>speleogenesis, theories, history</keywords>
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<title>Verification of the causes of glaciations and sea level changes using the records of calcite speleothems</title>
<abstract>The luminescence of calcite speleothems displays an exponential dependence on soil temperature unless there is a dense cover of forest over the cave to dampen it. This relationship is determined primarily by the strength of solar visible and infrared radiation. It is suggested that, as a consequence, the microzonal variations of luminescence often found in speleothems can be used as a proxy index of Solar Insolation. The luminescence solar insolation proxy record of a speleothem from Jewel Cave, South Dakota, USA, was found to display millenial and centennial cycles in the record. It exhibits a rapid increase in solar insolation at 139 ± 5.5 kyrs. This increase precedes that suggested by the Orbital theory by about 10,000 years and is due to superimposition of the most powerful cycle in solar luminosity of 11.5 kyrs, upon the curve of orbital variations. The record from a speleothem in Duhlata Cave, Bulgaria matches that of South Dakota within the limits of dating error, indicating that both of these records (which are 10,000 km apart) measure global solar insolation controls rather than local paleotemperature variations.</abstract>
<keywords>glaciations, sea level, records, speleothems, Bulgaria, United States of America</keywords>
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<title>The influences of cave tourism on CO2 and temperature in Baiyun cave, Hebei, China</title>
<abstract>Baiyun Cave in Hebei Province is one of the main show caves in North China. The speleothem landscape is wonderful, but strongly weathered. In order to set up the relationship between visitor flow and CO2 content and temperature, these parameters were measured at observation sites No. 1 and No. 2 in the tourist peak period of May Day Holiday from May 1 to May 7, 2000. and general tourist season August and October, 2000. The results show that visitor flow strongly affects the fluctuations of cave CO2 content and temperature, that the cave topography and dimensions affect the accumulation and diffusion of CO2. Variation of air temperature in the cave has shown to be attributable to the visitors.</abstract>
<keywords>Baiyun Cave, visitation, CO2 concentration, temperature</keywords>
<from>77</from>
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<id_volume>60</id_volume>
<volume>29 B (1/4) - 2000 [Physical Speleology]</volume>
<authors>Fuyuan Liang - Linhua Song - Xiaoning Wei.</authors>
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<title>Is it always dark in caves?</title>
<abstract>Underground natural sources of visible light are considered. The main light producer is Cerenkov radiation emitted in air, water and rock by cosmic ray muons, that depends, in a complex way, on shape of mountain and of caves. In general the illumination increases linearly with the cavity dimensions. Other light sources are from secondary processes generated by radioactive decays in rock from minerals luminescence. The natural light fluxes in caves are in general easy to detect but are not used from underground life.</abstract>
<keywords>muons underground, natural light in caves, Cerenkov radiation, caves darkness, Vostok lake, caves energy balance, rock radioactivity, beta decays, radon in caves</keywords>
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<title>New rare cave minerals from the Perolas-Santana karst system (Sào Paulo State, Brazil)</title>
<abstract>The Perolas-Santana karst system (Sào Paulo State, Brazil) has been partially studied from the mineralogical point of view. The present paper will contribute to the knowledge of the minerals in these caves, describing the occurrence of euhedral celestite crystals and of a rather rare mineral for a cavern environment: lithiophorite. Thanks to these new discoveries the Perolas-Santana karst system becomes one of the most important in Brazil from a mineralogical point of view. Finally, the result of the chemical analyses carried out on this newly discovered Monoxyhydroxide put in evidence a zonation in the distribution of the different elements which may be related to several subsequent depositional events characterized by solutions with a chemical content variable in time.</abstract>
<keywords>lithiophorite, chemistry, cave minerals, Perolas-Santana, Brazil, Brasil</keywords>
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<volume>29 B (1/4) - 2000 [Physical Speleology]</volume>
<authors>Paolo Forti - Ermanno Galli - Antonio Rossi.</authors>
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<title>Agriculture, grazing and land changes at the Serra de Tramuntana Karstic Mountains</title>
<abstract>Karst landforms are one of the most outstanding characteristics of the Serra de Tramuntana range on the island of Mallorca, especially regarding traditional farming and the landscape wilderness. Good examples of polje-like depressions, dolines, karstic gorges and karrenfields are widely distributed over the mountain range. Owing to karrenfields occupying a large surface area in the Serra to the exclusion of arable land, the traditional activity based on the repetitive burning of the Ampelodesmos mauritanica brushwoods for cattle-raising promotes hastening deforestation and soil removal.</abstract>
<keywords>traditional farming, deforestation, agriculture on-karst, livestock on-karst, Mediterranean karst</keywords>
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<title>Impacts of agricultural transformation on the principal karstic regions of France</title>
<abstract>The recent extension of intensive agriculture on the karst plateaus has caused different types of impact: soil management, generalised and/or localised pollution. Yet paradoxically rural depopulation can also have negative impacts, which largely depend on the characteristics and the hydrological function of the different karst environments. They are often negative, particularly as far as the water quality is concerned, which is why protection measures are undertaken, either in a defined area for a catchment, or in the framework of regional parks. But this is not always the case, so it is appropriate to analyse the problem of karst pollution as a whole, and to propose to experiment new solutions to mitigate the impacts.</abstract>
<keywords>karst, intensive agriculture, pollution, reserves, France</keywords>
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<volume>28 B (1/4) - 1999 [Karst and Agriculture in the World]</volume>
<authors>Jean Nicod - Jean-Noel Salomon.</authors>
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<title>Agriculture, landscape and human impact in some karst areas of Italy</title>
<abstract>Italy is made up for about 1/5 of its surface by soluble rocks, which represent the arena of karst environments. The karst morpho-units, some hundreds, are mainly distributed inside the alpine structure of the Mediterranean mountains. A very large number of rock formations are present, different in facies, lithology, age, etc. Among these, carbonate rocks prevail, followed by gypsum and salt. Most of the carbonate rocks are limestones sedimented in a platform environment and they show a wide range of porosity, frequency of fractures and bedding planes. The climatic processes, the expression of some different sub-types of Mediterranean climate (from the typical Mediterranean to sub-atlantic and sub-continental varieties), are the main control of the recent morphodynamics inside the karst morpho-units. In some areas the variability of precipitation is very high. The soil-water deficit during summer, together with the steep slopes, makes these environments highly vulnerable to human impact, especially in relation to soil use for grazing and agriculture. The soils, with enriched mineral contents from the fall of loess-like sediments or of volcanic ashes, were surely very appealing to the first farmers.</abstract>
<keywords>Italy soluble rocks</keywords>
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<volume>28 B (1/4) - 1999 [Karst and Agriculture in the World]</volume>
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<title>Land use and human impact in the Dinaric karst</title>
<abstract>The artice presents Dinaric karst, human impacts in the area, and its long history of deforestation, transformation into stony semi-desert, and a century long reforestation, where plans to restore the primary thick soil were just hoping against hope.</abstract>
<keywords>human impact, Dinaric karst, farming methods, reforestation</keywords>
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<title>Agriculture and nature conservation in the Moravian karst (Czech Republic)</title>
<abstract>Moravian Karst is a narrow strip of limestone with long history of settlement, agricultural use and man impact to karst. It is naturally divided into smaller units - karst plateaus - separated by deep valleys (glens). Each plateau has different proportion of land use, i.e. the percentage of agricultural land, forests, etc. The agricultural land constitutes now up to 70% in the north and max. 30% in the centre and south of the total area of plateaus. Intensive agricultural use of the arable land since 60ties of this Century caused great impact to quality of soils and groundwater by overdoses of fertilisers and other artificial chemical substances. Detailed research in 1980 to 1997 resulted in a plan of care based on the zonation of land. There were defined zones with different degree of restriction of land use, agricultural activities and application of fertilisers and biocides. Arable lands has been gradually changed to meadows and pastures by introduction of grass since 1987 in the most strictly protected zone to protect especially subsurface karst forms.</abstract>

<keywords>Moravian karst, land use, pollution, nature conservation, Czech Republic</keywords>
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<volume>28 B (1/4) - 1999 [Karst and Agriculture in the World]</volume>
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<title>Impacts of agricultural land use on some Hungarian karst regions</title>
<abstract>The karst regions are found in the medium altitude mountains of Hungary. Their land use types are natural and sustainable forestry, grazing and vineyards. In international comparison, Hungary belongs to those countries of Europe where arable land is abundant, therefore, in the future its extension has to be reduced. That means agricultural activity has to be restricted on the sensitive karst surfaces. This paper presents ways of sustainable forestry and other land use types for three karst regions of Hungary.</abstract>
<keywords>Hungary, human impact on karst, nature conservation</keywords>
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<title>Interaction between karst, water and agriculture over the climatic gradient of Israel</title>
<abstract>The dry climate of Israel and the karstic nature of its rocks have always imposed human innovation for utilisation of water resources and agriculture. Large perennial karst springs are available only in the lowlands, but sophisticated water supply systems were built both in the lowland and highland regions. Marl layers interbedded within carbonates give rise to local perched springs and allow terrace construction. Deforestation has taken place for some 4000 years, causing intense soil erosion, but terraces have reduced this impact.</abstract>
<keywords>fluviokarst, karst springs, east Mediterranean, water supply, deforestation, human impact, Israel</keywords>
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<title>Land use in the karstic lands in the Mediterranean region</title>
<abstract>Karstic lands have special importance in terms of soil formation and land-use. Soil appears only on the flat and slightly undulating karstic lands, while soils are found along the cracks and bedding surfaces between the layers on the hilly karst areas although these lands are rocky in appearance. Karstic lands in the hilly area are not conducive to cultivation. But rocky areas create a favourable habitat for the growth of forests except in an arid climate. Because the tree roots easily follow and develop along the cracks in the limestone. As a general rule soil erosion does not occur on sub-horizontal karst surfaces due to the fact that atmospheric waters easily infiltrate along the cracks. Natural generation of vegetation like the maquis-type occurs via the root suckers, but coniferous trees such as cedar, fir, pine through seed dispersal. The clearance of natural vegetation on the karstic lands leads to the formation of bare lands. That is why the slopes of the limestone hillsides have been converted into bare and/or rocky terrains in places where natural vegetation has been completely destroyed.</abstract>
<keywords>soil formation, land use, land degradation, Mediterranean region</keywords>
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<title>Environmental vulnerability and agriculture in the karstic domain: landscape indicators and cases in the Atlas Highlands, Morocco</title>
<abstract>After the brief presentation of the major karstic areas in Morocco, the article focused essentially on the Atlas mountains to investigate the impact of the agriculture on the natural systems equilibrium. Socio-economic changes (demographic pressure, escalation of the landscape use, utilisation of new techniques in water harvesting, etc...) have sometimes fathered mechanisms of degradation. Many indicators seem to reflect these mechanisms. The pedologic indicators, soil erosion, the hydrologic and geomorphic indicators, are apprehended to demonstrate existent correlation between different variables and the often negative impacts of land over-use in the karstic domain of the Middle Atlas.</abstract>
<keywords>Morocco, Karst, Atlas, agriculture, impact</keywords>

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<title>Sustainable development of agriculture in karst areas, South China</title>
<abstract>res to improve the ecological and sustainable development of the agriculture in the karst areas.</abstract>
<keywords>South China, human impact on karst, sustainable development</keywords>
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<title>Karst and agriculture in Australia</title>
<abstract>Much of the development and degradation of karst lands in Australia has occurred in the last two centuries since European settlement. Recent prolonged El Nino events add further climatic uncertainty and place real constraints on sustainable agriculture. The lower southeast of South Australia is perhaps the one area in Australia where karst, and particularly karst hydrology, impinge on the daily lives of the community in that pollution and overexploitation of the aquifer are readily apparent to the local population. Effluent from intensive dairy farms, piggeries and cheese factories enters the karst and has caused concern over pollution of water supplies. Human impacts on the Mole Creek karst of Tasmania have been well documented. The principal recent impacts on the karst arc associated with land clearance for farmland, forest cutting for timber, road building, refuse disposal and associated hydrological change. There is similar evidence of agricultural impacts un karst in central New South Wales, with clear evidence of vegetation clearance and soil stripping on the limestones at Wellington, Orange and Molong.</abstract>
<keywords>Australia, human impact on karst, water pollution, soil erosion</keywords>
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<title>Land use in the tropical karst - the case of Peruaçu, Januària and Jaiba; SE Brazil</title>
<abstract>The karstic regions of the municipalities of Peruaçu, Januària and Jaiba present a variety of soil uses which are a function of the organization of the karstic relief. This relief system forms a rift, which received fluvial sediments deposition from the Sào Francisco River. The horst of the Peruaçu plateau is developed on limestone rocks of Late Proterozoic age with a high concentration of calcium carbonate. The South American Surface was formed on this and is today occupied by cattle ranching. In the graben, due to easy irrigation from underground karst waters and because of the nearby drainage system of the Sào Francisco River, a mechanized and specialized farming system has developed. The change in the management of cattle breeding and in traditional farming methods has had a substantial impact on the economic structure of the community and also on the karst itself.</abstract>
<keywords>Brazil, Brasil, land use, human impact</keywords>
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<volume>28 B (1/4) - 1999 [Karst and Agriculture in the World]</volume>
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<title>Agricultural use and water quality at karstic Cuban western plain</title>
<abstract>In the paper some results of studies on the karstic aquifers of the western plain of Cuba are presented and discussed. The intensive exploitation of these aquifers for agriculture use and drinking water supply induces an increase of marine water intrusion, water salinisation and a progressive increase of chemical corrosion with a greater dissolution of carbonates. During the period of study (1983-1998) a trend in the deterioration of water quality was observed by means of a chronological series of hydrochloride content.</abstract>
<keywords>karst aquifers, salt water intrusion, Cuba</keywords>
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<title>Overview of the 8th International Symposium on Vulcanospeleology.</title>
<abstract>In February 1998 the 8h International Symposium on Vulcanospeleology was hosted by CEGEA (Cave Exploration Group of East Africa) in Nairobi, Kenya: it was attended by 16 scientists coming from 4 continents. Pre- and Post- Symposium excursions allowed the participants to have an overview on the most important and famous volcanic cave of that area.</abstract>
<keywords>Volcanic caves, symposium, Kenya</keywords>
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<title>Volcanic caves of East Africa - an overview.</title>
<abstract>Numerous Tertiary to recent volcanoes are located in East Africa. Thus, much of the region is made up volcanic rock, which hosts the largest and greatest variety of East Africas caves. Exploration of volcanic caves has preoccupied members of Cave Exploration Group of East Africa (CEGEA) for the past 30 years. The various publications edited by CEGEA are in this respect a treasure troves of speleological information. In the present paper an overview on the most important volcanic caves and areas are shortly reported.</abstract>
<keywords>vulcanospeleology, lava tubes, East Africa, Kenya, Congo, Uganda, Rwanda, Tanzania, Ethiopia</keywords>
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<title>The Cave Exploration Group of East Africa and volcanic caves in Kenya.</title>
<abstract>This paper looks at the history of the Cave Exploration Group of East Africa with special reference to the exploration of volcanic caves. It demonstrates that the group has concentrated on two main areas, the Chyulu Hills and Mt. Suswa, although other areas have also been studied. The Cave Exploration Group of East Africa has had to cope with various problems. The most important of which are related to the socio-economic conditions of a developing country. These problems have not prevented the group from making a valuable contribution to vulcanospeleology.</abstract>
<keywords>vulcanospeleology, Caving Club, Kenya</keywords>
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<title>Guano mining in Kenyan lava tunnel caves.</title>
<abstract>Commercial mining of bat guano for agricultural fertilizer only became possible in Kenya through discovery of major deposits in the lava tunnel caves of Mt. Suswa and the North Chyulu Hills in the early 1960's. This paper provides historical information leading up to the guano mining, describes the cave deposits, outlines the mining under-takings, and provides information on the guano producing bats and insect faunas. The results of guano analyses, details of the tonnages extracted and sold to recipients between 1966 to 1984, and some benefits which resulted from its use on crops are given. A brief outline of attempts to conserve the areas and caves is also included.</abstract>
<keywords>Guano, History, Kenya</keywords>
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<title>Lave caves of Kilimanjaro. Mawenzi lava tubes.</title>
<abstract>This is the first short report on the exploration of lava tubes in the upper part of Kilimanjaro. The area seems to be extremely interesting from vulcanospeleological point of view.</abstract>
<keywords>Vulcanospeleology, lava tubes, Kenya</keywords>
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<title>"Hades" - A remarkable cave on Oldoinyo Lengai in the East African Rift Valley.</title>
<abstract>Oldoinyo Lengai is the world's only active carbonatite volcano, situated in northern Tanzania within the Eastern Rift Valley, al 2.751 degrees S, 35.902 degrees E. It forms an isolated symmetrical cone at the southern end of Lake Natron, with a summit elevation of 2,890 m (9,480 ft). Periodic eruptions of ash and lava have been recorded since about 1880, and with increasing precision during this century since 1904. In 1990 a routine expedition to monitor activity levels at the summit led to the discovery of a remarkable cave located in the crater floor, filled with numerous long delicate pale yellow stalactites and stalagmites of unknown composition. Within 100 m there was considerable volcanic activity taking place, and black lava was spraying from a small cone at a height of some 10 m above the crater floor. Due to the regular emission of lava at the summit of Lengai it is unlikely that the cave could have survived intact for more than a few months at most. High internal temperatures and lack of safe access precluded any attempt at entry and sampling of the very unusual and attractive formations within the cave, but a good photographic record was obtained.</abstract>
<keywords>Speleothems, Volcanic caves, Tanzania</keywords>
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<title>Tectonic caves of Solai in the Kenyan Rift Valley.</title>
<abstract>Tectonic caves al Solai, Kenya, were explored in 1970. These lie in a complex geological area of the Great Rift Valley in columnar-faulted ignimbrite. Fissures are presumed to have been widened by later tectonic activity -e.g. the major earthquake of January, 1928. The caves and exploration are briefly described. Questions of formation, drainage and possibilities of steam reservoirs are discussed.</abstract>
<keywords>Vulcanospeleology, tectonic caves, Rift Valley, Kenya</keywords>
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<title>Lava caves of Grande Comore, Indian Ocean: an initial reconnaissance, September 1997.</title>
<abstract>What are believed to have been the first speleological investigations in the Comoros Islands were carried out on Grande Comore island between 7 and 13 September 1997. A number of caves were located with the help of local informants and the more significant ones surveyed. Exploration of some caves was not able to be completed. The potential for further significant discoveries is believed to be high.</abstract>
<keywords>Vulcanospeleology, lava tubes, Comore Islands</keywords>
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<title>Lava caves of the Republic of Mauritius, Indian Ocean.</title>
<abstract>In their Underground Atlas, MIDDLETON & WALTHAM (1986) dismissed Mauritius as: "very old volcanic islands with no speleological interest". Recent investigations indicate this judgement is inaccurate; there are over 50 significant caves, including lava tube caves up to 687 m long

(one 665 m long was surveyed as early as 1769) and 35 m wide. Plaine des Roches contains the most extensive system of lava tube caves with underground drainage rising at the seashore. Notable fauna includes an insectivorous bat and a cave swiftlet (Collocalia francica), the nests of which are unfortunately prized for 'soup". The caves are generally not valued by the people and are frequently used for rubbish disposal or filled in for agricultural development.</abstract>
<keywords>Vulcanospeleology, Lava tubes, Mauritius</keywords>
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<authors>Gregory J. Middleton.</authors>
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<title>Hollow volcanic tumulus caves of Kilauea Caldera, Hawaii County, Hawaii.</title>
<abstract>In addition to lava tube caves with commonly noted features, sizable subcrustal spaces of several types exist on the floor of Kilauea Caldera. Most of these are formed by drainage of partially stabilized volcanic structures enlarged or formed by injection of very fluid lava beneath a plastic crust. Most conspicuous are hollow tumuli, possibly first described by Walker in 1991. Walker mapped and described the outer chamber of Tumulus E-I Cave. Further exploration has revealed that it has a hyperthermic inner room beneath an adjoining tumulus with no connection evident on the surface. Two lengthy, sinuous hollow tumuli also are present in this part of the caldera. These findings support Walkers conclusions that hollow tumuli provide valuable insights into tumulus-forming mechanisms, and provide information about the processes of emplacement of pahoehoe sheet flows.</abstract>
<keywords>Geomorphology, Lava caves, Speleogenesis, Hawaii</keywords>
<from>95</from>
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<volume>27 B (1/4) - 1998 [Vulcanospeleology, Proc. 8th Int. Symp. Vulcanospeleology]</volume>
<authors>William R. Halliday.</authors>
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<title>Sheet flow caves of Kilauea Caldera, Hawaii County, Hawaii.</title>
<abstract>Terminal lobes of sheet flows of pahoehoe lava sometimes form three-dimensional nests, initially separated by partitions consisting of accreted 'skins" of each lobe. Melting breaks down these partitions, forming a uniform flow unit. In Kilauea Caldera we have found and mapped sizable drained cavities in low-slope sheet flows. Their general pattern includes three-dimensional nests, with partially melted septa evident in some examples. Christmas Cave is the most extensive found to date, with 632 meters surveyed on two levels. It is located at the lower end of an inflated sheet flow tongue which underwent local deflation as a result of drainage through the cave after its parameters were partially fixed. Small conduit remnants persist in its boundary ridges. The major part of the cave consists of wide, low nestled chambers. Meltdown of such partitions is one of the few emplacement mechanisms of thermal erosion which may not involve any mechanical element. Additional caves in this caldera are being identified and studied.</abstract>
<keywords>Geomorphology, Volcanic caves, Speleogenesis, Hawaii</keywords>
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<authors>William R. Halliday.</authors>
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<title>"Pit Craters", lava tubes, and open vertical volcanic conduits in Hawaii: a problem in terminology.</title>
<abstract>Almost from the 1849 publication of the term pit crater, volcanologists have disagreed about the parameters differentiating these features from other vertical volcanic structures. Kaluaiki is a jameo giving entry to Thurston Lava Tube in Hawaii Volcanoes National Park. Long-standing misidentification of it as a pit crater is an example of misunderstandings arising from the lack of a clear definition of pit crater. In general, pit craters are unrelated to lava tube caves genetically, but two special cases are discussed. One probably is genetically related to a rift tube deep below the surface; the other is a complex of a small pit crater with a partial rim of accreted plates plus an ordinary-seeming lava tube cave. The term pit crater should be redefined in such a way that it excludes collapses or subsidences related to ordinary superficial lava tubes and open vertical volcanic conduits. Otherwise, a non-definition like that currently listed for agglomerate may be appropriate.</abstract>
<keywords>Vulcanospeleology, Volcanic caves, Terminology, Hawaii</keywords>
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<authors>William R. Halliday.</authors>
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<title>Lava tube remelt by radiant heat and burning gasses.</title>
<abstract>Some volcanologists assume that interior surfaces of hot lava tubes can commonly he remelted by burning gases and radiant heat. Pending further data, this appears to be unlikely.</abstract>
<keywords>Lava tubes, Speleogenesis, Radiant Heat</keywords>
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<title>The origin of tubular lava stalactites and other related forms.</title>
<abstract>Tubular lava stalactites are often found in lava tubes. Field observations, sample analysis, and comparative studies indicate that these are segregations extruded during cooling from partially crystallized lava al about 1,070 - 1,000 °C. Retrograde boiling (gas pressure) within the lava provides a mechanism to expel the interstitial liquid. In addition to tubular lava stalactites, a variety of other lava features can also result, such as lava helictites, lava coralloids, barnacle-like stretched lava, runners, runner channels, and some lava blisters and squeeze-ups.</abstract>
<keywords>Lava speleothems, Soda straws, Experimental growth</keywords>
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<volume>27 B (1/4) - 1998 [Vulcanospeleology, Proc. 8th Int. Symp. Vulcanospeleology]</volume>
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<title>The 1981 eruptive fissure on Mt. Etna: considerations on its exploration and genesis.</title>
<abstract>This paper is targeted to an analysis of features common to various fissure caves on Mt. Etna, Sicily. The Authors report the preliminary results of the exploration carried out in the 1981 eruptive fissure, the technical problems met during the exploration, the flow trends and the different courses of the molten material inside the fissure, the particular morphologies. A genetic model is proposed, different from those characterising the lava tube cave genesis, and links are suggested between the various fissures and the main tectonic stress systems operating on Mt. Etna, as well as the morpho-structural conditions of the volcanic edifice of Mt. Etna.</abstract>
<keywords>Speleogenesis, eruptive fissure, Mount Etna, Italy</keywords>
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<volume>27 B (1/4) - 1998 [Vulcanospeleology, Proc. 8th Int. Symp. Vulcanospeleology]</volume>
<authors>Angelo Leotta - Marco Liuzzo.</authors>
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<title>Chemical deposits in volcanic caves of Argentina.</title>
<abstract>During the last Conference of the FEALC (Speleological Federation of Latin America and Caribbean Islands) which was held in the town of Malargue, Mendoza, in February 1997, two volcanic caves not far from that town were visited and sampled for cave mineral studies. The first cave (Cueva del Tigre) opens close to the Llancanelo lake, some 40 kms far from Malargue and it is a classical lava tube. Part of the walls and of the fallen lava blocks are covered by white translucent fibres and grains. The second visited cave is a small tectonic cavity opened on a lava bed some 100 km southward of Malargue. The cave "El Abrigo de el Manzano" is long no more than 10-12 meters with an average width of 3 meters and it hosts several bird nests, the larger of which is characterized by the presence of a relatively thick pale yellow, pale pink flowstone. Small broken or fallen samples of the secondary chemical deposits of both these caves have been collected in order to detect their mineralogical composition. In the present paper the results of the detailed mineralogical analyses carried out on the sampled material are shortly reported. In the Cueva del Tigre lava tube the main detected minerals are Sylvite, Thenardite, Bloedite and Kieserite, all related to the peculiar dry climate of that area. The flowstone of "El Abrigo de el Manzano" consists of a rather complex admixture of several minerals, the large majority of which are phosphates but also sulfates and silicates, not all yet identified. The origin of all these minerals is related to the interaction between bird guano and volcanic rock.</abstract>
<keywords>Cave minerals, Volcanic caves, Argentina</keywords>
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<authors>Carlos Benedetto - Paolo Forti - Ermanno Galli - Antonio Rossi.</authors>
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<title>Les deux faces de la pensée de E.A. Martel.</title>
<abstract>Réunion de textes de Martel: 1 - Extraits du Nouveau Traité des Eaux Souterraines (1921), donnant l'essentiel de la pensée de l'auteur sur l'hydraulique et la morphologie du karst. 2 - En opposition à cette vision, rappelée de nombreuses fois par l'auteur, extraits de diverses publications (de 1894 à 1930), admettant qu'un fonctionnement en régime noyé était possible: Martel est donc l'un des tout premiers ayant observé des formes de creusement en régime noyé, et les ayant interprétées comme telles.</abstract>
<keywords>Edouard-Alfred Martel, History</keywords>
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<title>The significance of E.A. Martel for Speleology in Slovenia.</title>
<abstract>Three times Martel visited karst in Carniola: in 1879, 1893 and 1896. The importance of his visits and later publications lies in fact that he informed the francophone public about our karst and caves; his visit stimulated the introduction of new technical means into the then Austrian speleology (folding boat, portable telephone); in 1893 due to his researches Postojnska jama became the longest cave in Europe; public found out about existence of caving society Anthron, which was the first Slovene and Slav society of the kind; he set up the foundations of international speleological co-operation and included into it Austrian speleologists; he informed the public about Putick and his researches of karst underground; unknowingly he helped to introduce the term "karst" into francophone public.</abstract>
<keywords>Slovenia, Edouard-Alfred Martel, History, Kras, Skocjanske Jame Cave</keywords>
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<title>Martel's links with USA.</title>
<abstract>Of the 29% foreign members in the Société de Spéléologie, five lived in USA. They were Luella Owen (the only woman member of the Société), R. Ellsworth Cali, H.C. Hovey, E Van Epps and C. R. Blackall. E.S. Balch, though not a member, also knew Martel. These members, between them, published ten papers in Spelunca, which also reviewed their other work. The activities of these six, and their links with France, are discussed. Martel actively encouraged cave work in America, as elsewhere, and Hovey, who had been with him during the survey of Aven Armand, he knew quite well. In 1912 Martel at last visited USA himself and the barometer readings he took in Mamoth Cave to measure altitude enabled him to draw the first longitudinal section of the cave since 1835.</abstract>
<keywords>United States of America, Edouard-Alfred Martel, History, Mammoth Cave</keywords>
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<title>Edouard-Alfred Martel et les cavernes de la Belgique.</title>
<abstract>An exhaustive report on the activity of Martel in Belgium is here given. In particular some relevant passages of Martel's letters and papers are also included.</abstract>
<keywords>Belgium, Edouard-Alfred Martel, History</keywords>
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<title>Martel's voyage to Russia in 1903.</title>

<abstract>The news concerning caves and karst reported in a Martel's book on his voyage to Russia in 1903 are here listed and the cave maps are reproduced.</abstract>
<keywords>Russia, Edouard-Alfred Martel, History</keywords>
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<title>Are troglobitic taxa troglobiomorphic? A test using phylogenetic inference</title>
<abstract>Obligate cave dwelling organisms are frequently characterised by a peculiar morphological syndrome, named troglomorphosis or troglobiomorphosis. This hypothesis, which deals with the evolutionary influence of the subterranean environment on cave organisms is far from being universally accepted. Yet it has been adopted by many authors and is often included in the definitions of the current classification of cave taxa. In this paper I present a test of the troglobiomorphosis hypothesis, using the case study of the cricket clade Amphiacustae (Orthoptera, Grylloidea, Phalangopsidae). Such a test preliminarily requires that observations of the habitat of the taxa (achieved on present-day populations) are clearly separated from hypotheses on the evolutionary transformations of cave taxa (troglobiomorphosis hypothesis s. str.). The evolutionary hypotheses on troglobite morphology are tested using phylogenetic inference, that is by parsimoniously mapping the states of several morphological characters (eye size, body colour, relative hindleg size) onto the cladogram of the Amphiacustae. According to these phylogenetic analyses, the troglobiomorphosis hypothesis is corroborated by the patterns reconstructed for eye size and body coloration characters, but is refuted by the patterns built for hindleg size.</abstract>
<keywords>Amphiacustae, Orthoptera, Grylloidea, phylogenesis</keywords>
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<title>The Hawaiian cave planthoppers (Homoptera: Fulgoroidea: Cixiidae) - A model for rapid subterranean speciation?</title>
<abstract>After the successful colonization of a single ancestral species in the Hawaiian Islands, planthoppers of the cixiid genus Oliarus underwent intensive adaptive radiation resulting in 80 described endemic species. Oliarus habitats range from montaneous rain forests to dry coastal biotopes and subterranean environments. At least 7 independant evolutionary lines represented by different species have adapted to lava tubes on Molokai (1), Maui (3), and Hawaii Island (3). Behavioral and morphological studies on one of these evolutionary lines on Hawaii Island, the blind, flight- and pigmentless Oliarus polyphentus have provided evidence for reproductive isolation between allopatric populations which may in fact be separate species. Significant differences in song parameters were observed even between populations from neighbouring lava tubes, although the planthoppers are capable of underground migration through the voids and cracks of the mesocavernous rock system which is extant in young basalt: after a little more than 20 years, lava tubes within the Mauna Ulu 1974 flow had been colonized by O. 'polyphenius" individuals, most probably originating from a near-by forestkipuka. Amazingly, this species complex is found on the youngest of the Hawaiian Islands, with probably less than 0.5 m.y., which suggests rapid speciation processes. Field observations have led to the development of a hypothesis to match underground speciation with the dynamics of vegetational succession on the surface of active volcanoes. Planthopper range partitioning and geographic separation of populations by young lava flows, founder events and small population size may be important factors involved in rapid divergence.</abstract>
<keywords>Oliarus, Homoptera, Cixiidae, speciation, Hawaii</keywords>
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<title>Climatic fluctuations and tropical troglobitic evolution.</title>
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<title>A simple scenario for stygobitization in Stenobermuda Schultz, 1978 (Isopoda Asellota Stenetriidae), with description of a new species from Andros Island, Bahamas</title>
<abstract>Description of a new stygobitic and troglomorphic species of Stenobermuda from a Blue Hole in the Bahamas, is an opportunity for speculation about hypogean colonization by this and by another cave-dwelling species from Bermuda, starting from populations of a widely distributed Western Atlantic shallow water marine species.</abstract>
<keywords>Stenobermuda, Isopoda, Crustacea, Bahamas</keywords>
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<title>Geographic variation and genetic relationships in populations of the Androniscus dentiger complex from Central Italy (Isopoda, Oniscidea, Trichoniscidae)</title>
<abstract>Androniscus dentiger is a terrestrial isopod distributed from Great Britain to North Africa, inhabiting humid edafic environments, superficial underground compartments and both natural and artificial caves. In this study allozyme data have been used to investigate the geographic variation and the genetic relationships of several populations of A. dentiger from Central Italy, using as outgroups populations from four congeneric species, A. calcivagus, A. cfr. subterraneus, A. spelaeorum, and A. degener. Multivariate analysis of A. dentiger allele frequencies indicates the existence of a group of populations (group A) distributed in a wide geographic area which are genetically slightly differentiated, and several populations (arbitrarily defined as group B) which show differentiation levels comparable to those observed between the morphologically well differentiated species. The low valley of the river Tiber seems to act as an effective geographic barrier between the populations from group A and the remaining ones. The genetic divergence between populations within the group A seems to have a recent origin. This is suggested by the low genetic distances and heterozygosity values within the group A, and by the very low number of private alleles occurring in this group. The high degree of intraspecific and interspecific genetic differentiation is not consistent with the levels of morphological differentiation traditionally used to distinguish different species within this genus. On the whole, these data suggest that A. dentiger might be considered as a complex of cryptic/sibling species.</abstract>
<keywords>Androniscus, Crustacea, Isopoda, Central Italy, geographic variations, genetic differentiation</keywords>
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<authors>Giuliana Allegrucci - Gabriele Gentile.</authors>
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<title>Genetic divergence and evolutionary times: calibrating a protein clock for South-European Stenasellus species (Crustacea, Isopoda)</title>
<abstract>We studied genetic divergence in a group of exclusively stygobiont isopods of the family Stenasellidae. In particular, we assessed evolutionary relationships among several populations of Stenasellus racovitzai and Stenasellus virei. To place this study in a phylogenetic context. we used another species of Stenasellus, S. assorgiai, as an outgroup. S. racovitzai occurs in Corsica, Sardinia and in the fossil islands of the Tuscan Archipelago, while S. virei is a polytypic species widely distributed in the central France and Pyrenean area. This vicariant distribution is believed to be the result of the disjunction of the Sardinia-Corsica microplate from the Pyrenean region and its subsequent rotation. Since geological data provide time estimates for these events, we can use the genetic distance data to calibrate a molecular clock for this group of stygobiont isopods. The calibration of the molecular clock reveals a roughly linear relationship (r = 0.753) between the genetic distances and absolute divergence times, with a mean divergence rate (19.269 Myr/DNei,) different from those previously reported in the literature and provides an opportunity to shed some light on the evolutionary scenarios of other Stenasellus species.</abstract>
<keywords>genetic divergence, Stenasellus, Isopoda, Crustacea, protein clock</keywords>
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<title>Long term stability of a terrestrial cave community</title>
<abstract>We report data on the spatial structure and seasonal variation of the community of Valmarino cave, a medium sized sandstone cave, located a few kilometres from the coast line, in Central Italy. Due to both its habitat features and its relatively recent geological history, Valmarino cave is only inhabited by terrestrial, troglophilic elements, i.e facultative cave dwellers. By means of monthly censuses and density plot estimates we have investigated species abundance, diversity and their spatial organization, by considering separately samples from different cave sectors. Homogeneous sampling design allowed to compare series of samplings performed in 1974 and 1994. On the whole 21 arthropods and one snail species constitute the cave community. Ordination plots resulting from correspondence analyses of monthly samples outline a distinct spatial and temporal structure. Two main sub-communities can be identified: a inner subcommunity, mainly represented by eu-troglophilic species, showing a remarkable stability

throughout the year and an outer sub-community, mainly represented by sub-troglophilic species, showing strong seasonal variation. Both spatial and temporal vectors show similar importance in shaping the community structure. An interesting result of this study is the long term stability of both spatial and seasonal components of the community structure which remained almost identical after 20 years, as shown by the comparison of ordination plots obtained from 1974 and 1994 sampling series. Therefore this study provides empirical evidence of a frequently hypothesised, albeit never demonstrated feature of the cave ecosystem.</abstract>
<keywords>Valmarino cave, Central Italy, cave ecosystem, evolution</keywords>
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<title>Sulphate rocks as an arena for karst development.</title>
<abstract>The rocks in which karst systems develop are most commonly composed of carbonate sulphate and chloride minerals. The sulphate minerals are quite numerous, but only gypsum and anhydrite form extensive masses in sedimentary sequences. Other minerals, which represent sulphates of K, Mg and Na, normally occur as minor beds (0.1-5.0 m), or as inclusions associated with chloride rocks. However some minerals precipitated in salt-generating basins, such as mirabilite and glauberite (typically formed in the Kara-Bogaz-Gol Gulf, salt lakes of Siberia and in China), form sequences up to 5-10 m thick where karst may develop. Due to the very high solubility of Na -sulphates, karst processes and features occurring in these rocks resemble salt karst. Thus, the term sulphate karst, although not strictly correct, is used mainly to indicate karst developed in gypsum and anhydrite.</abstract>
<keywords>Gypsum, Anhydrite, karst, sulphates</keywords>
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<volume>25 (3/4) - 1996 [Gypsum Karst of the World (Eds. Alexander Klimchouk, David Lowe, Anthony Cooper and Ugo Sauro]</volume>
<authors>Vjacheslav Andrejchuk - Alexander Klimchouk.</authors>
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<title>The dissolution and conversion of Gypsum and Anhydrite.</title>
<abstract>The development of karst is a complex system driven by the dissolution of a host rock and the subsequent removal of dissolved matter by moving water. It is the process that, at various stages, initiates or triggers associated processes including erosion, collapse and subsidence. The dissolution of sulphate rocks proceeds by different mechanisms and at different rates to those associated with the dissolution of carbonate rocks. For each rock type different factors influence the process. This chapter is an attempt to summarise the present knowledge of the dissolution chemistry and kinetics of gypsum and anhydrite. These are important for the genetic interpretation of karst features in these rocks. The gypsum-anhydrite-gypsum transitions and recrystallization processes are also addressed, because of their importance to karst development.</abstract>
<keywords>Gypsum, Anhydrite, Sulphates, Karst, Dissolution, Chemistry</keywords>
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<title>Dissolution of Gypsum from field observations.</title>
<abstract>The paper reports the results of field measurements of gypsum dissolution in various countries (Ukraine, Spain, Italy and others) and in different environments (river waters, precipitation, vadose zone, unconfined aquifer, perched cave lakes, ephemeral streams in caves, confined aquifer, cave air).</abstract>
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<volume>25 (3/4) - 1996 [Gypsum Karst of the World (Eds. Alexander Klimchouk, David Lowe, Anthony Cooper and Ugo Sauro]</volume>
<authors>Sergey Aksem - José Maria Calaforra - Franco Cucchi - Furio Finocchiaro - Paolo Forti - Alexander Klimchouk.</authors>
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<title>The typology of Gypsum karst according to its geological and geomorphological evolution.</title>

<abstract>Definition of karst in gypsum and explanation of different types of karst in gypsum: intrastratal, exposed, covered, buried, exumed and palaeokarst.</abstract>
<keywords>Gypsum, Karst, Geology, Geomorphology</keywords>
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<title>Speleogenesis in Gypsum.</title>
<abstract>Satisfactory explanation of the origin and development of caves (speleogenesis) is a core problem of karst studies. Karst evolves as a circulation system, organised and interconnected through a conduit structure. Such a system may include superficial inputs and outputs, expressed as or related to karst landforms. However, there may be no such components if the system is represented entirely by conduits as in the case with deep-seated intrastratal karst. The main differences between speleogenesis in gypsum and in carbonate rocks lie in the chemistry and kinetics of their dissolution, in some of the lithological or structural peculiarities of the respective rocks and formations, and in their hydrogeological characteristics. The present chapter considers how these factors influence cave origin and development. </abstract>
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<title>Hydrogeology of Gypsum formations.</title>
<abstract>Detailed explanation of hydrogeological characteristics of gypsum aquifers is given in various situations: deep-seated karst-confined conditions, subjacent, entrenched and denuded karst types-semi-confined, phreatic and vadose conditions. The hydrogeological evolution of barren exposed gypsum karst and flow velocities in gypsum karst aquifers is also discussed.</abstract>
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<title>Speleothems and cave minerals in Gypsum caves.</title>
<abstract>For many years gypsum karst was considered to contain little of interest from the point of view of chemical deposits. Relatively recently a general study of speleothems has begun within gypsum karst areas in different climatic zones around the world. So far this ongoing research has shown that gypsum karst can be very interesting in terms of its contained chemical deposits. In this chapter, all that is currently known about speleothems in gypsum caves is reported systematically, and the distinctive climatic control over them is emphasised.</abstract>
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<id_art>52</id_art>
<title>Geomorphological aspects of gypsum karst areas with special emphasis on exposed karst.</title>
<abstract>Medium- to large-size forms in gypsum karst are described, including dolines, blind valleys, ploje-like depressions, collapses and positive and/or residual forms such as outliers, cone-like hills, dome-like hills, mesa-like tabular blocks and plateaux and breccia pipe hills. The similarities and/or difference between gypsum and carbonate forms are discussed.</abstract>
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<id_art>53</id_art>
<title>Weathering crust and karren on exposed gypsum surfaces.</title>
<abstract>The evolution of gypsum bare rock surfaces is the result both of volume changes of the outer rock layer and mass wasting by dissolutional processes. Some unusual weathering processes induce an increase in the volume of the outer gypsum layer, resulting in the development of a "weathering crust" and of characteristic forms such as small ridges and bubbles. However, the more typical erosional forms are dissolutional ones of karren type, which are commonly interconnected, or superimposed upon the previously described forms. In this chapter a classification system is proposed and discussed, within which the magnitude, order and geometry of the different karren forms are outlined, and the related lithofacies and main morphogenetic processes are examined. </abstract>
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<title>Breakdown development in cover beds, and landscape features induced by intrastratal gypsum karst.</title>
<abstract>Intrastratal karst is by far the predominant gypsum karst type. Its development may begin in deep-seated settings within rocks already buried by younger strata, and it proceeds increasingly rapidly as uplift brings gypsum sequences into progressively shallower positions. Such development commonly occurs under confined (artesian) hydrogeological conditions, that subsequently change to open conditions (phreatic-water table-vadose). The general evolutionary line of intrastratal karst is typified by progressive emergence of a sequence into a shallower position, activation of groundwater circulation and development of cave systems within karst units, commencement of gravitational breakdown and its upward propagation through overlying beds, and development of a karst landscape. These processes and phenomena progress through the directed evolution of karst types as follows: deep-seated intrastratal karst (1K) to subjacent 1K to entrenched 1K to denuded karst. One of the main characteristics of intrastratal karst is that it induces gravitational breakdown in cover beds. With the aid of processes other then simple breakdown, such effects may propagate upwards and may, or may not, reach the surface, depending upon the thickness and structure of the overburden. A karst landscape evolves when such features reach the surface. This paper considers the conditions and mechanisms of such development. </abstract>
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<title>Environmental problems in gypsum karst terrains.</title>
<abstract>Description of environmental problems in gypsum karst areas, especially of the effects related to human impacts that are unique to gypsum karst systems or most commonly occur herein. The paper deals with pollution (oil, radioactive substances and fertilizers), mining activity, underground water abstraction, construction of dams and reservoirs, collapse and subsidence hazards giving examples of former Soviet Union.</abstract>
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<title>Gypsum karst of the World: a brief overview.</title>
<abstract>Short description of caves and karsts in gypsum of different parts of the World.</abstract>
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<title>Gypsum karst in the United States.</title>
<abstract>Gypsum is one of the most soluble of common rocks; it is dissolved readily to form caves, sinkholes, disappearing streams, and other karst features that typically are found in limestones and dolomites. The four basic requirements for gypsum karst to develop are: (1) a deposit of gypsum; (2) water, unsaturated with CaSO4 (3) an outlet for escape of dissolving water; and (4) energy to cause water to flow through the system. Gypsum deposits are present in 32 of the 48 conterminous United States, and they underlie about 35-40% of the land area; they are reported in rocks of every geologic system from the Precambrian through the Quaternary. Gypsum karst is known at least locally (and sometimes quite extensively) in almost all areas underlain by gypsum, and commonly extends down to depths of at least 30 m below the land surface. The most widespread and pronounced examples of gypsum karst are in the Permian basin of southwestern United States, but many other areas also are significant. Human activities may also cause, or accelerate, development of gypsum karst.</abstract>
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<title>Gypsum karst of Great Britain.</title>
<abstract>In Great Britain the most spectacular gypsum karst development is in the Zechstein gypsum (late Permian) mainly in north-eastern England. The Midlands of England also has some karst developed in the Triassic gypsum in the vicinity of Nottingham. Along the north-east coast, south of Sunderland, well-developed palaeokarst, with magnificent breccia pipes, was produced by dissolution of Permian gypsum. In north-west England a small gypsum cave system of phreatic origin has been surveyed and recorded. A large actively evolving phreatic gypsum cave system has been postulated beneath the Ripon area on the basis of studies of subsidence and boreholes. The rate of gypsum dissolution here, and the associated collapse lead to difficult civil engineering and construction conditions, which can also be aggravated by water abstraction.</abstract>
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<title>Gypsum karst of France.</title>
<abstract>Many small and scattered areas of gypsum karst are present in France. They occur in the plains and plateaux (Paris, Lorraine, Provence) as well as in the mountains, especially the Alps. Typical gypsum karst landforms are well developed and widespread, but underground cavities are scarce, despite much exploration and the apparent existence of subsurface waterflow. The Alps and Provence contain the largest karstic areas.</abstract>
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<title>Some examples of Gypsum karsts and the more important gypsum caves in Spain.</title>
<abstract>Spain possesses some of the most important examples of gypsum karst in Europe, in terms of the extent and variety of the gypsiferous outcrops. These are divided into gypsum belonging to the Triassic, Palaeogene and Neogene epochs, each of which displays different lithological and structural aspects. Some of Spain's most significant gypsum karsts, from the speleological standpoint, are described, and these share a common characteristic of all supporting the development of large caves. Reference is made to the geomorphology, hydrogeology and hydrochemistry of the gypsum karsts of Sorbas, Vallada and Gobantes-Meliones, which provide significant examples of intrastratal karst, speleogenesis by saline groundwater mixing and the influence of carbonate strata, respectively. Finally, brief geomorphological and speleogenetic descriptions of the more significant gypsum caves in Spain are given, together with a list of the longest and deepest gypsum caves in Spain.</abstract>
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<id_art>62</id_art>
<title>The gypsum karst of Italy.</title>
<abstract>Gypsum karst has been studied in Italy since the last decades of the l9th Century. In 1917 the geographer Olinto Marinelli published "Fenomeni carsici delle regioni gessose d'Italia", a fundamental synthesis of the early research. He distinguished 56 different morpho-karstic gypsum units and/or areas, which are all different in size and character, and described them, paying special attention to their surface morphology and hydrology. Marinelli listed all the main gypsum units and only a few secondary outcrops were overlooked. After Marinelli's synthesis, except for some discussion of archaeological caves, only a few papers about gypsum karst and environment were published until the nineteen-fifties. In the nineteen-sixties and seventies much exploratory work and documentation was carried out in the Emilia Romagna area, principally devoted to the gypsum caves, and undertaken by the local speleological clubs and university researchers. The chapters that describe gypsum karst surface landforms in this publication contain many references to examples of gypsum karst in Italy, and these supplement the descriptions provided below.</abstract>
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<title>Gypsum karst of the Eastern-European Plain.</title>
<abstract>Description of karts in the Eastern European Plain, comprising the following regions: Baltic, Timansky, Pinego-Severodvinsky, Volgo-Kamsky, Pre-Ural, Pre-Caspian, Donetsk and Podol'sko Bukovinsky.</abstract>
<keywords>Gypsum, Karst, Russia</keywords>
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<title>Gypsum karst in the Western Ukraine.</title>
<abstract>The great gypsum karst of the Western Ukraine, which is associated with Miocene (Badenian) gypsum, provides the worlds foremost examples of intrastratal gypsum karst and speleogenesis under artesian conditions. Differential neotectonic movements have resulted in various parts of the territory displaying different types (stages) of intrastratal karst, from deep-seated, through subjacent, to entrenched. Internal gypsum karstification proceeded mainly under confined hydrogeological conditions. While such development still continues in part of the territory, other parts exhibit entrenched karst settings. Huge relict maze cave systems have been explored here, five of which are currently the longest known gypsum caves in the world. They account for well over half of the total length of gypsum cave that has been explored. This unique concentration of large caves reflects the local coincidence of specific structural prerequisites of speleogenesis (character and extent of fissuring), favourable regional evolution (rapid uplift, and fossilization of maze systems), the presence of overlying limestone aquifers, and a widespread clayey protective cover (which prevented the total infilling and/or destruction of the caves). Surface karst evolved as a consequence of the internal karstification in the gypsum, and the karst landform assemblages differ between the territories that present different types of karst.</abstract>
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<title>Gypsum karst of the Baltic republics.</title>
<abstract>The Baltic Republics of Estonia, Latvia and Lithuania have karst areas developed in both carbonate and gypsiferous rocks. In the north, within the Republic of Estonia, Ordovician and Silurian limestones and dolomites crop out, or are covered by glacial Quaternary sediments. To the south, in Latvia and Lithuania, gypsum karst is actively developing in evaporites of Late Devonian (Frasnian) age. Although gypsum and mixed sulphate-carbonate karst only occupy small areas in the Baltic countries, they have important engineering and geo-ecological consequences. Due to the rapid dissolution of gypsum, the evolution of gypsum karst causes not only geological hazards such as subsidence, but it also has a highly adverse effect on groundwater quality. The karst territory of the Baltic states lies along the western side of the area, called the Great Devonian Field that form part of the Russian Plain. Within southern Latvia and northern Lithuania there is an area, exceeding 1000 sq. km, where mature gypsum karst occurs at the land surface and in the subsurface. This karst area is referred to here as the Gypsum Karst Region of the Baltic States. Here the surface karst forms include sinkholes, karst shafts, land subsidence, lakes and dolines. In Lithuania the maximum density of sinkholes is 200 per sq. km; in Latvia they reach 138 units per sq. km. Caves, enlarged dissolution voids and cavities are uncommon in both areas.</abstract>
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<abstract>Description of the gypsum karst of the pre-Ural region in Russia, with special emphasis on speleogenesis.</abstract>
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<title>Gypsum karst in China.</title>
<abstract>The Peoples Republic of China has the largest gypsum resources in the world and a long history of their exploitation. The gypsum deposits range in age from Pre-Cambrian to Quaternary and their genesis includes marine, lacustrine, thermal (volcanic and metasomatic), metamorphic and secondary deposits. The gypsum is commonly associated with other soluble rocks such as carbonates and salt. These geological conditions, regional climate differences and tectonic setting strongly influence the karstification process resulting in several karst types in China. Well developed gypsum palaeokarst and some modem gypsum karst is present in the Fengfeng Formation (Ordovician) gypsum of the Shanxi and Hebei Provinces. Collapse columns filled with breccia emanate upwards from this karst and affect the overlying coalfields causing difficult and hazardous mining conditions. Gypsum karst is also recorded in the middle Cambrian strata of Guizhou Province and the Triassic strata of Guizhou and Sichuan Provinces. Gypsum-salt lake karst has developed in the Pleistocene to Recent enclosed basin deposits within the Qinghai-Xizang (Tibet) Plateau.</abstract>
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<title>Geographical variation in the tropical cave cockroach Paratemnopteryx stonei Roth (Blattellidae) in North Queensland, Australia.</title>
<abstract>Observations of cave dwelling organisms in both tropical and temperate caves often reveal morphological modifications, which may reflect various stages of adaptation to cave life. From April 1994 to June 1995 a number of adult Paratemnopteryx stonei were collected from 7 caves in tropical North Queensland to investigate the degree of geographical variation in such troglomorphies between cave populations. Results of morphometric analyses showed the occurrence of a morphological discontinuity between cave populations from the different geographic regions. The body dimensions particularly important in discriminating between each cave population were tegmen length (both sexes), and secondly, tegmen width and tarsus length for males and females respectively. Morphological differences between populations are discussed in relation to stages of adaptation to cave live.</abstract>
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<title>A recent colonization of Dolichopoda cave crickets in the Poscola cave (Orthoptera, Rhaphidophoridae).</title>
<abstract>We report a series of investigations carried out on a Dolichopoda population recently discovered in the Poscola cave and in some small caves nearby (Lessini Mountains, Vicenza). This population is located north of Po river, outside the present known geographic range of this genus in Italy. Morphology of the epiphallus corroborated by chromosome and allozyme analysis indicated that this population belongs to D. laetitiae. Study of the genetic structure of population in the Poscola area revealed high gene flow levels between Poscola and the other minor caves, suggesting the occurrence of a single expanding population. This finding as well as mark-recapture data on population size, migrations, age structure and habitat type strongly suggest that the Poscola population is the result of a recent colonization due to anthropocore dispersal.</abstract>
<keywords>Orthoptera, Italy, Poscola cave, Vicenza</keywords>
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<volume>25 (1/2) - 1996 [Biospeleology]</volume>
<authors>Camilla Bernardini - Donatella Cesaroni - Claudio Di Russo - Mauro Rampini - Valerio Sbordoni.</authors>
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<title>A new genus and species of troglobitic Trechinae (Coleoptera, Carabidae) from southern China.</title>
<abstract>Guizhaphaenops zorzini n.gen.n.sp. is described from Anjia Yan Cave, Shuicheng County, Guizhou (China). This highly specialized troglobite species is easily recognizable from the other cave dwelling Trechini from China for the main morphological external characters, but its true relationships remain uncertain, the male being still unknown. Similar in habitus to Cathaiaphaenops and to Sinotroglodytes, the new taxon is much more related to the latter, being dorsally glabrous and having the mentum fused with the submentum, with a deep oval fovea, but it differs in its elongated head, with incomplete frontal furrows and without posterior frontal setae.</abstract>
<keywords>Coleoptera, Carabidae, China</keywords>
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<volume>25 (1/2) - 1996 [Biospeleology]</volume>
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<title>First record of Parastenocarididae (Crustacea, Copepoda, Harpacticoida) from subterranean freshwater of insular Greece and description of two new species.</title>
<abstract>The genus Parastenocaris, new for Greece, has been discovered in the hyporheic habitat of Kos and Kythira Island with two new species, that are described and discussed in this work. Parastenocaris aesculapii n. sp. shares some characters with P. nolli from Germany and P. italica from Italy, Macedonia and Turkey. Parastenocaris aphroditis n. sp. belongs, according to the Authors, to a group of species living exclusively in estuarine interstitial habitats, which are all characterised by peculiar morphology and ecology, that are as well considered and interpreted.</abstract>
<keywords>Greece, Crustacea, Copepoda</keywords>
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<volume>25 (1/2) - 1996 [Biospeleology]</volume>

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<title>Lithobius nuragicus n.sp., a new Lithobius from a Sardinian cave (Chilopoda, Lithobiomorpha).</title>
<abstract>A new species of Lithobius from a Sardinian cave (Cagliari, Santadi, loc. Su Benatzu, Grotta "Pirosu", 576 Sa/Ca, m 270) is described. Lithobius nuragicus n. sp. belongs to the subgenus Lithobius s. str. and is related to Lithobius variegatus Leach, 1814, occurring in the British Isles, Brittany, Channel Isles, Iberian Peninsula, Maghreb, Sicily and Southern Italy. This new species is differentiated from L. variegatus by the number of prosternal teeth (3+3), the number and arrangement of ocelli (1+3; little, depigmented, not contiguous to each other, in the center of a depigmented area, posterosuperior ocellus larger than the other ocelli), the size of the organ of Tòmòsvàry (larger), the number of antennal articles (79-86), the number of dorso-lateral and dorso-median setae and the shape and size of the claw of the female gonopods (4-5; 10-11; short, with a small lateral denticle on the internal side).</abstract>
<keywords>Sardinia, Italy, Chilopoda, Lithobius</keywords>
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<title>Paleokarst of the Bohemian Massif in the Czech Republic: an overview and synthesis.</title>
<abstract>Paleokarst of the Bohemian Massif on the territory of the Czech Republic developed as polygenetic and polycyclic forms with several phases of fossilization and rejuvenation depending on tectonic phases and deep chemical weathering. Paleotectonic period (pre-Permian in general) was characterized by evolution of relatively minor depositional and local paleokarsts. Neotectonic (platform) period (post-Permian) favoured the prolonged karst evolution of interregional paleokarst in two karst periods and several more or less distinctly separated karst phases.</abstract>
<keywords>Paleokarst, Czech Republic, Bohemian Massif</keywords>
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<title>Karst in siliceous rocks - Karst landforms and caves in the Auyàn-Tepui Massif (Est. Bolivar, Venezuela).</title>
<abstract>During the expedition Tepuy 93'. six caves were explored in the precambrian quartzites of Roraima Group, in the Auyan-tepui massif. One of this caves reaches the depth of 370 m and a development of almost 3 km; its name is "Sima Auyan-tepui Noroeste" and it is currently the deepest cave in the world discovered in siliceous rocks The geological and morphological study of this cave has underlined again the importance of deep solutional weathering, along the network of fractures for the formation of caves in siliceous rocks. The different formation stages of the big superficial shafts, called "simas" were observed in some vertical collapse caves explored during the expedition, while galleries with phreatic forms were observed in the deep network of caves. All these deep forms involve karst processes of solution at least in the initial stage.</abstract>
<keywords>Venezuela, Quartzites, Karst, Geomorphology</keywords>
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<title>The Speleothem medium of finger flutings and its isotopic geochemistry.</title>
<abstract>The isotopic geochemistry relating to the re-precipitation of calcite in caves is considered, in terms of its theory, natural manifestations, and relationship with questions of radiometric dating of carbonate speleothems. Specific forms of' such deposits are considered, together with the various modification processes they are subjected to. More specifically, particular forms of rock art found within, as well as on or under such deposits are examined, such as finger flutings commonly found in caves of Europe and Australia. Some of the variables relating to their occurrence are elucidated, their preservation and possible dating is reviewed in the light of these factors, and new radiometric data from South Australian caves are introduced and discussed.</abstract>
<keywords>Isotopic geochemistry, Carbonate speleothems, Radiocarbon dating, Rock art</keywords>
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<title>On some cave minerals from Northern Norway.</title>
<abstract>The present paper aims to point out the results of 31 samples from some Norwegian caves that have been analysed with respect to their mineralogical composition. Identification of the minerals was done by X-ray diffraction, thermal, infrared spectroscopy and scanning electron microscopy. Seventeen minerals were identified belonging to 4 groups: carbonates, sulphates, oxides-hydroxides and silicates.</abstract>
<keywords>Norway, cave minerals</keywords>
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<id_volume>10</id_volume>
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<title>The classification of cave minerals and speleothems.</title>
<abstract>The classification scheme of Hill and Forti, as used in the second edition of Cave Minerals of the World, is presented as a practical' solution to the classification of cave minerals and speleothems. Classification and naming of cave minerals is by crystal class and follows nomenclature approved by the International Mineralogical Association. Classification of speleothems is based on morphology and whatever is known about origin, with division of speleothems into types, subtypes, and varieties. It is proposed that new speleothem types, subtypes, and names be approved by a UIS Commission of cave mineralogists.</abstract>
<keywords>Cave minerals, classification</keywords>
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<volume>24 (1/4) - 1995 [Physical Speleology]</volume>
<authors>Paolo Forti - Caroll Ann Hill.</authors>
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<title>Some remarks on the genus Microcharon Karaman in Greece, and description of M. agripensis n. sp. (Crustacea, Isopoda, Microparasellidae)</title>
<abstract>Several samples of microparasellid isopods of the genus Microcharon Karaman were obtained in groundwater habitats of Greece. Four species are identified, and taxonomical and zoogeographical remarks on some rare or poorly known taxa are made. One species, herein described as Microcharon agripensis n. sp., is new to Science. M. latus prespensis Karaman, 1954, on account of the different morphology of the first and second male pleopods, and its partially overlapping distribution, in respect to M. latus Karaman, 1934, is definitively raised at specific rank. Supplementary descriptions and illustrations are reported for incompletely described species such as M. latus, M. prespensis stat. nov., M. major Karaman, 1954 and M. othrys Argano & Pesce, 1979. For some species, such as M. latus, M. othrys and M. antonellae Galassi, 1991, SEM preparations of the mouthparts, not well detailed with the optical microscopy, were carried out. According to data from the present study, a paleogeographical scenario of the Balkan Peninsula is briefly depicted in order to sketch the most significative events which led to the colonization and speciation of the Microcharon species in this area.</abstract>
<keywords>Crustacea, Isopoda, Greece</keywords>
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<title>Sinogammarus troglodytes n. gen. n. sp. A new troglobiont Gammarid from China (Crustacea Amphipoda)</title>
<abstract>The authors describe Sinogammarus troglodytes n. gen. n. sp. found in two caves in Sichuan province in China, the first Chinese troglobite of the Gammaridae family (sensu Barnard & Barnard, 1983; 1990). The new genus is discussed and compared with the microphthalmous and anophthalmous genera of Gammaridae, heretofore known in the subterranean waters of the Balkan peninsula and the Caucasus region. The genus Sinogammarus is most closely allied to Gammarus Fabricius and Anopogammarus Derzhavin.</abstract>
<keywords>Crustacea, Amphipoda, China</keywords>
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<title>A new species of Troglobius (Collembola, Paronellidae) from Brazil</title>
<abstract>Troglobius brasiliensis n. sp. from two caves of Brazil is described and illustrated.</abstract>
<keywords>Collembola, Brasil, Brazil</keywords>
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<title>A new Jujiroa from Sichuan, China (Coleoptera, Carabidae)</title>
<abstract>Jujiroa iolandae n.sp. is described from Liujia Cave in China (Sichuan, near Huaying, between Chongqing and Nanchong). Strongly depigmented, with very reduced eyes and markedly elongated appendages, it is well distinguishable from Taiwanese and Japanese species, and from the two previously known species from China. One of these, J. suensoni from Shangxi, is quite different (its doubtful taxonomic position is perhaps to be referred to another genus or lineage); the other, J. rufescens from Jiangxi (Fujian), is more related to the new species, that differs by the longer and more sinuate pronotum, with fore and hind angles much more produced, by the presence of basal pore and the absence of first dorsal seta on elytra, and by the apical tooth acute, long and spine-like. The new species extends well westwards the range of the genus, hitherto extending from southeastern Japan (five described species from Honshu, Shikoku, Kyushu), to Taiwan (seven species) and, in front, to Chinese Fujian.</abstract>
<keywords>Coleoptera, Carabidae, China</keywords>
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<title>Towards regressive evolution: the periodic colour change behaviour of a troglophilic fish Nemacheilus evezardi (Day)</title>
<abstract>Present study is an attempt to know the existence of colour change physiology of the cave fish Nemacheilus evezardi (Day) along a circadian time scale. Though, due to subterranean mode of life, practically this function has no survival value. The study has been conducted simultaneously in two different photoperiodic conditions (LD 00: 24 and LD 12:12 hr). The variation in different states of chromatophore has been computed with respect to different time points of the day. Results suggest that the phenomenon is lying completely disturbed in its in situ conditions. Interestingly, circadian rhythm in all the types of chromatophores were validated when the same fish was exposed under LD 12: 12 hr photoperiod.</abstract>
<keywords>Fish, Troglophile, colour change physiology, India</keywords>
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<title>Life cycle and population ecology of the cave cricket Dolichopoda geniculata (Costa) from Valmarino cave (Central Italy)</title>
<abstract>A D. geniculata population inhabiting a natural cave at low altitude near seashore was followed during two years. The population size, distribution in three age classes, spatial distribution, feeding habits were recorded. The life-cycle was found semivoltine, with overlaps between next choorts in each age class. A comparison to other Dolichopoda showed that the population of Valmarino cave is one of the best adapted to cave life, and this may be related with both historical and present geographical and ecological conditions of the cave.</abstract>
<keywords>Orthoptera, Dolichopoda, Italy, ecology</keywords>
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<title>Les grottes aménagées et l'Union Internationale de Spéléologie (1965-1990).</title>
<abstract>The initiatives of the International Union of Speleology concerning the show caves, approved during various International Congresses of Speleology are here reported. Among other things, an attempt of having a list of show caves is also recalled but only recently such an attempt produced successfully a document. An example of it is also given.</abstract>
<keywords>Show caves, tourism, International Union of Speleology</keywords>
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<title>Management of some unusual features in the show caves of the United States.</title>
<abstract>Protection of the unusual features in some of the 200 show caves of the U.S. have required innovative management. The sea caves of both the east and west coasts present the need for special preservation methods. Throughout the nation sometimes glass enclosures, vehicles and boats are used to separate visitors from sensitive cave features. Lighting and cleaning techniques have been studied and altered to discourage growth of algae. Some show caves are protected by double glass entrance and exit doors. Many caves, particularly on public lands, are closed during the hibernation period of endangered bats. In a number of caves, Native Americans have left artifacts and other evidences of their early visits. which have either been preserved in situ or relocated at appropriate archival sites. The paper gives in more details specific caves and methods for the preservation of particular unique features.</abstract>
<keywords>United States of America, show caves, tourism, presevation, rimediation</keywords>
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<id_art>31</id_art>
<title>Die Slowakischen Shauhohlen und ihre probleme.</title>
<abstract>In 1960 the Slovak Caves Administration, which managed twelve Slovak Caves was founded. It was controlled by the Ministry of Culture of the Slovak Socialist Republic and comprised also the Museum of Slovak Karst and the Slovak Speleological Society - a free speleological organisation. In 1981 such an Administration became part of the State Centre for the Protection of Nature. The main task of this centre was obviously the protection of nature in Slovakia but unfortunately many problems remained unsolved. The social movement in November 1989 accelerated the process to solve such problems and the Forum of Professional Workers of Show Caves was set up in Slovakia. Thanks to a very hard work, the first objectives were achieved on July 1, 1990 when the Ministry of Culture of the Slovak Republic signed the Document of Establishment and the Statute of the Slovak Caves Administration. The task of this administration is to ensure a good management of the show caves together with their suitable protection. In cooperation with UNESCO, a sort of Chart for the protection of the karst areas should be developed in order to acknowledge Karst as a natural heritage of Earth because Karst is one of the most important ecosystems. Show caves can play a relevant role in the development of these feelings in the public opinion.</abstract>
<keywords>Slovakia, show caves, protection</keywords>
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<title>Short note on the problems of the Yugoslav show caves</title>
<abstract>In the frame of the IUS, the activities concerning the Yugoslav show caves are reported and the most relevant problems are emphasized.</abstract>
<keywords>Slovenia, show caves, protection</keywords>
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<title>Problems of Show caves in Bohemia and Moravia.</title>
<abstract>In the last years the show caves in Bohemia and Moravia were administrated by the Ministry of Culture with the status of a state assisted organization. That means that they were considered as those organizations not self-sufficient, without connections with tourism. Presently, the management of the show caves in Bohemia and Moravia is at a crossroad: to remain under the administration of the Ministry of Culture or move under the newly formed Ministry of Environment. In the latter case the cave management should change into a business organization similar to a private body. We believe that these problems can be fairly solved by the newly formed National Show Caves Association.</abstract>
<keywords>Slovak Republic, Czech Republic, show caves, protection</keywords>
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<title>Tourist problems of Grotta Gigante in the Trieste karst</title>
<abstract>The paper reports the tourist evolution of the Grotta Gigante (Giant Cave), near Trieste (Italy) during 80 years (1908 - 1989) of its opening to the public. At the beginning it entered in competition with some other local show caves, even much more famous (like Postojna and Stocjan), after the II World War on account of the change of the state boundaries it remained the sole show cave in that part of Italy. Then the Grotta Gigante succeeded, even if slowly, to cope with the changing tourist demands, improving more and more its facilities to follow the increasing tourist flows. In recent years the visitors decreased slowly but steadily. Such a decrease is due to reasons independent of the management of the Grotta Gigante; these facts are reported and analyzed and the cooperation of other show caves is asked in order to establish a common strategy when similar factors are present.</abstract>
<keywords>Italy, Trieste, Grotta Gigante, show caves</keywords>
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<title>The exploitation and development of the "Grotta di Bossea" as a show cave</title>
<abstract>The Bossea Cave has a great interest from the point of view of nature and the environment because many karst and speleogenetic processes are still active. The water stream flowing in the cave was the determining factor of some picturesque morphologies and splendid scenographic effects. An underground laboratory for experimental researches (the "Bossea Scientific Station") was established in the cave and is operating since 1969 (Biological Section) and 1982 (Physical Section). The cave has been explored and studied since 1850 and opened to the public in 1874. At present its exploitation can be furtherly emphasized. For this purpose a programme was prepared according the following items: 1 - rearrangement of the tourist facilities 2 - best exploitation of internal hydrography 3 - creation of alternative trails 4 - improvement of the scientific facilities 5 - creation of new outside facilities 6 - preparation of literature and visual aids. The goals of the Scientific Station installed inside the cave and the results achieved are described by Guido Peano, laboratory director; the cave exploitation project, concerning both the scientific and tourist facilities, is due to Giorgio Fisanotti.</abstract>
<keywords>Italy, show caves, Grotta di Bossea</keywords>
<from>37</from>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
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<title>Activity od the scientific commission of "Grotta Grande del Vento" (Genga, Ancona, Central Italy).</title>
<abstract>The Grotta Grande del Vento (the Great Wind Cave) was discovered in 1971. An administrative body (the "Consorzio Frasassi") under the control of some local authorities took care of its development and the cave was opened to tourists in 1974. A Scientific Commission formed by some experts (choosen by the Consorzio Frasassi) of different disciplines was established in 1975. During these 15 years the Commission acted as an advisory committee for the Consorzio in order to guarantee the protection of the cave environment. In particular the Commission set up a monitoring network of the most important environmental parameters (air and water temperature. air currents, relative humidity and CO2 concentration) in some suitable locations and studied the best solutions to avoid algae and other plants proliferation in the vicinity of light sources. The Commission promoted and directed researches in the karst system under a strict co-operation with the Consorzio Frasassi which funded most of them. Some scientific papers resulted from these researches.</abstract>
<keywords>Frasassi, Italy, show caves, scientific research, Grotta Grande del Vento</keywords>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
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<title>Faunistic study in the karst complex of Frasassi (Genga, Italy).</title>
<abstract>f the complex and they are the consequence of a relatively recent faunistic colonization.</abstract>
<keywords>Frasassi, Italy, Biospeleology, Show caves, karst area</keywords>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
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<title>230Th dating of the speleothems from the "Grotta del Fiume-Grotta Grande del Vento" karst system in Frasassi (Ancona, Italy) and paleoenvironmental implications.</title>
<abstract>Chronological measurements have been carried out on speleothems from the Grotta del Fiume-Grotta Grande del Vento karst system in Frasassi (Ancona, Italy) by means of the 230Th radiometric method in order to date hypogean karst levels and related geological events. Higher levels were found to be older than the lower ones according to standstills and sinkings of the water table. The dated speleothems from the first and second level formed less than 10,000 years ago; the minimum ages of the third and fifth levels, which are respectively 130,000 and 200,000 years old, were correlated to climatic events. Dating different portions of a speleothem allows the measurements of the radial and vertical accretion rates and their variation over time. Such data together with the 234U/238U activity ratio and the uranium content of the speleothems have been correlated with the climatic variations connected to the glacial cycles. The same data have been used to fit a hydrogeological model.</abstract>
<keywords>Paleoenvironment, chronology, karst evolution, speleothems, Frasassi, Italy, paleohydrology</keywords>
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<authors>Adriano Taddeucci - Paola Tuccimei - Mario Voltaggio.</authors>
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<title>Proposal for a micro-climatic research to be carried on in deep underground zones</title>
<abstract>Deep underground zones of karst systems are practically isolated from the outside influence and their climatological characteristics are scarcely known. To improve the knowledge of the karst areas it would be therefore rather useful to obtain energy balances for different environmental situations in order to evaluate both the deep climatological phenomena and the outside influence.</abstract>
<keywords>show caves, meteorology</keywords>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
<authors>Jacques Choppy - Arrigo A. Cigna.</authors>
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<title>Morphological description and environmental impact evaluation due to the development as a show cave of the "Grotte di Is Zuddas" (Cagliari. Sardinia, Italy)</title>
<abstract>After a short history of the discovery of the caves of "Is Zuddas" a geological description of the region and the geomorphological evolution of the cave are recorded. The results of a preliminary climatological research are reported and a rough evaluation of the visitors capacity is also given.</abstract>
<keywords>Sardinia, Italy, Show caves, Environmental impact, Grotta di Is Zuddas</keywords>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
<authors>Roberto Curreli - Nicolino Diana - Antonello Floris - Antonello Sulas.</authors>
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<title>The "Saalfelder Feengrotten": a show mine with cave features</title>
<abstract>The well known "Saalfelder Feengrotten" originated from an old aluminium mine called "Jeremiasglùck". The mine has been working from 1943 to 1945; the oldest formations have an age of about 350 years. Such formations were formed by an oxidation process which explains the rather fast growth rate in comparison to the growth rate of calcite formations. In the "Feengrotten" rare minerals can be found: the most common is a soft unstable compound, the diadochite (iron(III) phosphate). The control of the lampenflora is rather complicate and it is obtained with some compounds normally used in caves. The "Feengrotten" are visited yearly by about 250,000 persons and the global number of visitors up to now is more than 15 millions of persons.</abstract>
<keywords>Germany, ancient mines, tourism, mineralogy, lamp flora, alluminium</keywords>
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<volume>23 (1/2) - 1994 [Proceedings I Congress of International Show Cave Association, Genga (Italy), 1-4 november 1990]</volume>
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<title>The Treasure Cave, Rincòn de la Victoria (Malaga, Spain)</title>
<abstract>«La Cueva del Tesoro» (The Treasure Cave) is located on the East, 10 kilometres from the city of Malaga, in a coastal promontory called «El Cantal» (a small steep), which is situated in the municipality of Rincòn de la Victoria. The composition of land in this zone «El Cantal» is made up of limestone and there are many caves which are located within a radius of 2 kilometres, although some of them have already disappeared: la Cueva dei Tesoro, la cueva del Hoyo de la Mina, Cuevas de Navarro, Cuevas de la Cantera, Cueva de los Molinos, Cueva de la Raja del Humo, etc. The best known of these caves and the only one who can be visited is the Cueva del Tesoro. It has been also known by some other names, such as the Cueva del Higueròn or the Cueva del Suizo. The Cueva del Tesoro has its origin in the sea coast depths; that is why its morphology is made up of halls, gorges and columns. Then, and because of the upheaval of «El Cantal» the cave emerged out of the sea. Finally, fresh water percolation resulted in the formation of some stalactites and stalagmites, although they are of less importance within the whole cave This cave. which was already used as shelter for 8 months by Marcus Crassus (according to a legend) in 86 B.C. when he was prosecuted, it was also used, according to another tradition, to hide the Almoravid treasure in the l2th century. This treasure has been searched for by some people in the last two hundred years. One of them was the Swiss, Antonio de la Nari, who died because of an explosion inside the cave in 1847. Professor Manuel Laza Palacios from Malaga, owner of the cave, has been the best specialist and treasure searcher. He was an exceptional person, has knew how to keep alive hopefully the old legend throughout his whole life. Besides, the cave has provided some important archaeological discoveries: Father Breuil found out some cave paintings in 1918 and excavations have been recently carried out by Mr. Manuel Laza. A rather interesting material appeared, such as Neolithic pottery, lithic industry (the most important object is an Upper Paleolithic arrow-head), human and animal remains. According to these discoveries, the presence of human beings in this cave is proved since the Paleolithic. There are also a series of legends and traditions related to the Cueva del Tesoro. So, in this frame, it has been given for sure and for a very long time that the ghost of the Swiss still appears in «El Cantal» to look for the treasure. Another tradition, studied by Mr. Laza, places the sanctuary of the old goddess Noctiluce inside a hall of the cave.</abstract>
<keywords>Spain, Cueva del Tesoro, protection, archaeology</keywords>
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<title>The cave of Nerja (Malaga, Spain)</title>
<abstract>The history and the development of the cave of Nerja are here summarized. A short description of the cave with the main goals for the future are also reported.</abstract>
<keywords>Spain, Malaga, Cueva de Nerja, show caves</keywords>
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<id>139</id>
<id_art>44</id_art>
<title>The "Grotta del vento" (Wind Cave): a feature within the Natural Park of the Apuan Alps</title>
<abstract>After a short history of the explorations of the cave its development as a show cave is here reported with details. Such a development was carried out in order to preserve not only the physical integrity of the cave environment but also to keep the tourists' approach as natural as possible. In co-operation with the Medical Faculty of the Pisa University the cave is also used since many years for an interesting and quite successful experiment for the treatment of bronchial asthma.</abstract>

<keywords>Grotta del Vento, Tuscany, Italy, Apuan Alps, show cave</keywords>
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<title>The cricket fauna of Chiapanecan caves (Mexico): systematics, phylogeny and the evolution of troglobitic life (Orthoptera, Grylloidea, Phalangopsidae, Luzarinae)</title>
<abstract>The present study deals with the cavernicolous Grylloidea of Chiapas. It details the composition of this fauna, which belongs exclusively to the Phalangopsid group Amphiacustae, and considers its troglobitic evolution in the methodological framework of Comparative Biology. This method consists in analysing the evolution of biological features in reference to phylogeny, using character state optimization. The material studied comes mostly from Italian biospeological expeditions, but also from the authors work in Mexico, from North American biospeological expeditions achieved in Central America and the West Indies, and from the collections of the Academy of Natural Sciences of Philadelphia, the Museum National d'Histoire naturelle de Paris and the University of Michigan Museum of Zoology. I first present a systematic and phylogenetic analysis of Amphiacustae. Six new genera are defined and the genus Amphiacusta Saussure, 1874 is clearly delimited; twenty-three of the twenty six species considered in the paper are new and described. A key for genera and species groups is given. Phylogenetic relationships among genera are established using cladistics (implicit enumeration of Hennig 86 program). The evolution of troglobitic Amphiacustae is then analyzed. Available data on the biology of Amphiacust genera are presented and compared with what is known on other Phalangopsidae. Three biological attributes are moreover defined (troglobitic versus non troglobitic; cavernicolous versus non cavernicolous; leaf litter foraging versus leaf litter not foraging). The mapping of the attributes upon our cladogram has shown that Amphiacustae evolved twice toward cave life and that their ancestral habitat could be characterized by cavernicolous habits and leaf litter foraging. The results are discussed in reference to theories on troglobitic taxa evolution, and to the exaptation concept of Gould & Vrba (1982). This leads to three main conclusions: 1/ Amphiacust adaptation to caves could be the result of a tentative to exploit karstic resources in Central America; 2/ An epigean dispersion by cave living species can be hypothesized; 3/ For Grylloidea, having cavernicolous habits at ground level appears to be exaptative to troglobitic life.</abstract>
<keywords>Orthoptera, Grylloidea, Chiapas, Mexico</keywords>
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<title>The second occurrence of the troglobic shrimp Macrobrachium microps Holthuis (Crustacea, Decapoda, Palaemonidae), in Samoa</title>
<abstract>A single example of Macrobrachium from an anchialine lava tube un Upolu, Samoa, is described and illustrated. The specimen is referred to M. microps Holthuis, 1978, but shows some differences that may be of specific value, which are discussed. The troglobic species of Macrobrachium are reviewed.</abstract>
<keywords>Crustacea, Decapoda, Samoa Islands</keywords>
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<title>Harpacticoida (Crustacea, Copepoda) from subterranean waters of Bue Marino cave,</title>
<abstract>Three new species of harpacticoid copepods are described and discussed. Nitocrella beatricis n. sp. has been collected in different hyporheic sites in Sardinia and in two caves (Bue Marino cave in Sardinia and St. Barthélémy cave in Corsica); Elaphoidella janas n. sp. and Parastenocaris triphyda n. sp. have been collected only in Bue Marino cave. Some considerations concerning the ecology and biogeography of the three species are also presented.</abstract>
<keywords>Crustacea, Copepoda, Sardinia, Italy, Corsica, France</keywords>
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<title>Comparative performances of non-visual food search in the hypogean cyprinid Phreatichthys andruzzii and in the epigean relative Barbus filamentosus</title>
<abstract>The anophthalmic hypogean cyprinid Phreatichthys andruzzii Vinciguerra shows a more efficient food searching behaviour than blinded specimens of the epigean species Barbus filamentosus Cuvier and Valenciennes. This difference seems to be related to a tendency to swim near the bottom of the aquarium and the behavioural stereotypes in food localization and intake. Both in P andruzzii and in the blinded B. filamentosus food search is guided by chemical stimulation. Other data indicate that mechanical stimulation could play an important role in the feeding behaviour of the hypogean form. The behavioural analogies in food localization between P andruzzii and the cave forms of the characid Astyanax fasciatus Cuvier are briefly discussed.</abstract>
<keywords>Cave fish, food search, performance</keywords>
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<title>Habitat use and gas bubble disease in southern cavefish (Typhlichthys subterraneus)</title>
<abstract>In situ observations of habitat use by southern cavefish (Typhlichthys subterraneus) in a Missouri, U.S.A. spring suggest that groundwater discharge and that zones of substrate which have large interstitial spaces that fish can enter may be important components of the species habitat. Such substrates may also facilitate smallscale dispersal. In addition, we document the first recorded case of gas bubble disease in a laboratory-held specimen of this species. Cavefish may be particularly susceptible to this malady, and the conditions under which it occurred are important to avoid should captive maintenance or propagation of this or related species be attempted.</abstract>
<keywords>cave fish, United States of America, Missouri, spring, habitat, gas bubble disease</keywords>
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<title>Morphometric analysis of dolines</title>
<abstract>The doline is the most specific surface form of karst landscapes, which enables one to distinguish them from "normal" erosion landscapes shaped by surface water. From a morphodynamic point of view the doline constitutes an elementary hydrographic unit, comparable to a simple basin, which, with its system of slopes, conveys water to the absorbing points at the bottom into an underground network. The morphometric study of these karst landforms enables a quantitative analysis of karst environment. Comparisons of the various parameters may give unexpected results and lead to new hypotheses about the evolution and the dynamism of the karst "geo-ecosystem". All the main morphometric parameters of the dolines are listed and explained and a preliminary discussion about some methods of spatial analysis is developed. It is intended to give methodological suggestions about data sources, systems of measurement, and to stimulate some reflection on the choices of possible processing of morphometric variables and on the significance of statistical analysis applied to different parameters. After a brief review of some morphometric and spatial analyses made in the past by different authors, three different examples are presented, relative to karst areas of the Venetian Prealps (Cansiglio-Cavallo, Montello) and of the Carso di Trieste. From these few examples one can understand how to confront this complex subject and what kind of results the analysis of morphometric parameters may give. In interpreting the results it is evident that one must not forget the geological, geomorphological, pedological, vegetational and climatic context of the karst area.</abstract>
<keywords>doline, morphometry, spatial analysis, Venetian Prealps, Cansiglio-Cavallo, Montello, Carso di Trieste</keywords>
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<title>Speciation of troglobites: studies in the San Antonio cave (Oaxaca, Mexico)</title>
<abstract>The phylogenetically young species community of San Antonio Cave (Oaxaca, Mexico) exemplifies the hypothesis that speciation of troglobites can occur in close contact with epigean predecessors. In a subterranean creek which continues outside with a rich epigean fauna, four troglobitic aquatic crustacean and one fish species (Rhamdia reddelli, Pimelodidae) were studied. Today not a single surface specimen can be found in the cave waters although several epigean species are troglophilic and/or are the ancestors of cave forms in other parts of Mexico. The absence of epigean invaders is attributed to the presence of specimens of some of the more aggressive and carnivorous cave species close to the cave entrance. Contrary to this it can be presumed that at the beginning of the troglobitic evolution the cave ancestral epigean forms were regularly invading the cave. It is assumed that photonegative behaviour played a role for the initial colonization of the cave but it is not of significance as a separating mechanism for the speciation process.</abstract>
<keywords>Crustacea, cave fish, troglobic, speciation, Mexico</keywords>

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<title>Metabolic efficiency and regulation of body weight: a comparison between life in hypogean and epigean ecosystems</title>
<abstract>In the present study metabolic efficiency in the epigean and hypogean populations of Nemacheilus evezardi (Day) was examined. Different experiments were conducted, in both populations, by keeping them either in restricted oxygen or restricted feeding conditions, including starvation. Results clearly show that the rate of oxygen consumption for the hypogean population was significantly less as compared to its epigean counterpart. Further, results also suggest that the hypogean population has a tremendous capacity to maintain its metabolic activity and regulate its body weight under severe conditions characterized by an absence or a limited supply of food.</abstract>
<keywords>cave fish, metabolism, hypogean, epigean, ecosystem, India</keywords>
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<title>Population size of Pyrenean troglobiont coleopters (Speonomus species) in a cave in Belgium</title>
<abstract>The population size of three troglobitic species of Speonomus (Coleoptera Bathysciinae) from the Pyrenees, intentionally introduced in 1969-1970 into the "Grotte de Ramioul" cave (Province of Liège, Belgium) has been studied using the mark-recapture technique. It has been shown that the three cave levels possess large Speonomus populations (upper network: 12,718; middle network: 13,902; lower network: 18,249 individuals) and that the superficial underground environment is also colonized, including the schist area. The most abundant species is Speonomus longicornis (relative frequency between 0.73 to 0.89). The two other species are present in the relative frequency between 0.04 and 0.23 for S. diecki, and between 0.03 and 0.11 for S. stygius. The overall Speonomus population size in the cave is estimated at 44,000 individuals.</abstract>
<keywords>Coleoptera, artificial introduction, population size, Belgium</keywords>
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<title>Revision of the genus Troglophilus (Orthoptera, Rhaphidophoridae) in Crete, Greece</title>
<abstract>The genus Troglophilus (Orthoptera, Rhaphidophoridae) from Crete is revised using new data from specimens collected recently. The three previously reported species are considered to be only one, T. spinulosus, on the basis of morphological, ecological and distributional similarities. The species is more fully described and notes are given on its ecology.</abstract>
<keywords>Orthoptera, ecology, Greece, Crete</keywords>
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<title>Observations on the biology of Spelaeiacris tabulae PerInguey (Orthoptera, Rhaphidophorldae), from the Wynberg cave (Capetown, South Africa)</title>
<abstract>Data on the age structure, fecundity, egg morphology and feeding habits of the Spelaeiacris tabulae population from Wynberg cave are reported and compared with other Rhaphidophoridae species. S. tabulae shows a certain degree of adaptation to cave life, as usual in the other temperate species of Rhaphidophoridae.</abstract>
<keywords>Orthoptera, biology, cave adaption, South Africa</keywords>
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<title>Ultrastructure des sensilles cylindriques, mécanorécepteurs d'un Crustacé Mysidacé souterrain.</title>
<abstract>The ultrastructural features of a new chordotonal sensillum in a cavernicolous Mysidacea is described. That sensillum and the other mechanoreceptor sensilla of the same Mysidacea are compared. 9 + 0 cilia show ultrastructural features which previously allowed us to establish a hypothesis with respect to the mode of functioning of chordotonal sensilla. That sensillum shows a pore at the tip of its external receptor.</abstract>
<keywords>Crustacea, Mysidacea, sensillum</keywords>
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<title>Secondary sympatric occurrence of sibling species of subterranean shrimps in the Karst.</title>
<abstract>Allozyme variation at 32 gene loci was studied in cave dwelling shrimps of the genus Troglocaris (fam. Atyidae). Populations were collected from several caves and wells belonging to different drainage systems in the Karst areas of NE Italy. Results suggest the existence of two sympatric, genetically distinct, biological species (provisionally indicated as species A and B in the T. anophthalmus complex) in the samples collected at the Duino Well, Sagrado and Comarie caves (Nei's D = 0.209). Samples from Gradisca and Aurisina are represented by only one (A) or the other (B) of the two species, respectively. Two remaining eastern populations from the Rosandra Valley also proved to be monospecific. However, they posses fixed alternative alleles markedly different from both species A and B suggesting that these two populations may belong to a third sibling species, C (A vs. C, D=0.346; B vs. C, D=0.146). These data are discussed in relation to allopatric speciation of cave dwelling shrimp species, flooding periods of subterranean waters and the role of cave organisms as markers of this process.</abstract>
<keywords>Crustacea, Atyidae, sibling, Kras, Italy</keywords>
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<to>27</to>
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<volume>19 (1/4) - 1990 [Biospeleology]</volume>
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<title>Laboratory studies of predatory behaviour in two subspecies of the Carabid cave beetle: Neaphaenops tellkampfi.</title>
<abstract>Comparative studies on the foraging behaviour of Neaphaenops tellkampfi tellkampfi and N. t. meridionalis demonstrated adaptation to different environments. The southern subspecies N. t. meridionalis, which is found in wet muddy caves where cave cricket eggs are unlikely prey, did not locate buried cricket eggs and dug fewer and less accurate holes in the lab than the nominate subspecies. N. t. tellkampfi, which reaches high densities in sandy deep cave environments where cricket eggs are the only viable prey, gained significantly greater weight than meridionalis when presented buried cricket eggs as prey. There was no difference with respect to weight change between the subspecies in the presence of Ptomaphagus larvae. N. t. meridionalis gained weight at a significantly greater rate than the nominate subspecies with enchytraeid worms as prey. Enchytraeid worms represent the natural prey most likely to be encountered by N. t. meridionalis. 25% of beetle holes were dug deep enough to potentially located buried cricket eggs. Since Hubbell and Nortons' morphological data on the relationship between cricket ovipositor length and beetle predation have some problems with sample sizes and minor assumptions I conclude that there are no unequivocal data that support the possibility of coevolution between Neaphaenops and Hadenoecus.</abstract>
<keywords>Coleoptera, Carabidae, predatory behaviour, evolution</keywords>
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<volume>19 (1/4) - 1990 [Biospeleology]</volume>
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<title>Isopoda (Crustacea: Isopoda: Microcharon, Jaera, Proasellus) and other fauna in hypogean waters of southern Cyprus.</title>
<abstract>Springs and wells in SW and S part of Cyprus were briefly surveyed. Chlorinity was 0.1 - 0.8 p.p.t. Some isopods were found in collecting galleries of springs and in wells in calcarenites and in gravel deposits. These were Proasellus coxalis ssp. with some depigmented specimens, the probably stygobitic P. c. nanus ssp. n., poorly pigmented Jaera italica, and Microcharon luciae n. sp.; they were accompanied by the stygobitic amphipod Bogidiella cypria, by Turbellaria (Tricladida), by Copepoda (Cyclopoida), and rarely by some other animals (Pisidium sp., Oligochaeta). Only slightly depigmented Turbellaria Tricladida (cf. Dugesia sp.) occur in wells far from surface waters. Descriptions of new taxa are given.</abstract>
<keywords>Crustacea, Isopoda, Hypogean waters, Cyprus</keywords>

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<title>Two new Niphargus species (Amphipoda) from caves in Yugoslavia.</title>
<abstract>Niphargus numerus sp. n. from the Cavlinska pecina near Obrovac (Dalmatia) and N. factor sp. n. from Vjetrenica (Herzegovina) are described. Both new species from Yugoslav caves belong to the N. transitivus aggregate of species.</abstract>
<keywords>Dalmatia, Bosnia, Herzegovina, Crustacea</keywords>
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<title>Troglobius coprophagus, a new genus and species of cave Collembola from Madagascar, with notes on its ecology.</title>
<abstract>Troglobius coprophagus n. g., n. sp. a cave Collembola from Madagascar is characterized by an elongate and serrate mucro, a non spines dens. Description and illustrations of the new genus and species are given. Some ecological data of this highly cave adapted species is also included.</abstract>
<keywords>Madagascar, Collembola</keywords>
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<title>General characteristics of the landforms in the Alps and Julian Prealps and in Trieste Karst.</title>
<abstract>The morphology of the Julian Alps and Prealps and of the Triestian Karst are here shortly described; the structures, which defined its origin and development, are also considered. We can notice some cliffs which follow one another from the State boundary to the Adriatic sea; they are made up by lithologic successions, which repeat themselves according to the latitude. Anyway we recognize a general outcropping of rock masses which are decreasing little by little southward as regards the altitude, the age and than the erodibility. There are some differences between the western (Carnian) and the eastern (Julian) bend of the regional mounts according not only to the latitude but to the longitude, because of the lithology. In fact, the Julian mountains often look like the Dolomities in the northern zone. The southern ones, particularly near the high alluvial plain, are rounded and gently dipping. The drainage networks are quite different too. In the upper zone it is a trellis net, in the lower one is locally a trellis net and than it becomes a dendritic system. The glacial erosion follows the same principle too, coming southward along the main and the subordined valley cuts. At last, the Karst morphology shows itself strongly conditioned by the structural scheme as well as by the lateral lithologic changes. It comes out an anisotropic whole of surface forms and of subsurface ones, clearly referred to those reasons. The whole area here described shows moreover a high evolutive dynamics, connected with the recent tectonic phases.</abstract>
<keywords>Italy, Carso, Trieste, Alps, Morphology</keywords>
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<title>Geomorphological asset of the coast and of the seafloor of Trieste Gulf and considerations on their Late-Quaternary evolution.</title>
<abstract>Description of geomorphology of the coasts and the seafloor of the Gulf of Trieste, with paleogeographical discussion on its Late Quaternary evolution.</abstract>
<keywords>Trieste, Gulf, Italy, Geomorphology, Paleogeography, evolution</keywords>
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<title>Mineralogical characteristics of the caves of Trieste Karst.</title>
<abstract>Mineralogical description of terra rossa, alluvial sediments, guano deposits, oxides, carbonates and gypsum found in caves of the Trieste Karst.</abstract>
<keywords>Mineralogy, cave sediments, Trieste, Italy</keywords>
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<title>The karren fields of Borgo Grotta Gigante in Trieste Karst.</title>
<abstract>Detailed description of the karren fields close to Borgo Grotta Gigante near Trieste, with very detailed maps, pictures and tables.</abstract>
<keywords>Geomorphology, karren fields, mapping, Trieste, Italy</keywords>
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<title>Skocjanske Jame Speleological revue.</title>
<abstract>Historical overview of the investigations and of the touristic display of the Skocjanske Jame cave with geological, geomorphological, sedimentological and speleogenetical outlines.</abstract>
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<title>Rakov Skocjan Karst Valley.</title>
<abstract>Geological, geomorphological and speleological description of the Rak Valley with several caves and natural bridges.</abstract>
<keywords>Slovenia, Rak valley, caves, geology</keywords>
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<title>Trieste Karst: geological and stratigraphical notes.</title>
<abstract>Detailed geological and stratigraphical description of the Karst of Trieste.</abstract>
<keywords>Geology, Stratigraphy, Kras, Trieste, Italy, Slovenia</keywords>
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<title>History of Speleology at Trieste in relation to the Timavo problem.</title>
<abstract>Historical overview of Speleological researches carried out to understand the Timavo problem near Trieste.</abstract>
<keywords>Speleology, Timavo, Trieste, Italy, Slovenia</keywords>
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<title>Pseudosinella revisited (Collembola, Entomobryinae)</title>
<abstract>Eight controversies are active in the study of macroevolution. These are: 1) the meaning of the term macroevolution, 2) the role of chance, 3) the role of stasis and gradualism, 4) whether significant change Is limited to speciation events, 5) the environmental conditions where macroevolutionary change occurs, 6) whether Neodarwinian mechanisms are adequate to explain change, 7) the existence and nature of hierarchical evolutionary processes, and 8) Darwin's views about all this. After a brief examination of each of these issues we used the extensive data available for 9 species of European and Nearctic cave Pseudosinella to examine the third, fourth and fifth controversies mentioned above. Our conclusions are that while we are unable to demonstrate ongoing directional selection, we have clear evidence that significant adaptive change is not limited to speciation events. It does however appear that the amount of adaptive change is greater in the process of speciation than in between. We also show that there is no evidence for clear periods of stasis in the evolution of these forms. This leads us to a new model of the macroevolutionary process combining features of gradualism and punctuated equilibrium. We also showed that evolutionary change Is not associated with unstable environments but rather with more stable ones.</abstract>
<keywords>Collembola, evolution, selection, morphological change, speciation, environmental conditions</keywords>
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<volume>17 (1/4) - 1988 [Symposium on Speciation and Adaptation to Cave Life: Gradual vs. Rectangular Evolution: Part II]</volume>
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<title>Paleoenvironment and speciation in the cave beetle complex Speonomus delarouzeei (Coleoptera, Bathysciinae)</title>
<abstract>In the eastern part of the Pyrenees (France) the author describes a scenario of speciation in the cave species complex Speonomus delarouzeei (Coleoptera Bathysciinae); the speciation processes have been initiated by a breakdown of the ecological equilibrium induced during three glacial-interglacial episodes. The scenario is the following: during the first glaciation (2.3-2.1 MY), psychrophilic populations ancestral to S. brucki were selected over the highest elevation of the range, by means of cold effect which produced an adaptive demographic advantage; adaptive characters of troglobitic species (K strategy) take place presumably in relation to colonization of caves and M.S.S.; during the second glaciation (1.7-1.3 MY) and a more recent, S. charlottae, latter S. emiliae, diverged from troglobite ancestors of S. brucki without further adaptive characters, as result from stochastic and historical events. M.S.S. generated during erosional period of glacial event provided ways for migration and new niches for colonization. Bottleneck effect in size population of ancestors, founder effect, and colonization by local population which present genetic and behavioural geographical polymorphism, argue for a rapid speciation, presumably 100,000 years long and 50,000 generations in the case of S. emiliae.</abstract>
<keywords>Coleoptera, Bathysciinae, speciation, paleo environment, paleogeography</keywords>
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<title>Mating behaviour and barriers to hybridization in the cave beetle of the Speonomus delarouzeei complex (Coleoptera, Catopidae, Bathysciinae)</title>
<abstract>The complex Speonomus delarouzeei combines 6 species which were previously synonymized. Using behavioural data, based on 12 populations, the author assesses the validity of 4 species and points out the occurrence of 2 species as yet undescribed. Constant and important differences during the mating appear between these different species. They concern the number of behavioural steps, the duration, the number of clappings of antennae, the abdominal male movements and the rubbing of female abdomen. The results of crossing experiments between different species indicate a prezygotic reproductive isolation with atypical matings and no sperm deposit. Between the populations of S. delarouzeei s. str., having the same mating pattern some small differences observed do not represent barriers to hybridization and they may represent a speciation event at a very early stage.</abstract>
<keywords>Coleoptera, Bathysciinae, mating, hybridisation</keywords>

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<title>Evolutionary genetics and morphometrics of a cave crayfish population from Chiapas (Mexico)</title>
<abstract>The recently explored Cueva de Los Camarones, in the remote village of Constitucion, Chiapas, Mexico, houses a unique highly variable population of Procambarus crayfish (Crustacea, Decapoda). Morphologically, a more or less clinal variation is revealed at several features such as the degree of rudimentation in both pigmentation and eye, and the elongation of body and appendages. Extremes are quite different, ranging from typical dark, thick, eyed individuals to light, elongated, microphtalmic phenotypes. Evolutionary relationships among individuals were investigated electrophoretically (25 structural gene loci) and morphometrically (12 characters) by means of multivariate analyses. Results from analysis of individual allozymic multilocus profiles indicate that the "light" phenotypes belong to a distinct gene pool with respect to the "dark" ones, but some level of introgression is hypothesized. Results from analysis of individual morphometric profiles also show a discrimination between light and dark samples, chiefly determined by the shape of the rostrum and chela. The existence of such a discontinuous variation both in morphometric and allozymic characters presumably reflects a history of allopatric divergence followed by secondary contact of the two species.</abstract>
<keywords>Crustacea, Decapoda, Morphometry, Genetics, Evolution, Chiapas, Mexico</keywords>
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<title>Paleoenvironmental data for N.W. Georgia, U.S.A., from fossils in cave speleothems</title>
<abstract>Pollen grains and gastropod shells in two speleothems from Red Spider Cave, Georgia indicate that ca. 10,000 yr B.P. the vegetation near the cave was Mixed Mesophytic Forest. Conditions were cooler and moister than today and a shallow pond existed in the doline above the cave. As these findings support palynologic evidence from nearby pond sites it is clear that cave speleothems are a potential source of paleoecological data to ca. 350,000 yr. B.P.</abstract>
<keywords>Palaeo environment, fossils, speleothems, Georgia, United States of America</keywords>
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<title>Stratigraphic sections in the Ste. Genevieve Formation (Middle Mississippian) exposed in Garrison Chapel karst area caverns Western Monroe county, Indiana USA</title>
<abstract>The Ste. Genevieve Formation and related strata in the Blue River Group comprise more than 75 meters of Middle Mississippian carbonate deposition across the Indiana portion of the Eastern Interior Basin in Valmeyeran seaways. Forty kilometres of subterranean caverns occur in this carbonate rock sequence in the Garrison Chapel karst area where blind valleys are a striking topographical feature. The bedrock floor of a karst valley is locally accordant with a continuous horizon of lithographic limestone named Indian Creek Beds and illustrated on five cavern stratigraphic reference profiles.</abstract>
<keywords>Stratigraphy, Lower Carboniferous, Indiana, United States of America</keywords>
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<title>Diatom, contributors of coralloid speleothems, from Togawa-Sakaidani-Do cave in Miyazaki Prefecture, Central Kyushu, Japan</title>
<abstract>Coralloid speleothems are commonly distributed in Togawa-Sakaidani-do Cave in Miyazaki Prefecture, Central Kyushu, but their speleological study has not heretofore been achieved. Light and scanning microscopes analyses revealed that coralloid speleothems consist of alternating layers of diatom colonies, detrital minerals and clay. Electron microprobe analysis shows coralloid speleothems to be silicious. This paper

asserts that diatom (genus Melosira) is one of the important contributors to siliceous coralloid speleothems in the threshold zone at non-calcareous caves.</abstract>
<keywords>Diatom, speleothems, microscopy, pyroclastic rocks, cave, Japan</keywords>
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<title>Les mésaventures des sources de l'Estavelle et de l'Inversac en Languedoc Méditerranéen</title>
<abstract>The Estavelle and the Inversac are two celebrated springs in the Mediterranean Languedoc (South of France). Unfortunately, the first one has been chosen as a type for the karstic cavities alternatively absorbing or discharging the waters, according to the season, which has never been the case. On the opposite, the second one can be taken as model for this alternation as swallow hole or emergence.</abstract>
<keywords>Springs, Karst, France</keywords>
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<title>Relationships between the internal and external evolution of the Monte Cucco Karst Complex. Umbria, Central Italy.</title>
<abstract>The relationships between the internal and external evolution of the Mt. Cucco karst complex are studied. A classic set of equations, involving the oxidation of hydrogen sulphide, originated at depth in an evaporitic formation, is used to explain the presence of massive gypsum deposits in the Mt. Cucco and the Faggeto Tondo caves. The distribution and the morphology of more than 30 caves in the system, the presence of gypsum, always located along faults, and the presence of broken stalactites and columns, suggest that the evolution of the karst system has been controlled by tectonic movements. Relationships between the development of the caves and the geomorphic evolution of the area are proposed.</abstract>
<keywords>Geomorphology, speleogenesis, gypsum, evolution, Umbria, Italy</keywords>
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<title>Carbonate surface solution in the classical karst</title>
<abstract>The current research on the dissolution of carbonate rocks in the Karst of Trieste indicates that the average degradation of surfaces exposed to atmospheric agents is 0.028 mm/year with an average rainfall of 1350 mm. The maximum levels (0.031 mm/year) correspond to micro-crystalline limestones, the minimum values (0.014 mm/year) to dolomites.</abstract>
<keywords>Karst, corrosion, measurements, micro-erosion meter, Italy</keywords>
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<title>The evolution of non-relictual tropical troglobites</title>
<abstract>The discovery of terrestrial troglobites living in caves on young oceanic islands with close epigean relatives living in nearby surface habitats offers unique opportunities to develop and test hypotheses concerning their evolution. Studies comparing the physiological ecology of troglobites with their epigean relatives suggest that troglobites are highly specialized to exploit resources within the system of interconnected medium-sized voids (mesocaverns) and only colonize cave passages (macrocaverns) with a stable, water vapor-saturated atmosphere. Few other animals can live in the mesocaverns. Rather than being relicts isolated in caves by the extinction of their epigean ancestral population, troglobites appear to evolve by a process called adaptive shift from species that are frequent accidentals in the mesocaverns.</abstract>
<keywords>Tropics, troglobites, evolution, Hawaii, United Statse of America</keywords>
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<volume>16 (1/2) - 1987 [Symposium on Speciation and Adaptation to Cave Life: Gradual vs. Rectangular Evolution]</volume>
<authors>Francis G. Howarth.</authors>
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<id>176</id>
<id_art>176</id_art>
<title>The role of gradualism and punctuation in cave adaptation.</title>
<abstract>The theory of punctuated equilibrium, offers a potential explanation for the profound morphological changes that accompany isolation in caves. I consider three aspects of punctuation theory: the association of morphological change with speciation; periods of stasis; and the number of genes controlling a trait. If the evolution of cave organisms is associated with speciation, then speciose groups and cave species derived from other cave-limited species should show increased adaptation. Analysis of Kane and Barr's data on the subspecies of Neaphaenops tellkampfi and Holsinger's data on crangonyctid amphipods fails to provide any support for the hypothesis. If the evolution is characterized by long periods of stasis, then directional selection should be rare. An estimate of selection in a cave population of Gammarus minus indicates that directional selection is occurring. Third, if punctuation is important, characters associated with isolation in caves should be controlled by a single gene. Wilkens and others have found most characters in cave Astyanax to be controlled by between 3 and 7 genes. It is more useful to frame the question of evolutionary change accompanying cave invasion in terms of adaptive topographies. Several examples of its use are discussed, including assessing the role in selection in structural reduction, and the role of isolation in adaptation to cave life.</abstract>
<keywords>Cave adaption, gradualism, punctuation, isolation, evolution, Crustacea, Amphipods, Coleoptera, Carabidae, United States of America</keywords>
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<title>Genetic analysis of evolutionary processes</title>
<abstract>Epigean and cave populations of A. fasciatus (Characidae, Pisces) differ in a series of morphological physiological, and ethological features. The interfertility of these populations made possible a genetic analysis of organs characteristic of interspecific divergence. The study of the regressive organs "eye" and "melanophore system" on the one hand and that of the constructively improved "gustatory equipment and feeding behaviour" on the other yielded identical principles of genetic manifestation: (1) All features have a polygenic basis with an at least di- to hexahybrid inheritance. (2) All polygenes have the same amount of expressivity. (3) After recombination of a minimum number of genes, discontinuous distributions (threshold effects) develop. (4) All features are independently inherited. (5) The genes responsible for a feature are unspecific. In the case of the eye this means that no "lens-" or "retinagenes" are analyzed; due to developmentally physiological interdependence within complex structures, only so-called "eye-genes" have as yet been described. Because of the developmentally physiological interdependence of complex organs, the process of reduction proceeds as a diminution in size, that of constructive evolution as enlargement. In both cases different allometric correlations of the single structures can be found. The convergent reduction of eyes in cave animals is caused by the loss of stabilizing selection which normally keeps the eye in its appropriate adapted form. It is not directional selection pressure, like f. ex. energy economy, but mutation pressure that causes eye reduction. By this, random mutations, which are mostly of deleterious character, are accumulated. The principles of regressive evolution are not restricted to the development of cave species. The absence of stabilizing selection regularly occurs during transitional evolutionary phases. These are f. ex. initial stages of speciation which may be observed when biotopes with little or no interspecific competition are colonized by an invader. Genotypic and phenotypic variability now arise and equilibria become punctuated, because stabilizing selection for a specific ecological niche which has once been acquired by the invading species is no longer acting. Examples include the evolution of species flocks in geologically young lakes or oceanic islands. Rapidly increasing variability now secondarily provides the material for directional selection which radiates such species into vacant niches. Genetic threshold effects as described above may accelerate this process. Variability will finally become lower again under the influence of inter- and intraspecific competition. A new equilibrium is attained.</abstract>
<keywords>Evolution, cave adaption, Genetics, Pisces, Characidae, Mexico</keywords>
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<title>Food-finding ability in cave fish (Astyanax fasciatus)</title>
<abstract>When competing under cave similar conditions, such as darkness and food scarcity, cave fish find much more food than their epigean relatives. The cave fish not only react much faster to food but also their food-finding ability is four times higher compared to that of the epigean fish. Several morphological and ethological alterations in the cave fish, described by other authors, seem to be responsible for this adaptation to the cave conditions.</abstract>
<keywords>Cave fish, adaptation, competition</keywords>
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<title>Origination of stone forests in China.</title>
<abstract>The stone forests are widely distributed in the tropical and subtropical climatic areas. The stone forests may be divided into hilltop stone forest, hill slope stone forest and the stone forest in the depressions or valleys. The conditions for stone forest development should be (1) thick and pure limestone, (2) gentle dipping of limestone formation, generally less than 150, (3) a lot of vertical joint and fissure networks, (4) the soil covering on the limestone surface inhomogeneous, thick in the fissures and thin on the rock top surface, and (5) the soil should be wet and contain rich organic materials and CO2. In the above conditions, the stone teeth may develop to the stone forest. If lack of organic soil, low humidity and stable depth of soil erosion zone occurs, only the stone teeth are developed.</abstract>
<keywords>Geomorphology, tropics, stone forests, China</keywords>
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<title>Use of cave-maps for tectonic surveys.</title>
<abstract>Results of the author's investigations show the useful application of cave-map-data for tectonic assessment. Considering speleological features, cave genesis, and structural differences, it is possible to select of the cave map's pattern various jointing and stress systems. By 7 selected cave maps, representing areas of different tectonic history (W-Germany, Austria and Switzerland) it will be demonstrated that three types of kinematic joint-systems can be identified (fundamental, orthogonal- fold- and shear-system). Therefore, tectonic models are expected to become more valuable. It must be stated that future tectonic investigations in karst-areas should include the additional use of cave maps.</abstract>
<keywords>Tectonics, cave survey, West Germany, Austria, Switzerland</keywords>
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<title>The speleogenetic role of air flow caused by convection. First contribution.</title>
<abstract>In the past some authors described the speleogenetic role of convection in phreatic conditions. Similar effects exist also in the air-fiLled part of vadose passages of caves as a consequence of an air circulation due to a relevant temperature gradient; the effects can be enhanced by the presence of some acids as, e.g., H2S, H2SO4, etc. In this paper the conditions matching convection and condensation which produce typical forms, very similar to those found under phreatic conditions, are discussed both for limestone and gypsum caves.</abstract>
<keywords>Limestone, gypsum, caves, vadose, convection, condensation, speleogenesis</keywords>
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<title>Preliminary report of the first German speleological expedition to the Himalaya.</title>
<abstract>The first German speleological expedition to the Himalaya went to the terrace sediments of Pokhara, Nepal. New discoveries could be made in the longest cave of the Himalaya (Patalae Chhango or Harpan-River-Cave) and other caves were surveyed for the first time. Due to the observations the classification of conglomerate-caves as pseudokarst-appearances has to be questioned.</abstract>
<keywords>Conglomerate, caves, Himalaya, Speleology</keywords>
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<title>Evidence for karstic mechanisms involved in the evolution the Moroccon hamadas.</title>
<abstract>Underground tubular karst features, observed in an arid envinronment of southern Morocco, are described. On the basis of various evidences, it is suggested that such features were originated mainly by condensation water. A computation of the time necessary for their formation supports this hypothesis.</abstract>
<keywords>Karst, Arid environment, hamada, Morocco</keywords>
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<title>The Invertebrate Faunas of Tropìcal American Caves, Part 6: Jumandi Cave, Ecuador</title>
<abstract>Twenty-two species of invertebrates are reported from Jumandi Cave, Napo Province, Ecuador. Three are probably trogloxenes, and the other 19 are troglophiles. The only troglobite is the catfish Astroblepus pholeter.</abstract>
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<title>Nouvelles données morphologiques et caryologie du Triclade hypogé pyrénéen Dendrocoelum lescherae.</title>
<abstract>The study of a new strain of the hypogeous Tricladida Dendrocoelum lescherae has demonstrated the very low anatomical variability of this species. The chromosome complement was found to be 2n = 32; measurements of somatic mitoses have shown that these elements are metacentric; the gametocytes possess 16 bivalents. Number and morphology of the chromosomes are similar within the subgenus Dendrocoelides.</abstract>
<keywords>Morphology, Genetics, Turbellaria, Tricladida, France</keywords>
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<title>New records for Salentinella Ruffo (Crustacea Amphipoda) from phreatic waters of Italy and Greece.</title>
<abstract>New localities for the subterranean amphipod Salentinella Ruffo from central-eastern Mediterranean are reported. New collecting localities are listed for Italy, continental Greece and islands of Cephalonie and Zante. Furthermore, some remarks are made about the systematics, the variability and the ecology of the genus. Moreover, the Author refers to the main characteristics of a Salentinella sp. from central Italy, showing intermediate features between S. angelieri and S. franciscoloi. A map of the distribution of the genus Salentinella in Italy and in the Balkan-Dalmatian Peninsula is enclosed.</abstract>
<keywords>Crustacea, Amphipoda, phreatic waters, Italy, Greece</keywords>
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<title>The occurrence of the troglobitic amphipod, Stygobromus tenuis tenuis (Smith) (Crangonyctidae) in the Taconic Mountains of southwestern Massachusetts (USA): a case for the existence of a subterranean refugium in a glaciated region.</title>
<abstract>Stygobromus t. tenuis is one of only two species of troglobitic amphipods known to occur in the New England physiographic province. The rarity of subterranean organisms in New England is attributed to limited karst development and eradication of organisms from the region during glacial times. Traditionally it has been believed that those troglobitic species presently occurring north of the glacial terminus migrated there following glacial

retreat from refugia south of the areas influenced by glacial conditions. However, a few recent studies favour the existence of subsurface refugia in glaciated regions during glacial times. Stygobromus t. tenuis is recorded from springs connected with deep, solution zone aquifers in the Taconic Mountains of western New England, an area well north of the glacial terminus. It is suggested that these aquifers served as a refugium for S. t. tenuis during the latter part of perhaps all of the Pleistocene Epoch.</abstract>
<keywords>Crustacea, Amphipod, glaciation, evolution, Massachusetts. United States of America</keywords>
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<title>Two new genera of cave-dwelling millipedes (Diplopoda), with remarks on the millipede fauna of West Caucasian caves</title>
<abstract>Two new genera and species of the Diplopoda from Caucasian caves are described: troglobitic Caucasodesmus inexpectatus n.g., n.sp. (family Macrosternodesmidae) from a cave in North Osetia, North Caucasus, and troglophilic Ratcheuma excorne n.g., n.sp. (family Antroleucosomatidae) from a cave in Racha, Georgia, Transcaucasia. Millipedes of the western Caucasian cavernicolous fauna are reviewed as regards their distribution, relationship with caves and zoogeographical connections.</abstract>
<keywords>Diplopoda, Georgia Middle East, Osetia, Caucasus</keywords>
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<title>Polydesmide et Craspedosomides cavernicoles nouveaux de France et du Maroc (Myriapoda - Diplopoda).</title>
<abstract>This is a description of the affinities and biogeographic significance of three new cavernicolous species of Diplopoda from France and Morocco. One species apparently belongs to the Polydesmida (family Paradoxosomidae) and the other two to Craspedosomida (families Caratosphydae and Chordeumidae). 1) Eviulisoma abadi n.sp. is distinguished from other species of this genus by total depigmentation, by the characters of the gonopodial orifice and the male gonopods, by the low number of segments (19) and by its geographic isolation (Morocco) and ecology (Kef Aziza cave). This justifies the establishment of a new sub-genus, Jeekelosoma. The other species of this genus are found in equatorial Africa and the east. E. abadi is the first paleoarctic species of this genus and is the second paleoarctic species of the tribe Eviulisomidi after Boreviulisoma liouvillei Brol.). It is also the first known from a cave. Like the two other known species of Paradoxosomidae known from the southwest of the paleoarctic zone, Boreviulisoma liouvillei Brol. and Oranmorpha guerinii (Gerv.) the new species is indicative of originating in the Ethiopian region at a time when the Sahara was not a barren desert. 2) Ceratosphys maroccana n.sp. from Gouffre Friouato (Morocco) probably is not an epigean troglophile; it is the southernmost species of this genus which is normally found in France and Spain. This is apparently a remnant of a small group of species from the south of Spain that constitute a sub-genus Proceratosphys Mau. and Vincente. 3) Orthochordeumella leclerci n.sp. (caves of Ardèche, France) manifest the presence unique in this genus of cavernicolous characters including depigmentation and extreme length of antennae and is the only truly troglobitic species of this genus. Other characters are less distinctive but it is possible to distinguish this species by sexual characteristics from other species, notably that from the neighbouring geographic area, O. cebennica (known only from the Ardèche region) which is troglophilic. The other three species are found in epigean forest habitats, one in the Pyrenees, the other two in the Tyrol, the Swiss Jura, Baden and the northeast of France and Belgium.</abstract>
<keywords>Diplopoda, Biogeography, France, Morocco</keywords>
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<title>Morphological clines in reduced areas. The case of Henrotius jordai (Reitter), cave-dwelling beetle from Majorca Island.</title>
<abstract>The present paper shows a statistically significant correlation between the geographical latitude and the morphological variation of the pronotum of Henrotius jordai (Reitter) (Col. Caraboidea), cave-dwelling beetle from Majorca island, after studying the linear and curvilinear regression between these two variables. The existence of specimens situated at different heights of the regression lines leads to the conclusion that morphological variation is clinal. The phenomenon of "semi-isolation" to which the studied populations are subjected, because of their cavernicolous character, allows to explain the existence of a cline in such a restricted area as that occupied by this beetle (ca. 500 Km2). It is worth pointing out the interest in the study of these reduced clines of cavernicolous populations, because they can provide a restricted "observation field" - easier to deal with - to investigate these genetic phenomena and their evolutive implications.</abstract>
<keywords>Coleoptera, Carabidae, geography, morphology, Majorca, Spain</keywords>
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<title>The anatomy and histology of the alimentary tract of the blind catfish Horaglanis Krishnai Menon</title>
<abstract>H. krishnai is a blind catfish inhabiting the dug-out wells at Kottavam Kerala, South India. Studies on the alimentary tract of the fish show that, the alimentary tract, though typically teleostean, shows several adaptive modifications. The bulbous stomach helps in storing food which is helpful in an environment chronically deficient in food. The ileo-rectal sphincter helps in retaining the digested food in the intestine for a long duration to facilitate maximum absorption. This is very helpful as the intestine is short. The liver is well developed.</abstract>
<keywords>cave fish, anatomy, histology, alimentary tract, India</keywords>
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<title>Classification of Pseudokarst forms in Czechoslovakia.</title>
<abstract>The paper is a geomorphological classification of pseudokarst forms in Czechoslovakia/Bohemien Massif and the Carpathians. In the author's opinion, forms occurring in non-carbonate rocks, are morphologically and often genetically analogous to the forms of karst relief, and are pseudokarst phenomena. They are divided according to their size into macroforms in sandstone morphostructures of the Bohemian Cretaceous Basin some types of rocky valleys, water-shed plains and ridges, forming rock cities in some places, mesoforms with six types of caves, sinkholes, rock perforations and several rock phenomena and microforms such as weather pits and niches, lapies, etc.. The most prominent pseudokarst phenomena have been formed in the sandstones of the Bohemian Cretaceous Basin whose relief may be considered "pseudokarst". They are also common in other sediments; in neovolcanic rocks and granitic rocks, as well as in other types of rocks. Pseudokarst forms are the product of geomorphological processes, especially weathering and denudation, block rock slides, erosion, suffosion, etc. Most of them have been developing in the recent mild humid climatic conditions.</abstract>
<keywords>Pseudokarst, geomorphology, Czech Republic, Slovak Rebublic</keywords>
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<title>Lattice Deformation and Curvature in Stalactitic Carbonate.</title>
<abstract>The cause of lattice curvature is related to the nature of growth on a curved surface, peculiar to stalactites and stalagmites. Lattice curvature in stalactitic carbonate results from the coalescence of sub-parallel to divergent syntaxial overgrowth crystallites on the growing surface of stalactites and stalagmites. Moderate lattice mismatch results in an undulose extinction, or subcrystal domains, whereas more divergent growth favours marked lattice curvature recognized by its optical brush-extinction. Extreme lattice mismatch between the precursor crystallites results a columnar crystal boundary instead of lattice curvature.</abstract>
<keywords>Crystallography, carbonate, speleothems</keywords>
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<title>Environmental Implications of Competitive Growth Fabrics in Stalactitic Carbonate.</title>
<abstract>Competitive growth fabrics in stalactitic carbonate are not as widespread as commonly supposed. Most radial columnar crystals are attributed to the coalescence of a precursor crystallite mosaic comprised of syntaxial overgrowths. This secondary fabric is the consequence of carbonate precipitation from a thin water film. Competitive growth, however, is much rarer and arises from two contrasting environments: an influx of detritus interrupting carbonate precipitation, and cave flooding. Thick layers of impurities favour deposition of randomly oriented seed crystals on the growth surface. These result in competitive growth centres when the renewal of carbonate precipitation fails to have crystallographic allegience to the substrate. Competitive growth centres resulting in regularly spaced stellate arrays are favoured habits of fibrous aragonite. Competitive growth in calcite is more likely with conditions of cave flooding, when normal growth of syntaxial overgrowths is suppressed. This results in competitive growth between large terminations with planar faces.</abstract>

<keywords>Crystallography, growth, fabrics, speleothem, carbonate, environment</keywords>
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<title>Secondary Origin of the Radial Fabric in Stalactitic Carbonate.</title>
<abstract>The growth surfaces of most stalactites are interpreted as numerous syntaxial overgrowth crystallites. These coalesce immediately behind the growth surface, often trapping portions of the water film as fluid-filled cavities. The fluid inclusions represent former inter-crystallite spaces and characterize the widely misinterpreted "growth ring". Complete crystallite coalescence generates inclusions-free calcite, whereas inhibition of lateral coalescence of the overgrowth crystallites generates layers of acicular calcite. It is generally only during periods of cave flooding that the crystallites merge and overgrow each other and precipitation eventually occurs upon large, planar crystal faces. Stalactitic carbonate growth is secondary, from a multi-crystalline precursor that is, in a sense, a largo skeletal crystal. The precursor crystallites are in lattice continuity with the substrate and with adjacent crystallites. Crystal boundaries arise from lateral lattice mismatch on the curved growth surface. It is not competitive growth as the secondary columnar crystals do not interfere with each other.</abstract>
<keywords>Crystallography, radial, fabric, speleothem, carbonate, secondary origin</keywords>
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<title>On the Wad-Minerals from the Cavern Environment.</title>
<abstract>The wad-minerals from limestone caves of Yugoslavia, China and Japan were studied. X-ray diffraction analysis revealed five minerals; birnessite, 10A-manganite, pyrolusite, todorokite and goethite. The heavy metal elements, Mn, Zn, Fe and Cr have been detected by X-ray fluorescence analysis and their contents were roughly determined. The condensation water introduced directly from the covering soils formed by the continental weathering and the deriving corrosive water interaction with limestone could be the input sources of manganese and other metal elements into the system.</abstract>
<keywords>Mineralogy, manganese oxides, Slovenia, China, Japan</keywords>
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<title>Problemas de Fugas a Traves dei Karst en la Presa de Tous (Espana) (Anàlisis estructural, prevision del comportamiento y recomendeciones).</title>
<abstract>In the present work, the problems of leakages happened in Tous's dam (Valencia-Spain) are studied. Tous's dam is built on karstic terrains with the existence of caverns and strike-slip faults that at the same time become karstic. In this study the techniques of structural geology are applied, so, we deduct the karstic drainage directions, by using determined hypothesis of work. The confirmation of these hypotheses in the course of our fieldwork has permitted to quantify the probability of those leakages for each direction we found. This circumstance has permitted to foretell the places where it would be possible to expect leakages with the increase of the height of the dam foreseen for a second phase of building.</abstract>
<keywords>Dam, costruction, engineering geology, karst area, Spain</keywords>
<from>73</from>
<to>154</to>
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<volume>13 (1/4) - 1983 [International Symposium on Groundwater Biology]</volume>
<authors>Fernando Bermejo - Juan Pablo Cano - Joaquin Del Val - Adolfo Eraso - José Vicente Navarro - Felix Parra - Jesus Ribelles - Julia Saint-Aubin - Consuelo Valdes.</authors>
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<title>Stenasellus chapmani n. sp. Crustacea Isopoda Asellota des eaux souterraines de Bornéo (Sarawak).</title>
<abstract>The females of a new species of Stenasellidae have been discovered in Snake Cave (= Gua Siput), in Sarawak, 4th Division, Malaysia (Gunong Mulu National Park, Borneo Island), by Mr. Philip Chapman, of Bristol, U.K., during an expedition of the Royal Geographical Society. The

females of another larger species were known previously from several Cambodian caves. This suggests the existence of a general distribution of this family in the underground waters of the Peninsula and of the large Islands of the Indochinese Platform. Nevertheless, we must wait for the discovery of the males of these species to study their relationships, either with the European, or with the African stocks of the family.</abstract>
<keywords>Crustacea, Isopoda, Malaysia, Borneo</keywords>
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<title>Observations on the Biology of Cave Planarians of the United States.</title>
<abstract>Observations are made on the biology of several species of cave planarians (mostly of the family Kenkiidae) collected alive from over 50 caves in 14 states. Most of these species were maintained in laboratory cultures at 12°C±3°C. Food eaten was extremely variable. Functions of the anterior adhesive organ included food capture, locomotion, defence against predators, and probably chemoreception, mechanoreception, and as a holdfast in strong currents. Predators probably consist of fishes, crayfishes, and salamanders. Sporozoan and ciliated parasites were found occasionally. Cocoons were found in winter, spring, and summer; they hatched in about 3 months and contained 2 to 17 young.</abstract>
<keywords>Planaria, Caves, Biology, United States of America</keywords>
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<title>Absolute Population Censuses of Cave-Dwelling Crickets: congruence between mark-recapture and plot density estimates.</title>
<abstract>The absolute size, N, of a Dolichopoda geniculata population was estimated both by the Lincoln-Petersen index and the total count on sample plot methods in a natural cave in Central Italy. 19 pairs of estimates, obtained over 2 years, exhibit a seasonal pattern and a mean value of N ≈ 430. Differences between estimates obtained with the 2 methods are not significant (P > 0.8). These results, and data from the literature enable most of the major factors influencing the two types of estimates to be identified. Respective cases where methods may be preferably applied are suggested.</abstract>
<keywords>Orthoptera, estimation, population</keywords>
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<title>Paramexiweckelia, a new Genus of Subterranean Amphipod Crustacean (Hadziidae) from Northern Mexico.</title>
<abstract>Paramexiweckelia, new genus, is described from a groundwater outlet in Cohauila, Mexico. The type-species, by monotypy, is Mexiweckelia particeps Holsinger. Based on the number of its plesiomorphic (ancestral) characters, this genus is the most primitive member of the family Hadziidae from the North American mainland.</abstract>
<keywords>Crustacea, Amphipoda, Mexico</keywords>
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<title>Variation among populations of the yroglobitic Amphipod Crustacean Crangonyx Antennatus Packard (Crangonyctidae) living in different habitats II. Population distribution.</title>
<abstract>Population densities and factors affecting the distribution of the troglobitic (i.e., obligatory cavernicole) amphipod Crangonyx antennatus were examined in two distinct aquatic habitats. Observations were made seasonally for one year in six Lee Co., Virginia (U.S.A.) caves, three with mud-bottom pools and three with gravel-bottom streams. Pool habitats were found to contain greater C. antennatus densities than stream habitats, while the highest seasonal densities were recorded in August. Availability of food is considered to be the major factor allowing these increased population densities. The population distribution of C. antennatus was not found to be related to current velocity, water depth, macro-detrital food sources or

isopods densities in both pool and stream habitats. The distribution of C. antennatus was observed to be related to substrate type. Substrate selection appeared to be passive in five of the amphipod populations, while in one cave, substrate selection may be influenced by competitive interactions. The fact that population distributions were not related to environmental parameters which differ markedly between habitats indicates that this troglobitic species retains ecological flexibility.</abstract>
<keywords>Crustacea, Amphipoda, population, distribution, United States of America</keywords>
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<title>Sur une nouvelle espèce cavernicole du genre Cyathura (Isopoda, Anthuridae), (Résultats zoologiques de la Mission spéléologique britannique en Papouasie-Nouvelle Guinée, 1975, 7).</title>
<abstract>The present paper deals with the description of a new species of the genus Cyathura - C. beroni n.sp. - discovered in the caves in Papua New Guinea.</abstract>
<keywords>Crustacea, Isopoda, Papua New Guinea</keywords>
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<title>Lamtobathynella pentodonta n.g., n.sp., Leptobathynellidé nouveau d'Afrique (Cote d'Ivoire) (Malacostraca, Bathynellacea).</title>
<abstract>Lamtobathynella pentodonta n.g., n.sp. is described. We consider then its relations with the genus Leptobathynella and Parvulobathynella. Some observations about the most characteristic features of The VIIIth male pereiopods are made. This study ends with a discussion concerning the differences between Lamtobathynella pentodonta n.g., n.sp. and Acanthobathynella knoepffleri Coineau.</abstract>
<keywords>Malacostraca, interstitial fauna, Cote d'Ivoire</keywords>
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<title>A contribution to the knowledge of the invertebrate cave faunas of Venezuela: Invertebrate faunas of tropical American caves, part. 4.</title>
<abstract>The invertebrate faunas of four caves in northern Venezuela were studied. Three were dry and one was a wet cave; but guano provided the base of the food chain in all four caves. The faunas in each were strikingly different. Of 24 non-accidental species of arthropods, all were judged to be troglophiles. All were scavengers except for 5 predators, one ectoparasite, and one parasitoid.</abstract>
<keywords>Invertebrates, biospeleology, tropics, Venezuela</keywords>
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<title>Three Groundwater Candoninae (Ostracoda) from Romania.</title>
<abstract>Description of Mixtcandona botosaneanu, Mixtacandona loffleri and Phreatocandona motasi, are presented. The first two species belong to the group laisi-chappuisi and have been found in porous and karstic aquifers in Southwest Romania in or near the Lower Danube Valley. Phreatocandona motasi occurs in a porous aquifer in the Olt Valley, at Jiblea, near Calimanesti. Biogeographical information on the present distribution of the Mixtacandona of the group laisi-chappuisi and on the subterranean Candoninae from the Lower Danube Valley in Romania is given.</abstract>
<keywords>Crustacea, Ostracoda, Romania, Danube, interstitial fauna</keywords>
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<title>Effets des informations chimiques provenant d'un milieu habité par des congénères sur l'orientation topographique du poisson cavernicole Phreatichthys andruzzii Vinciguerra (Pisces, Cyprinidae).</title>
<abstract>Two series of experiments were performed on the oriented locomotor responses of 27 specimens of the blind cave fish Phreatichthys andruzzii from Somalia using a three-compartment choice apparatus. The oriented responses were observed individually from the central compartment towards either of the extreme ones. In one of them, 500 ml water were introduced from either the tank in which the test fish had previously resided with conspecifics (lst series, 46 experiments) or from another tank occupied by unknown conspecifics, the other compartment receiving an equivalent volume of pure water. The two series were performed in random blocks of 6 experiments, the momentary position of the test fish being noted every 30 seconds after an adaptation period of at least 4 hours. Results, analyzed in 9 blocks of 5 minutes show a definite preferential orientation of the fishes for the compartment containing chemical information from both known or unknown conspecifics. This effect is discussed in relation to the ecological conditions in which the species under study lives.</abstract>
<keywords>Cave fish, Pisces, ecology</keywords>
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<title>Fluoreszenzmikroskopische Untersuchung der Bakterienflora und Bestimmung ihrer heterotrophen Aktivität in organisch belastetem und unbelastetem Grundwasser sandig-kiesiger Ablagerungen.</title>
<abstract>Bacteriological investigations were carried out in the groundwater of sandy and gravelly deposits of the river Fulda valley in an area named «Johannesaue» near the town Fulda (Hesse, Fed. Rep. of Germany). In January 1979 water samples were collected from 16 pumping tubes distributed in organically polluted and unpolluted areas. For characterizing the bacterial populations, methods used for surface waters were modified and, as far as the author is aware, these methods were used for the first time for investigations pertaining subterranean waters. The bacteria were counted by means of epifluorescence microscopy after staining the bacteria with the fluorochrome acridine orange. This technique renders possible the simultaneous registration of shape and size of bacteria. Parameters characterizing the heterotrophic bacterial activity were measured with 14C-labelled glucose. The number of bacteria in the groundwater collected through pumping tubes, varied from 1.4 to 11.3 million bacteria per ml. The relative glucose uptake potential vr, which was measured at one substrate concentration (600 microg glucose .1-1) where the maximum uptake velocity is almost reached, was 0.12 - 0.74 microg glucose 1-1 .h-1. The corresponding specific potential was 0.02-0.18 microg glucose h-1 cell-1. The results agreed with the values of maximum uptake velocity Vmax which was measured at the same time in some of the groundwater samples. The data give first information about distribution of the number of bacteria and of heterotrophic bacterial activity in the groundwater of the investigation area. Relationships could be shown between the bacteriological parameters on the one hand and the concentration of oxygen and the values of COD measured with KMnO4 on the other hand.</abstract>
<keywords>Microbiology, subterranean water, Germany</keywords>
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<title>A Note on Directed Phytokarst in Sarawak (E. Malaysia).</title>
<abstract>A distinctive new type of phytokarst, oriented towards available light, has been found in cave entrances in the Gunong Mulu National Park, Sarawak, E. Malaysia. The karst features of this area are spectacular and important.</abstract>
<keywords>Phytokarst, Malaysia, cave entrance</keywords>
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<title>The Role of CO2 In Gypsum Speleogenesis: First contribution.</title>
<abstract>Starting from direct observation carried out inside gypsum caves around Bologna (Italy), the authors develop a new theory about the role played by CO2 in gypsum karstification. Such a theory agrees with the presence of calcite sinters inside gypsum caves without any source of calcium

carbonate (cover or interbedding layer). Moreover, starting from this theory, gypsum speleogenesis has to be always considered as a hyperkarstic phenomenon (more than 3 components at the equilibrium).</abstract>
<keywords>Gypsum caves, carbonate, speleothem, hyperkarst, speleogenesis, Italy</keywords>
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<title>International Symposium on Groundwater Biology: introduction.</title>
<abstract>Short presentation of the Symposium on Groundwater.</abstract>
<keywords>Symposium, Groundwater, Biology</keywords>
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<title>Genetic Differentiation in Populations of the Freshwater Amphipod Gammarus minus Say in a Karst Area.</title>
<abstract>The genetic makeup of populations in a particular geographic area should conform, in part, to environmental structure. Three polymorphic enzyme loci in the amphipod Gammarus minus are geographically differentiated in gene frequencies in the mid-Appalachian Mountains of the eastern United States, and genetic breaks usually coincide with topographical features and stream divides. Areas with well integrated drainage systems have a high degree of genetic uniformity.</abstract>
<keywords>Crustacea, Amphipoda, Genetics, differentiation</keywords>
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<title>Genetic Population Structure in an Amphipod Species.</title>
<abstract>Genetic structure of a species should conform, in part, to environmental structure. Three polymorphic enzyme loci in the amphipod Gammarus minus Say are geographically differentiated in gene frequencies in the mid-Appalachian Mountains of the eastern United States, and genetic breaks usually coincide with topographical features and stream divides. Considering alleles as migrational markers, it is expected that heterozygosity would decrease upstream in isolated drainage basins, increase in the headwaters of adjacent but oppositely flowing streams in which gene exchange was occurring between genetically differentiated populations, and increase in sites near regional master streams. These genetic patterns were found to exist in an area near the Juniata River in central Pennsylvania.</abstract>
<keywords>Crustacea, Amphipoda, Genetics, Population, United States of America</keywords>
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<title>Investigations of the Troglobitic Crayfish Orconectes inermis testii (Hay) in Mayfield's Cave, Monroe County, Indiana.</title>
<abstract>Mark-recapture studies of some aspects of the biology of the cavernicolous crayfish, Orconectes inermis testii (Hay), were conducted from December, 1969 to March, 1970, in Mayfield's Cave, Monroe County, Indiana. Population size was estimated to be 66 +/- 9 (95% C.L.) for the 300 m study area, but because of the small sample size, this is undoubtedly a deflated value. Size of animals, expressed as total length, indicates that the population was comprised primarily of adults. Seventy-four percent of the marked crayfish moved no more than 10.5 m away (total upstream and downstream distances) from the tagging site. Hence, this species appears to restrict its activities to a specific area ("home range") of up to 10.5 m of stream passage. Form I males travelled greater distances than did Form II (15.1 and 3.0 m, respectively), possibly in search of mates. Adult females moved less than juveniles, and males appeared to move greater distances than females (means of 12.9 and 5.9 m, respectively). Upstream movements were more commonly observed than downstream (mainly Form I males), indicating a possible restocking mechanism following floods. Distances travelled were not rebated to the size of individuals or to elapsed time.</abstract>

<keywords>Crustacea, Decapoda, cave, United States of America, ecology</keywords>
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<title>Variation among Populations of the Troglobitic Amphipod Crustacean Crangonyx antennatus Packard (Crangonyctidae) Living in Different Habitats, III: Population Dynamics and Stability.</title>
<abstract>Populations of the troglobitic amphipod Crangonyx antennatus from caves in Lee Co., Virginia (U.S.A.) were investigated on both a short and long term basis. The dynamics of populations living in two distinct aquatic cave habitats (mud-bottom pools and gravel-bottom streams) were compared seasonably for one year. Sex ratios indicated a larger number of females in both pool and stream habitats. The majority of males in both habitats were found to be sexually mature throughout the year investigated. Seasonal fluctuations in female maturity were observed in both habitats, with larger numbers collected in June and August. In addition, a larger number of ovigerous females were observed in the spring, indicating the possibility of a circannian reproductive cycle in both pools and streams. The structure of populations from the caves studied appears to reflect a controlled recruitment of females from immature to mature stages. In order to determine the stability of population structure, collection data from a pool and a stream habitat for a l0-year period were analyzed. Population structures were found to be relatively stable over long periods in both habitats, with immature females comprising the dominant population class.</abstract>
<keywords>Crustacea, Amphipoda, Population, Dynamics, Stability</keywords>
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<title>Some Implications of Competition for Cave Stream Communities.</title>
<abstract>Based on recent theoretical work by Robert May and Richard Levins, two hypotheses about time fluctuations in abundance of competing species were generated. Data for isopods and amphipods from four cave stream communities in Virginia and West Virginia were used to test the predictions. First, variance of total abundance should be less than the sum of the variances of individual species' abundances. In three of four communities studied, the prediction was confirmed, but none were statistically significant. Positive correlations among carrying capacities of competing species may explain the poor agreement with predictions. Second, the signs of 19 correlations and partial correlations of species abundances were predicted on the basis of relative magnitudes of direct and indirect effects of competition, and of these predictions, 16 were confirmed by the data, including 5 statistically significant ones. Most interesting was the finding that competitors can be positively correlated.</abstract>
<keywords>Crustacea, Amphipoda, Isopoda, United States of America, competition</keywords>
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<title>Distribution and Habitat Diversity of Subterranean Amphipods in the Rocky Mountains of Colorado, U.S.A.</title>
<abstract>Subterranean amphipods have been collected from 35 locations on the eastern and western slopes of the Continental Divide in Colorado. All belong to the exclusively subterranean genus Stygobromus. Five species have been identified, two of which are undescribed. Specimens have been collected from (a) the hyporheic zone of rivers, (b) interrupted streams, (c) springs, and (d) seeps at elevations from 1597-2134 m a.s.l. Stygobromus occurs in several habitat types in interrupted drainage basins including sources, seeps, and isolated pools containing leaf detritus. All habitats contained waters which were cool to cold with dissolved oxygen values ranging from 4.3 ppm to fully saturated. Most waters exhibited soft or medium hardness, although one spring containing an undescribed species of Stygobromus had very hard waters (203 ppm bound CO_2) and was mildly saline (913 mg/l TDS). There is evidence that the subterranean amphipods are phreatobites which, only under special conditions, establish relatively permanent populations in epigean habitats. Although little is known regarding ecology, zoogeography, or even taxonomy of the subterranean fauna of this region, stygobromid amphipods from the Cordilleran of western North America are apparently represented by fewer well differentiated species per unit area than their congeners from the geobiologicably older Appalachian region of eastern North America where numerous species are found in caves.</abstract>
<keywords>Crustacea, Amphipoda, United States of America, Distribution, Habitat</keywords>
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<title>Biogeographical and Paleobiogeographical Problems in Stenasellids (Crustacea Isopoda Asellota of Underground Waters).</title>
<abstract>Considering their systematic isolation among present Asellota, their strong burrowing behaviour, their aptitude for interstitial life and their wide north-tropical present distribution, the history of Stenasellid Crustaceans seems to be marked by the antiquity of their settlements in continental groundwaters (Middle Cretaceous period?) and a long stage of life in phreatic waters on permanently emerged paleotropical continents during the Cenozoic Era. The resemblance between some forms of the Guinean shield and Mexico sets the problem of the anteriority of their continental conquest to South Atlantic drift. The repartition of Mediterranean European forms appears as a consequence of paleogeographical changes in Tertiary Times. The distribution of continental European forms has been marked by Quaternary climatic alterations: severe curtailment of settlements, endemicity in Glacial periods but wide Holocene expansion for the forms adapted to new climatic conditions.</abstract>
<keywords>Crustacea, Isopoda, Biogeography, Paleobiogeography</keywords>
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<title>Perspectives in the Study of the Zoogeography of Interstitial Crustacea: Rathynellacea (Syncarida) and Parastenocarididae (Copepoda).</title>
<abstract>Aspects of the zoogeography of Bathynellacea and Parastenocarididae are discussed in the light of my recent investigations. Parastenocarididae in Australia are rare and not very diverse in number of species. Four species belonging to three genera were collected on a tour through Australia in 1968. Despite relationships to species from other Gondwanian landmasses the poorness of the Australian fauna, together with the apparent ability of this family to spread over longer distances, suggest a late arrival of Parastenocarididae in Australia. Invasion is likely to have taken place from two directions. As for the Bathynellacea, the relationships presumed to exist between genera from Australia and Malaysia within the Parabathynellidae have been invalidated. As an alternative to the double-armed dispersal model of the Parabathynellidae propounded earlier, a vicariance model is discussed following Schram (1977). The zoogeography of Parastenocarididae can probably be best explained in terms of a primary dispersal history.</abstract>
<keywords>Crustacea, Syncarida, Copepoda, Zoogeography, Australia</keywords>
<from>83</from>
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<id_volume>44</id_volume>
<volume>11 (1/2) - 1981 [International Symposium on Groundwater Biology]</volume>
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<title>Distribution of Ostracods in the Groundwater of the North Western Coast of Euboea (Greece).</title>
<abstract>Freshwater fauna from 20 wells located 15-200 m from the seashore as well as marine interstitial fauna from the coastal zone around the village Aghios Georghios (Cape Likhada) have been investigated. Freshwater hypogean ostracods live mainly in protected wells having clean bottom and little particulate organic matter from which the water is moderately pumped. Epigean freshwater ostracods dominate in unprotected wells with large amounts of organic matter on the bottom. There is a sharp difference between the ostracod fauna living in fresh groundwater (mainly Cypridids) and those living in coastal marine interstitial habitats (marine Cytherids and Polycopids). It is suggested that in the Mediterranean realm the hypogean fauna could be found easily in protected wells with little organic matter accumulation, where water is moderately pumped.</abstract>
<keywords>Crustacea, Ostracoda, Greece, interstitial</keywords>
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<volume>11 (1/2) - 1981 [International Symposium on Groundwater Biology]</volume>
<authors>Dan L. Danielopol.</authors>
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<title>Phreatische Fauna in Ljubljansko polje (Ljubljana-Ebene, Jugoslavien) - ihre oekologische Verteilung und zoogeographische Beziehungen.</title>
<abstract>The phreatic basin of Ljubljansko polje (polje = plain, field) recharges its water supply mainly from the Sava river-bed and at a few other locations where connections with karstic subterranean waters might exist and only up to 15% from precipitation. An important zone of infiltration in the river-bed is the bottom and not the bank which is to a large extent watertight due to organic debris (rests of Sphaerotilus e.g.). The main water-body moves about 10 m/day, there are however some local jets with far higher speeds. Yearly amplitudes of water temperatures are high near the river but in the centre of the plain only a couple of centigrades. Oxygen saturation is in the open river-water 100%, dropping to 40-60% just 1 m into the phreatic. True stygopsammal animals are represented here only by a few species and specimen in spite of the fact, that the interstices in the gravel are mostly filled with finer sediments. Remarkable is also the scarcity of Nematodes and the near absence of Acarina (compare with Danielopol 1976). Only a few specimen of the river benthos (Chironomidae, Tipulidae, Leuctra supp., Baetìs spp.) penetrate the interstitial water (compare with Ruffo 1961,

Danielopol 1976) and only Naididae are more frequent there. However, many epigean animals occur in interstitial waters in the periodically flooded gravel-banks; one can explain this with oscillations of the water level. Some epigean animals (creno- and troglophilic) are quite regularly represented in the phreatic near the river, but have not been found in the river-bed. The distribution of phreatic species within the studied water-body seems to be controlled mainly by the presence of food supplies and the consequent competition among species. The same is true for the speed of the water current and some other factors which are less easily defined. The characteristics of the substratum as well as O2-saturation and other characteristics of the water seem to have little influence on the fauna. The energetically (food-) rich neighbourhood of the river is inhabited by a number of species in quite dense populations while the central parts of the phreatic water body exhibit a great poverty of species and of specimen. However, some species live here, which don't occur in the presence of larger food supplies and of greater competition (Niphargus serbicus). The higher current speed seems to prevent settlement of some species (Cyclopoida, Proasellus deminutus) while some are bound to such habitats (Proasellus vulgaris). Some species exhibit a high degree of euryvalency inside the stygopsephale habitats (Niphargus longidactylus e.g.), while some are highly specialized. Some of them form dense populations (comparatively dense even in energetically poor places) while others exhibit even in most favourable conditions very low densities (Niphargus jovanovici multipennatus). The present fauna is zoogeographically very diverse. Some species are distributed throughout Europe; some reach from Central Europe to the borders of Dinaride Karst (Bogidiella albertimagni) and some even penetrate it (Trichodrilus pragensis, Acanthocyclops kiefer). Bogidiella semidenticulata. Niphargus pectinicauda, Hadziella deminuta seem to be limited to the higher reaches of the Sava River. All of the above mentioned animals live regularly in interstitial waters and only sporadically in karstic hypogean waters. Niphargus stygius is here the only animal of a certainly karstic provenience; inside the plain it is limited to a completely special habitat. It is very likely that the entire Proasellus-deminutusgroup has developed in interstitial waters of larger plains which are in contact with karstic areas; some species penetrated from the plains into the karst rather than the reverse. To the contrary (judging from the distribution of the genera) karstic waters seem to be the cradle of Hauffenia and Hadziella. Such a sharp delimitation between cave- and interstitial fauna resp. in this area is very noteworthy. Both faunas live here in abundance and in close contact. It is very probable that particularly high competition and specialization of both faunas, caused by their richness and diversity, prevent mixing of species.</abstract>
<keywords>Crustacea, phreatic fauna, Slovenia, zoogeography, ecology</keywords>
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<title>The Edwards Aquifer: Earth's Most Diverse Groundwater Ecosystem?</title>
<abstract>Recent studies on the Edwards Aquifer, a karstic formed cavernous system in Texas, indicate an extremely diverse community of aquatic troglobites. Sampling of wells and springs is providing new insight into the dynamics of this fascinating system, which is possibly the most diverse subterranean aquatic ecosystem known in the world today.</abstract>
<keywords>Biospeleology, acquifer, United States of America, ecosystem</keywords>
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<title>Structure et Fonctionnement des Ecosystèmes du Haut-Rhone Français; VIII: Hydrologie de deux stations phréatiques dont l'eau alimente des bras morts.</title>
<abstract>We have been working since 1975 on phreatic stations providing two old meanders of the French river Rhone with interstitial water. The hydrological characteristics are quite different (see diagrams in the text): - The one (station 2) is a particular under-flow circulating laterally to the river ("paraécoulement"), which is closely subordinate with the varying level of the Rhone. - The other (station 8) is the confluence of continental phreatic water proceeding from a Northeastern plateau (the "Dombes") with the hyporheic of the river Ain (eastern tributary of the Rhone). The Rhone has no influence on the characteristics of this second interstitial flow. The physico-chemical disparity of these stations clearly appeared during two extremely opposite climatic periods; the inferences on resident populations are considered.</abstract>
<keywords>Ecosystem, phreatic fauna, chemistry, physics, water, France</keywords>
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<title>Structure et Fonctionnement des Ecosystèmes do Haut-Rhone Français; IX: Analyse des peuplements de deux stations phréatiques alimentant des bras morts.</title>
<abstract>Two phreatic stations providing old meanders of the French river Rhone ("Lones") with interstitial water have been studied for three years. The samples (100 liters of water) have been collected by the Bou-Rouch method at 60 cm deep in the sediment. The analyses of populations show that the biocenoses of the two stations are quite different: The one (Station 2) is rather specialized; most of the species are troglobitic (80% of the whole

biomass; the only Amphipod, Niphargopsis casparyi, represents 67% of this biomass). The other (Station 8) is very diversified; the seven dominant groups are all epigean animals. Population numbers have changed during the three years of sampling. Fluctuations have been observed in station 2, but the total numbers were quite similar in 1975 and 1977. On the contrary, station 8 shows an "exponential" type of growth generated by epigean organisms, while troglobitic species remained unchanged.</abstract>
<keywords>Ecosystem, France, phreatic, fauna</keywords>
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<title>Investigation of the Mutual Influence between a Polluted River and its Hyporheic.</title>
<abstract>This paper describes investigations of fundamental biological and pratical importance. Interstitial subterranean water (hyporheic) which is near a polluted river in a plain is the subject of the study. The water is becoming increasingly important as a source of drinking water. The relation of the hyporheic water to the physical, chemical, bacteriological and faunistic characteristics of the river is discussed.</abstract>
<keywords>Pollution, River, sediments, aquifer, microbiology, chemistry</keywords>
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<title>The development of limestone cave systems in the dimensions of length and depth.</title>
<abstract>Karst caves are defined as solutional cavities 5-16 mm in diameter and discussion is limited to cases where such continuously extend to a surficial input or output or both. Three opposed sets of general genetic hypotheses ("the classical hypotheses") have been presented for such caves, Arguing that the majority develop 1) in the vadose zone 2) in the phreatic zone 3) proximate and parallel to a watertable. It is contended here that vadose, phreatic and watertable caves are all of common occurrence and may be linked in one genetic theory. A four state model is proposed in which ideal phreatic and watertable caverns are end members: in a given massif of soluble rock the state (cave type) that develops is a function of the frequency of fissures penetrable by groundwater. The water-table type is the high frequency end member. Fissure frequency increases with passage of time after onset of karstification and gradational features may also develop to modify phreatic types. Vadose caves may be of "drawdown" type (following an initial phreatic path) or "invasion" type (developing a new path through rock drained by earlier caves). Extensive cave systems may comprise vadose, phreatic and/or watertable developed contemporaneously.</abstract>
<keywords>Speleogenesis, theories</keywords>
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<title>Fracturation and Karstification of a Massif: the example of the Azerou El Kebir (Northern Algeria).</title>
<abstract>The fracturation of the sub-autochthonous massif of the Azerou el Kebir is not fundamentally different from that of the adjoining allochthonous massif - where the structures are due to an Alpine phase, known as the Atlas phase. As with all fractures, karstification only exploits certain of them, without having any linkage to their statistical importance, caves have developed following fractures which are qualitatively important, but are poorly represented quantitatively. The study of the karstification therefore, confirms his complementary to the structural analysis in order to elucidate the technical problems of fracturation in the region.</abstract>
<keywords>Speleogenesis, tectonics, Algeria</keywords>
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<title>Adolf Schmidl (1802-1863) the father of modern speleology?</title>

<abstract>A. Adolf Schmidl (1802-1863) was the first person to regard speleology as a single coherent subject. Besides making important new explorations, he studied karst hydrology and underground meteorology and was also closely concerned with the work of others on cave fauna and flora. His publications ensured that his achievements were known to his successors, but his influence was less widespread than that of Martel who nevertheless called him "the real originator of speleology".</abstract>
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<title>A bibliographical Synthesis on the toxicity of fluorescent substances used in Hydrology.</title>
<abstract>This synthesis has been established from three recent studies and from a complementary bibliographical research. It resumes the names of fluorescent substances actually used or experimented as tracers in hydrology and draws attention to their uses and relative problems in their uses. The adjoining annex gives an exhaustive use of publications received on the subject (35 titles).</abstract>
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<title>Present Karstic base level in the main canyons of oriental Languedoc and Plans of Provence.</title>
<abstract>In a karstic country cut by a canyon in which runs an allogenic river, there are several base levels (karstic, fluvial...); chiefly if the limestones develop greatly under the bottom of the gorge. The difficulty of characterizing them appears in all the definitions given. From the example of the three most important canyons of the Eastern Bas Languedoc (South-East of France) and with the different geological controls (s.l.) one ascertains that at present: a) When an allogenic and surface river is perennial without important loss there is a total connection between fluvial level and karstic base level. b) When an allogenic and temporary surface river doesn't flow and has losses, there is no connection between the major fluvial and base level and the karstic base level.</abstract>
<keywords>Geomorphology, speleogenesis, fluvial, base level</keywords>
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<title>First observations on deposition of calcite sinter in a cave.</title>
<abstract> after some years of experimentation the growth rate will be determined under controlled conditions.</abstract>
<keywords>Mineralogy, speleothem, gypsum cave, Italy</keywords>
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<title>Studies of the cave crayfish, Orconectes inermis inermis Cope (Decapoda, Cambaridae). Part IV: Mark-recapture procedures for estimating population size and movements of individuals.</title>
<abstract>Several methods for permanently marking cavernicolous crayfishes were investigated prior to initiation of field work in Pless Cave, Lawrence County, Indiana. Internally injected ink complemented with external "painting" proved to be a most satisfactory tagging procedure. During the two-year study period 211 individuals of the troglobitic crayfish Orconectes inermis inermis Cope were marked; 96 tagged individuals were recaptured at least once, a 46% recapture rate. The population size was estimated to be 1586 +/- 79 (95 % C.L.) over the 540 m subterranean stream study area and remained relatively stable during the period of 1970 to 1972. The home range of male crayfishes is as high as 20 m and extends up to 23 m for females, although maximum distances travelled by individuals of both sexes greatly exceed these values. Small individuals of both sexes are displaced

downstream whereas larger crayfish show distinct upstream movement. If all movement data are pooled, both sexes exhibit a net downstream movement. The downstream movement of crayfish is heavily influenced by flooding. </abstract>
<keywords>Crustacea, Decapoda, population, ecology</keywords>
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<title>A study on Rhachomyces species (Ascomycetes, Laboulbeniales), parasitic on Italian Duvalius (Coleoptera, Carabidae, Trechini).</title>
<abstract>The systematic position, variability and distribution of the two species of Rhachomvces parasitic on Italian Duvalius are defined on the basis of several new findings. Rhachomyces stipitatus Thaxter was found in Liguria, central Italv, Sicilv and Sardinia; its synonyrny with R. capucinus Thaxter is confirmed and the ssp. pallidus Maire is considered of no systematic relevance. R. maublancii, whose position is regularized by a Latin validating diagnosis, was only found on the Alps and previous records in other countries are questioned.</abstract>
<keywords>Insecta, Coleoptera, Ascomycetes, parassite, Italy</keywords>
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<title>Eco-ethological and parasitological data on the cavernicolous Chiroptera in Shaba (Zaire).</title>
<abstract>After a brief analysis of the elements of the cavernicolous microclimate in Shaba, the author emphasizes the possibility of relations between ecology and parasitism. He then reviews the 9 species of Chiroptera that live in the subterranean field in Shaba, pointing out their environmental habitat. behaviour and parasites.</abstract>
<keywords>Chiroptera, parassites, Shaba, Congo</keywords>
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<title>Spontaneous and induced acivity patterns in troglobite beetles (Genera Aphaenops, Geotrechus,Speonomus).</title>
<abstract>In Constant temperature the troglobite beetles Aphaenops cerberus and pluto, Geotrechus orpheus and Speonomus diecki are aperiodically active. By periodogram analysis neither circadian nor ultradian or infradian periodic components can be found. Moreover there are no relevant correlations between the lengths of successive activity bursts and rest pauses. Consequently the activity patterns are stochasticly structured. - In cases with constancy of activity respectively rest behaviour the probabilities for the transition from activity to rest and from rest to activity are computed using the Frequency histograms of lengths of activity bursts and rest pauses. The transition probability is time-invariant if the observed histogram can be approximated to the negative exponential function. Y=ae -fx . The transition probability increases continuously if the observed histogram can be approximated to the Poisson or normal function. -74% of the investigated frequency histograms of the length of activity bursts and 57% of the histograms of the lengths of rest pauses can be approximated to one of the tested functions. -Aphaenops and Geotrechus specimens do not react to changes of the illumination intensity. Conversely temperature cycles induce distinct activity periodicities. In Aphaenops the mean length of activity bursts is -on the average - less temperature dependent than the mean length of rest pauses. Moreover, in this species the mean length of bursts is weakly negatively correlated with the mean length of pauses. - The evolution and adaptive reactions of the random mechanism of activity control in troglobite animals are discussed.</abstract>
<keywords>Insecta, Coleoptera, ecology</keywords>
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<title>Bragasellus escolai n.sp., cavernicolous Crustacea Isopoda Asellota from Spain.</title>

<abstract>The paper gives a description of a new, unpigmented and anophtalmous species of Bragasellus collected in Calderòn Cave, Vellia de Carriòn, Palencia Province, Northern Spain (hydrographic basin of Douro River).</abstract>
<keywords>Crustacea, Isopoda, Spain</keywords>
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<title>Contribution to the study of Karstic caves of Djurdjura (Algeria). Morpho-hydrogeological description and evolutive synthesis.</title>
<abstract>In North-Africa, the karst of Djurdjura Mountains is important because it shows high-alpine characters. In others papers, we have studied shallow morphology and speleological explorations. Here, we describe the caves: morphology, qualitative hydrology and fillings. These cavities are replaced in their morpho-structural context. We make distinctions between kinds of cavities. Gulfs and resurgences characterize high-alpine karst which is actual. Other caves that have their opening at the middle of slopes are dry, disconnected of actual morphological context. They belong to past karstification phases. From the synthesis of those elements, we show that it is possible to use karstic data in the reconstruction of morpho-structural evolution of a country.</abstract>
<keywords>Speleogenesis, geomorphology, Algeria</keywords>
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<title>A note on the speleo-minerals in South Korea.</title>
<abstract>Description of a total of nine minerals found in ten caves of the middle Eastern part of the Korean peninsula.</abstract>
<keywords>Mineralogy, Cave, Korea</keywords>
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<title>New results of the speleological researches in the Hainburger Berge (Lower Austria) and their scientific meaning.</title>
<abstract>Since 1971 speleological and paleontological investigations have been carried out in the quarry "Hollitzer" which is in the Pfaffenberg near Bad Deutsch Altenburg (Hainburger Berge, Lower Austria). Evident karst phenomena are missing at the surface, but the existence of caves filled with sediments in the quarry show that the area is a fossil buried karst. A steady scientific survey allowed the study of the karstic phenomena without hindering the work in the quarry. Up to now more than 150 cavities have been discovered. Most of them seem to belong to a unique solutional system; corrasive forms are missing. Fossils (Gasteropoda, Amphibia, reptiles, birds and mammals) have been found in more than twenty cave fills. The oldest findings can be dated from the middle to the recent Pliocene (Csarnotanum), the more recent ones to the older Pleistocene (Villanyium; Biharium) the material is well preserved. Its variety in species and individuals as well as the possibility for a biostratigraphical evaluation makes the findings of Pfaffenberg a particular source for the above mentioned periods. The investigations are still continuing.</abstract>
<keywords>Palaeontology, cave</keywords>
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<title>The occurrence of Metacyclops subdolus Kiefer (Crustacea: Copepoda) in subterranean waters of Greece with remarks on its systematic status.</title>
<abstract>The paper gives new localities for the Copepod Metacyclops subdolus from Greece and Crete together with the main morphological and ecological features of the species.</abstract>
<keywords>Crustacea, Copepoda, Greece</keywords>
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<title>Adult Batrachuperus in a cave in Iran. A new species?</title>
<abstract>During a speleological exploration of a cave in Iran, a species of Urodele Hynobiidae was found. This Batrachian is either a new species of the genus Batrachuperus or an adult form of the species Batrachuperus persieus previously only described in its larval and juvenile forms. Certain observable differences suggest that it can be considered a new species. Observations on its feeding habits indicate that the presence of this periodic trogloxene in the cave is not "accidental", but that it remains there for a long period during its life cycle.</abstract>
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<title>Observations on the behaviour patterns of the Cuban cave fish Lucifuga subterranea Poey (Pisces, Ophidiidae).</title>
<abstract>The swimming behaviour and the sensory reactions of the blind Cuban cave fish Lucifuga subterranea Poey were studied on a single individual during a period of 6 months. Mechanical stimulation elicits but slight reactions. Gustatory substances in solution elicit fairly typical motor responses which are not followed by systematic exploration behaviour, the same being true for stimulations by odours of prey. The presence of moving prey provokes an oriented exploration with a slight plunging movement of the kind evidenced in other cave fishes. Actual seizing of the prey requires an active approach of the latter towards the anterior part of the body of the fish.</abstract>
<keywords>cave fish, ecology, Cuba</keywords>
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<title>The Discovery of Proteus-eggs (Proteus anguinus Laurenti, Amphibia) in seminatural Conditions.</title>
<abstract>Proteus-eggs were found for the first time in the nature, drifted out of a karstic spring. They were obtained from the Vir Spring al Sticna, 30 km ESE of Ljubljana. The hydrological and faunistical data indicate that Proteus lays its eggs also in "unsheltered", energetically rich groundwater habitats.</abstract>
<keywords>Amphibia, Proteus, reproduction, Slovenia</keywords>
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<title>A classification of karstic phenomena.</title>
<abstract>The paper describes and classifies the several types of karstic processes, distinguishing karstic, parakarstic, hypokarstic, hyperkarstic and pseudokarstic phenomena. An appendix on solubility of silica is also given.</abstract>
<keywords>Karst, types, classification</keywords>
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<title>A critical review of hypotheses on the origin of vermiculations.</title>
<abstract>Mud and clay vermiculations are irregular and discontinuous deposits of incoherent materials, almost ubiquitous, found both inside and outside of caves, overlying limestone or other materials, they are formed from many substances (clay, mud, candle-black, colloidal silica, etc.) also their shape dimensions vary greatly. The following genetical hypotheses have been proposed: fossil fillings; chemico-genetical deposition; biological formation; mechanical deposition from moving water or air; clay-layer drying process (Montoriol-Pous hypothesis); physicochemical deposition from drying liquid films. The last is proposed by the authors who, having discussed the various hypotheses, give many examples and the results of some experiments. They distinguish two types of vermiculations: Type 1 or negative vermiculations Type II or normal vermiculations. The genesis of type I is explained by the Montoriol-Pous hypothesis; these vermiculations are large and made of clay or other colloidal material, and are due to the gradual drying of a layer of clay or other substance. The last stage of this drying process causes the vermiculations to form in a more or less dried state. The vermiculations of the second type are small and thin, much ramified and always with a clear «halo» around them. Vermiculations consisting of many materials have been observed, usually as macroscopic aggregates. They are caused by the drying of a liquid film containing suspended colloidal particles. The proposed mechanism provides a good explanation of all the observed characteristics of vermiculations.</abstract>
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<title>Locomotor responses of the cave fish Astyanax jordani (Pisces, Characidae) to periodic and aperiodic light and temperature signals.</title>
<abstract>The locomotory activity of adult cave fishes Astyanax jordani was recorded in isolation in the following light and temperature conditions: constant conditions (100 Lx - 200C), in a light cycle (LD:11/11 -10 Lx -100 Lx) and in a temperature cycle (11/11; 17/20, 19/22, 20/23, 27/30 °C). All longitudinal time series extended for a minimum of 30 days. Results show: (1) That no circadian regulation appears in constant conditions; (2) that passive entrainment occurs in LD (Amplitude: 90 Lx) and in periodic temperature conditions (Amplitude: 3°C). The entrainment effect damps out and varies individually; (3) that the mean activity increases with temperature; (4) The adjustment of activity to periodic signals is individually stable. These results suggest that A. Jordani is devoid of any endogenous oscillator of the circadian type. The observed thermal adaptation could have the following functions: (1) To increase the level of activity in function of the thermal level under the form of passive entrainment; (2) To enhance the exploratory behaviour of the fish in search of a thermal preference allowing the animal to keep inside a well defined zone of the subterranean biotope in relation to small local temperature changes.</abstract>
<keywords>Pisces, cave, ecology, locomotion</keywords>
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<title>Hypogean ostracods from South of France. 2. Pseudocandona simililampadis n.sp..</title>
<abstract>The description of Pseudocandona simililampadis n. sp. is presented. The new species belongs to the group schellenbergi and has been found in the karstic system of the Vidourle river at Sauve (Gard).</abstract>
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<title>Microflora and activity of functional groups in the sediments of three caves of Central Italy.</title>
<abstract>A comparative study is presented of the microflora of sediments in three caves with different trophic characteristics. Quantitative and qualitative variations of microflora were investigated for one year by studying the total microflora and the activity of the nitrogen cycle functional groups. Data were compared with those of other works of previous authors. Results show that the quantity and kind of organic matter of sediment are most important factors regulating the abundance and activity of cavernicolous microflora. The experimental part of this paper is prefaced by a digest of investigations previously carried out on cavernicolous microflora and by a report of topographic, geomorphologic, hydrologic and trophic characteristics of the caves examined.</abstract>
<keywords>Microbiology, microflora, cave, ecology, Italy</keywords>
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<title>On the Composition, the Origin and the Formation of the Cave Fauna of Western Stara Planina (Bulgaria).</title>
<abstract>The karstic area between the rivers Timok and Vit has about 500 caves and pot-holes, more than 300 of them being the subject of the present study. In this area (called here Western Stara Planina) we have noted 63 species and subspecies of terrestrial troglobites and 17 species and subspecies of aquatic troglobites. The two Regions into which we split the area (region of Ogosta and Region of Iskar) are the richest in cave fauna of Bulgaria. This study deals with the particularities in the composition and the distribution of the different groups of terrestrial troglobites, and especially of such groups as Diplopoda, Isopoda, Coleoptera and others. According to the paleogeographic development of the area conclusions are made concerning the age of certain troglobites and the barriers determining their present distribution.</abstract>
<keywords>Cave fauna, evolution, biogeography, Bulgaria</keywords>
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<title>Ecological and distributional remarks on unpigmented and anophthalmous Turbellaria Tricladida in Romania.</title>
<abstract>Twenty-two localities, where unpigmented and mostly blind tricladid turbellarians (Dendrocoelidae and Fonticola) were discovered by the author, are described in more or less detail. These animals are particularly well represented in Romania; the explanation is that they are expansive offshoots of a fauna formerly inhabiting the huge brackish or freshwater lakes which covered most of this country during the Neogene (and especially the Sarmatian). Different species are inhabitants of different particular habitats of the underground water realm, and the author distinguishes between species inhabiting cave waters, typical phreatobionts, hyporheic species and species living in springs or springbrooks. These species are sensitive indicators of even small changes affecting the abiotic or biotic conditions prevailing in their habitats (several examples are offered, especially of competitive exclusion).</abstract>
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<title>Hypogean ostracods from South of France. 1. Mixtacandona juberthieae n.sp.</title>
<abstract>The description of Mixtacandona juberthieae n.sp. is presented. The new species belongs to the group taurica and has been found in the karstic system of the Vidourle river at Sauve (Gard).</abstract>
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<title>The spiders of the genus Rhode in Yugoslavia (Araneae, Dysderidae).</title>
<abstract>Rhode magnifica n. sp. is described from a Montenegrine cave and Rhodestalitoides n. sp. from a Bosnian cave. There is a redescription of Rhode aspintfera (Nikolié). The author includes in the genus Rhode the species previously contained in the genera Harpassa and Typhlorhode. The northern Yugoslav genus Stalita and related genera are regarded to be the nearest relatives of Rhode and it is concluded that they have originated on the Balkan Peninsula from a common ancestor.</abstract>
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<title>Dytiscidae from Papuan caves (Zoological Results of the Britisb Speleological Expedition in Papua New Guinea, 1975, 1).</title>
<abstract>This paper reports the results of the investigations on Dytiscidae from New Guinea caves. Three new species are described: Copelatus subterraneus sp.n., Platynectes (Metaplatynectes) beroni sp.n. and P. (M.) chapmani sp. n. Synonymic notes on the subgenera of the genus Platynectes and descriptions of two new subgenera Notoplatynectes subgen. n. and Metaplatynectes subgen. n. are also reported.</abstract>
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<title>An interstitial Asellid from Ebro basin (Spain): Proasellus lescherae n.sp. (Crustacea, Isopoda, Asellota).</title>
<abstract>Proasellus lescherae n.sp. is a little, interstitial species, living in the underflow of Rio Guadalope Basin (a tributary of Ebro River). It is related to the water-slaters of the underground waters of the Pyreneo-cantabrigian region (the phyletic line of Proasellus spelaeus Racovitza). The mean size of the reproductive females is very small (2,9 mm) and the brood contains only 6-10 eggs. Nevertheless, the size of the eggs and intramarsupial larval stages are the same as in epigean or hypogean species of the genus, which reach a larger adult size.</abstract>
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<title>Diplopoda from Papuan Caves (Zoological Results of the British Speleological Expedition to Papua-New Guinea, 1975, 4).</title>
<abstract>Eight species of polydesmoid millipeds are described from the caves of the extreme northwestern corner of Papua New Guinea. Four new genera are named: in Paradoxosomatidae, Selminosoma, type S. chapmani; Astromontosoma, type A. jeekeli; in Doratodesmidae, Scolopopyge, type S. pholeter; Selminarchus, type S. hispidus. Two additional new species are referred to established genera Eustrongylosoma exiguum and Nothrosoma beroni, the latter, however, (known only from females) is probably referable to a new genus. Selminosoma chapmani appears both from its structure and biology to be a true troglobite, the first such species known in the Paradoxosomatidae. The two doratodesmid species extend the known range of this family eastward across Wallace's Line from west Java.</abstract>
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<title>The Tegumental Glands of a Troglobitic Crustacean.</title>
<abstract>Tegumental glands, located in the antennae of Antromysis juberthiei are present in males and females; in the antennulae each of them consists of 3 cells: a secretory cell of large size, an intermediary cell and a canal cell probably secretory in nature. The canal cell possesses an extracellular cavity with deep infoldings and microvilli between which the canal crinkles along. The intermediary cell is heavily provided with microfilaments. The secretory granules have an organized content.</abstract>
<keywords>Crustacea, Mysidacea, Cuba</keywords>
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<title>Magniezia gardei n.sp. (Crustacea Isopoda Asellota): a Stenasellid from the underground waters of Southeastern Morocco.</title>
<abstract>This new species has been discovered in the waters of Kef Aziza Cave, on the Saharian slopes of the High Atlas Range, Southeastern Morocco. Magniezia gardei n.sp. belongs to the same Genus as four species previously described from the phreatic waters of the Guinean area. So, it is assumed that this Moroccan species should be a relict of the ancient aquatic hypogean fauna of the entire West Africa, nowadays protected by the development of an arid climate.</abstract>
<keywords>Crustacea, Isopoda, Morocco</keywords>
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<title>Ecological investigations of the influence of a polluted river on surrounding interstitial underground waters.</title>
<abstract>Because of the fundamental biological investigations and also of the practical importance, the authors investigated interstitial subterranean water (hyporheic) near a polluted river Sava in the plain where the underground waters are considered as potable. With the comparison of the physical, chemical, bacteriological, saprobiological and faunistic characteristics of the river and its hyporheic zone in different seasons their mutual relation is detected. The results show the influence of polluted river water on the hyporheic water within the river bed to at least 2 m depth.</abstract>
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<title>A remarkable new genus and three new species of cavernicolous Carabidae (Coleoptera) (Zoological results of the British Speleological Expedition to Papua-New Guinea 1975, 2).</title>
<abstract>Speagonum mirabile gen. et sp. n. and Gastragonum caecum sp. n. are described as troglobites from caves in the Behrman Mountains of west New Guinea; Pseudozaena (Trichozaena subgen. n.) cavicola sp. n. is a troglophile from New Ireland.</abstract>
<keywords>Coleoptera, Carabidae, Papua-New Guinea</keywords>
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<title>A new species of Rhachomyces (Ascomycetes, Laboulbeniales) parasitic on the troglobite Carabid beetle Speagonum mirabile Moore, from New-Guinea (Zoological Results of the British Speleological Expedition to Papua-New Guinea, 1975, 3).</title>
<abstract>Rhachomyces beronii n. sp., parasitic on Speagonum mirabile Moore (Coleoptera, Carabidae, Anchomenini) from New Guinea, is described. The new species resembles Rhachomyces tenuis Thaxt. in general habit, but it differs from the latter in having a smaller receptacle, a larger and less pigmented perithecium, a different structure of the appendages and in the multiplication of appendiculate cells.</abstract>
<keywords>Ascomycetes, Laboulbeniales, Parassite, Coleoptera, Papua-New Guinea</keywords>
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<title>A contribution to the study of the Genus Porrhomma (Araneae: Linyphiidae). Notes on a a population of P. Egeria (Simon) and other cavernicolous species.</title>
<abstract>A morphological and biometrical study of a population of Porrhomma egeria (Simon) has allowed to determine that P. moravicum (Miller and Kratochvil) and P. obambulatum (Kritscher) belong to the same species and should thus be considered synonymous. The importance of biometric studies for the study of this Genus is emphasised.</abstract>
<keywords>Araneae, nomenclature, Porrhomma</keywords>
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<title>New and interesting mites from the Museum of Geneva XXXII. Two new species of mites (Acari: Acaridae) from a Kenyan cave.</title>
<abstract>From a sample of Acaridae mites collected in a Kenyan cave, two new species are described. For one of them a new genus is defined.</abstract>
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<title>Bogidiella martini, a new hypogean Amphipod from the island of Saint-Martin (West Indies) and the zoogeography of the Bogidiellidae.</title>
<abstract>Both sexes of a new species of Bogidiella, B. martini, are described. The new species, with a very pronounced sexual dimorphism, has been discovered in two wells in the island of St.-Martin (French part), one of the Lesser Antilles. Another member of Bogidiella has been recorded from the island of Curaçao, but the specimens were damaged too much to allow proper description. The Bogidiellidae (5 genera, 26 named species, and several unnamed species) are present in the sea as well as in inland waters. The family has a wide distribution, exceeding the boundaries of the former Tethys Sea. Probably, they represent a very old stock that had acquired already a great part of its present-day distribution before the fragmentation of the primordial continent of Pangaea during the Mesozoic.</abstract>
<keywords>Crustacea, Amphipoda, Saint-Martin, Antllles</keywords>
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<title>A new Microparasellid from subterranean phreatic waters of Italy: Microcharon arganoi n. sp. (Crustacea: Isopoda).</title>
<abstract>Microcharon arganoi, a new Microparasellid from subterranean waters of Southern Italy is described. For the shape and ornamentation of pleopod II of females and for the morphology of pleopod II of males, the new species is clearly related to the phyletic line which includes all the Western and French species of the genus. However, from all these species and from all the other ones M. arganoi differs by the ornamentation of the antennae, maxillipeds and pereiopeds, by the shape and ornamentation of pleopods I and II of males and II of females. and by ratio endopod/exopod of pleopod III. The new species is the first one from the subterranean freshwaters of Italy.</abstract>
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<title>The first hyporheic Proasellus from Spain: P. jaloniacus n. sp. (Crustacea Isopoda Asellota).</title>
<abstract>This new, anophthalmous and unpigmented species lives in the underflow of Jalon River, Province of Alicante, Southeastern Spain. It belongs to the phyletic line of Proasellus meridianus (Racovitza, 1919).</abstract>
<keywords>Crustacea, Isopoda, Spain</keywords>
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<title>Carotenoids in Niphargus Casimiriensis Skalski (Amphipoda) from artesian wells.</title>
<abstract>By means of columnar and thin-layer chromatography, the presence of carotenoids in Niphargus casimiriensis Skalski from an artesian well was studied. There are qualitative and quantitative differences in the carotenoid contents of the Niphargus casimiriensis Skalski specimens.</abstract>
<keywords>Crustacea, Amphipoda, Poland</keywords>
<from>131</from>
<to>136</to>
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<volume>9 (2) - 1978</volume>
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<title>The sensoral outfit of subterranean Trechinae. II. Ultrastructure of the Elytral trichobothria.</title>
<abstract>The ultrastructure of trichobothria (Tm2, Tr2, Tr4) of the elytra has been studied in the troglobitic Coleoptera Geotrechus vulcanus and Aphaenops cerberus. Two bipolar neurons innervate these trichobothria. The first ends at the level of the hair base, and its distal segment contains a tubular body, characteristic of mechanoreceptive bristles. The other does not possess a tubular body, and its distal segment ends in the bristle canal; its function is unknown. The trichobothria possess one glial enveloping cell, one trichogen cell, and one tormogen cell; the latter two show an apical, common, large, receptor lymph cavity. The small trichobothria are innervated by a large mechanoreceptor neuron, and by 4 smaller neurons; its function is unknown. The trichobothria of blind Trechinae are highly specialized. A cuticular cup enshrines the hair base; hair and cup move together. The large amplitude swaying movements of the hair are controlled by a spongious tissue around the cup. The trichobothrià of Trechinae and Periplaneta have the same type of cuticular dome-shaped structure, and differ from trichobothria that arise from a cavity in the cuticle.</abstract>
<keywords>Coleoptera, Carabidae, sensors, France</keywords>
<from>137</from>
<to>152</to>
<id_volume>39</id_volume>
<volume>9 (2) - 1978</volume>
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<title>The fine structure of Hamann's organ in Leptodirus hohenwarti, a highly specialised cave bathysciinae (Coleoptera, Catopidae).</title>
<abstract>Hamann's organ in Leptodirus hohenwarti a highly specialized cave Bathysciinae, has been studied under the TEM, SEM and light microscope. This receptor organ located in the 7th, 9th and 10th antennal articles and previously referred to as the "vesicule olfactive" and as the "antennal organ" or "antennal vesicle", reaches its highest degree of structural complexity in leptodirus. This paper attempts to establish some degree of synonymy among the terms used by earlier authors in describing the various antennal parts and sensilla. Five types of sensilla to be found in the organ are described, namely cribrose-stick sensilla, cribrose-utricular sensilla, star-shaped sensilla, claviform sensilla and branching setae. Comparisons within Bathysciinae species and among the latter and other subfamilies of Catopidae reveal differences in the number of vesicles and in the number and structures of sensilla, these differences appear to depend on i) the degree of phylogenetic relationships among taxa and 2) the degree of specialization to cave environment. The considerable complexity of Hamann's organ, unrivalled by other insects organs, apart from light receptors, suggests that it has a plurality of functions. Its hygroreceptor role, supported by recent experimental work, is discussed here.</abstract>
<keywords>Coleoptera, Catopidae, Hamann's organ, Italy</keywords>
<from>153</from>
<to>165</to>
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<volume>9 (2) - 1978</volume>
<authors>Fiorenza Accordi - Valerio Sbordoni.</authors>
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<title>Humidity responses and the role of Hamann's organ of cavernicolous Bathysciinae (Coleoptera Catopidae).</title>
<abstract>The humidity responses of Bathysciola derosasi and Leptodirus hohenwarti, two species of troglobitic Bathysciinae showing different degrees of adaptation to cave environment, have been studied. Intact and antennectomised subjects were tested using choice-chambers with various combinations of relative humidity alternatives (i.e. 20-100%, 50-100%, 90-100%, 50-90% and, as controls, 100-100%) to investigate the role played by the sense organs situated on the 7th, 9th and 10th antenna segments. The results show that intact-antenna subjects of both species are very sensitive to humidity gradients and that their intensity of reaction varies according to the intensity of stimulus, as previously reported by Argano, Sbordoni and Cobolli Sbordoni (1969). The antennectomy experiments show that receptors situated on the 7th, 9th and 10th antenna segments (Hamann's organ) are involved in hygroreception. In Leptodirus. insects antennectomised below the 9th segment show a reduced intensity of reaction, while those antennectomised below the 7th segment show no positive response at all. This seems to indicate that receptors in the 9th and 10th antennal segments have additive roles beyond that of the 7th. Further research is needed to ascertain whether the antennal organs of Bathysciinae may have yet further additional sensory roles (e.g. chemioreception) as their complex structure suggests.</abstract>
<keywords>Coleoptera, Catopidae, Hamann's organ, Italy</keywords>
<from>167</from>

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<title>Martel's La France ignore: new information from two post cards to his Publisher.</title>
<abstract>Two recently discovered post cards written by Martel to his publisher provide new information on the date he completed the manuscript of the first volume of La France ignorée and on the progress of its printing.</abstract>
<keywords>History, speleology, Martel, France</keywords>
<from>179</from>
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<title>Nitrobacter in Mammoth Cave.</title>
<abstract>Mammoth Cave, a large lirnestone cavern in Mammoth Cave National Park in the Central Kentucky karst, was first mined for saltpetre in 1808 and was a major source of nitrates used in the manufacture of gunpowder during the War of 1812. The mechanism of saltpetre formation is unknown, although hypotheses encompassing both biotic and abiotic functions have been suggested. Present studies were conducted in various saltpetre caves using species specific fluorescent antibodies in order to determine if the chemoautotroph, Nitrobacter, were present. Population densities and species distribution of Nitrobacter were studied in relation to chemical and physical parameters for over 200 sediment samples from Mammoth Cave. Both the isolation and immunofluorescence data indicate that Nitrobacter are present in relatively high population densities in Mammoth Cave sediments, and that such bacteria are common among saltpetre caves in the southeastern United States. Immunofluorescence data further indicates that N. agilis dominates the Nitrobacter population in Mammoth Cave. The possibility that Nitrobacter is the etiological agent for saltpetre formation is suggested.</abstract>
<keywords>Microbiology, salpetre, United States of America</keywords>
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<volume>9 (1) - 1977</volume>
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<title>Investigations on the Entocytheridae Ostracods. Data on Sphaeromicola cebennica juberthiei nov. ssp. and Sphaeromicola cirolanae Rioja.</title>
<abstract>Sphaeromicola cebennica juberthiei n. ssp., a cavernicolous ostracod found in the South of France (Système de Cent Fons and Avencas, Herault), is described here. The new subspecies differs from Sph. cebennica cebennica (found in a cave from Ardèche) by the smaller carapace and a reduced distal bristle on the 'finger" of the male copulatory organ. The affinities and differences between the European Sphaeromicola and Sph. cirolanae from Mexico are discussed. The genus Sphaeromicola is divided into two groups of species: the group topsenti and the group cirolanae. Some observations on the mating process of Sph. Cebennica juberthiei are presented. A precocious sexual behaviour of the female in the last post-embryonic instar is recorded. This type of behaviour seems to be a characteristic of the Entocytheridae.</abstract>
<keywords>Crustacea, Ostracoda, France</keywords>
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<title>Variation among populations of the troglobitic Amphipod Crustacean Crangonyx antennatus Packard living in different habitats. I. Morphology.</title>
<abstract>Populations of the troglobitic (i.e., obligatory cavernicole) amphipod Crangonyx antennatus living in two distinct aquatic habitats were examined for possible morphological variation. Collections were made seasonally for one year in six Lee Co., Virginia caves, three with mud-bottom pools and three with small gravel-bottom streams. Environmental parameters thought to influence population variation were recorded for each of the six caves. Body length of mature amphipods was found to be greater in the mud-bottom pool habitats, whereas stream amphipods possessed more first antennal segments per unit body length. Variation was also observed in integument coloration; stream amphipods were characterized by a brownish integument and pool amphipods a whitish integument. Differences in the type and amount of available food in the two habitats is considered the most

important environmental parameter affecting morphological variation. The population variation noted between habitats is believed indicative of the adaptive flexibility of this vagile troglobitic species.</abstract>
<keywords>Crustacea, Amphipoda, morphology, United States of America</keywords>
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<title>New data about the biogeography and the ecology of Niphargus nadarini Alouf (Crustacea, Amphipoda).</title>
<abstract>Some new samples made between 1971 and 1975 show that the area of extension of Niphargus nadarini Alouf is the Biqa's plain. New data about the ecology of this species is given.</abstract>
<keywords>Crustacea, Amphipoda, biogeography, ecology, Lebanon</keywords>
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<title>Stenasellus escolai n. sp., Crustacea Isopoda Asellota from the subterranean waters of Southern Spain.</title>
<abstract>This new species was captured in the phreatic waters of Guadalquivir valley, where it lives together with another, very small-sized Stenasellid: St. bragai Magniez, previously described. It belongs to the phyletic line of St. breuili Racovitza, which colonizes the subterranean waters of the Iberic peninsula.</abstract>
<keywords>Crustacea, Isopoda, Spain</keywords>
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<title>The effect of cave entrances on the distribution of cave-inhabiting terrestrial Arthropods.</title>
<abstract>Populations of cave invertebrates are generally considered to be food-limited. The cave entrance is a major source of food input into the community in the form of decaying organic matter. Thus, the densities of scavenging terrestrial cave invertebrates should be related to the distance from the cave entrance because this represents a measure of food abundance. A test showed this expectation to be true in Crossings Cave, Alabama. A population density peak occurred 10 m inside the cave where the dark zone and detritus infall regions meet. The greatest population peak occurred at 100 m where densities of crickets and their guano are highest. The pattern should hold for most caves, but the actual distances will vary in each site depending on its circumstances. When the fauna was removed from the cave, the remnant had not regained community equilibrium a year later. Removal of the dominant scavenger, a milliped, allowed other species populations to expand because of decreased competitions.</abstract>
<keywords>Arthropods, ecology, United States of America</keywords>
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<title>On the geographical distribution of the interstitial fauna of the Danube and some of its tributaries in Lower-Austria.</title>
<abstract>The wide distribution of the interstitial isopod Proasellus slavus as well as new records of Troglochaetus (Archiannelida) and Bogidiella (Amphipoda) in Lower-Austria are presented. Species of the genera Microcharon (Isopoda Microparasellidae), Kovalevskiella (Ostracoda Metacyprinae) and of the family Parabathynellidae (Bathynellacea) are recorded for the first time in Austria.</abstract>
<keywords>Crustacea, Ostracoda, Amphipoda, Annelida, Austria, Interstitial fauna</keywords>
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<title>The adaptations to volvation of the external cephalic skeleton of Caecosphaeroma burgundum Dollfus, a subterranean waters Isopod.</title>
<abstract>The study of the cephalic capsule of Caecosphaeroma burgundum, a subterranean waters Isopod, demonstrates improved adaptations to volvation; these concern in a similar manner the other regions of the body, particularly the pleotelson. From a primitive aquatic Isopod structure, the head of this blind Spheromid has been completely fashioned by many mechanical factors: posterior margin of pleotelson providing support on the head, relation of anterior angles of the second pereionit and, above all, the mandibular palps and antennae which retract into two deep grooves of the face. The comparative study of the head of other volvational Isopods shows the importance of that "antennary factor", e.g. in Oniscoids, epigean Spheromids and some other subterranean waters Isopods (two Spheromids and one Cirolanid). This comparison shows that Caecosphaeroma burgundum is certainly the most specialized of all; it approaches perfection in volvation for it is the only one which rolls up into a hermetic sphere without outwards projections. Volvation seems to play a two-fold role. It is a mean of defence against predators used by single specimens and by copulating pairs, males and females being then associated in two concentric spheres. Furthermore, it is a very important way for passive dissemination allowing settlement of these Crustacea in distant subterranean waters.</abstract>
<keywords>Crustacea, Isopoda, adaption, France</keywords>
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<title>Bragasellus comasi n.sp., cavernicolous Crustacea Isopoda Asellota from Western Spain.</title>
<abstract>This new, albinistic and anophtalmous Bragasellus has been collected in the waters of the Cova del Infierno ("Hell Cave") near Covadonga, province of Asturias, Northwestern Spain.</abstract>
<keywords>Crustacea, Isopoda, Spain</keywords>
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<title>Stygiomysis major, a new troglobitic Mysid from Jamaica, and extension of the range of S. holthuisi to Puerto Rico (Crustacea, Mysidacea, Stygiomysidae).</title>
<abstract>Stygiomysis major, new species, the third species of the genus, is described from Jackson Bay Cave, Jamaica. It is up to twice the length of the other known species. S. holthuisi, until now known only from its type-locality in St. Martin, is reported from 2 caves in Guànica State Forest, Puerto Rico. It differs slightly from St. Martin specimens in the armature of the uropods.</abstract>
<keywords>Crustacea, Mysidacea, Jamaica, Puerto Rico</keywords>
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<title>Two new Pseudoscorpion-species from Moroccan caves.</title>
<abstract>Chthonius (E.) longesetosus n. sp. (1 female) collected in the cave of Sidi Mejbur Tazas, and Allochernes maroccanus n. sp. (4 males 1 female 4 Tritonympha), collected in the cave of Caid (Ifri et Caid), Ait Mohammed, are described and figured. It is the first record of cave dwelling pseudoscorpions in Morocco aside from the publication of a Chthonius sp. from a cave near Taza.</abstract>
<keywords>Arachnida, Pseudoscorpiones, Morocco</keywords>
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<title>The karst of Transvaal (South Africa).</title>
<abstract>The Transvaal Karst is a world important example of a Karst developed on a very old dolomite. Its unique character is due to the composition of the rock and history of development. The dissolution of the dolomite is interesting and has an important effect on the character of the caves developed. The caves preserved in this area include the longest known in South Africa and are perhaps among the largest dolomite systems known in the world. They are very old and in some cases contain important palaeontological deposits (Australopithecine fauna). The caves to various degrees are in a state of de-generation, having been exposed for a very long period above the water-table. For the greater part of the Karst area, aggressive vadose waters, and long exposure has resulted in the accumulation of a thick covering of residual material. The plateau-like geomorphology and low rainfalls has prevented physical erosion and significant removal of this debris from the land surface. The caves themselves are often characterized by collapse and in general lack of formations. Massive calcite formation in the caves is usually partly or nearly completely redissolved and are relics of past colder climatic periods with winter rains. Formations active now are small, usually delicate and often due directly to evaporation. The heavy mantle of residual debris preserved under some of the more ancient of South African landsurface relics (the African Surface) poses a serious economic problem of stability, with mans' utilization of the environment. A greater understanding of the Karst, its evolution and properties is thus of considerable practical importance.</abstract>
<keywords>Karst, Transvaal, South-Africa</keywords>
<from>229</from>
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<title>A preliminary note on the spatial distribution of Meta menardi, Triphosa dubitata, Triphosa sabaudiata, Nelima aurantiaca and Culex pipiens within a cave ecosystem (Grotte de la Scierie: Haute-Savoie).</title>
<abstract>Following 8 months of observations in a richly populated cave, (Grotte de la Scierie, HauteSavoie, France), it has been possible to outline the movements and distribution of Meta menardi (Araneae), Nelima aurantiaca (Opiliones), Triphosa dubitata and Triphosa sabaudiata (Lepidoptera) and Culex pipiens (Diptera) within the cave ecosystem. Although no general rule can be postulated it appears that the morphology of the cave walls and the climatic conditions regulate the distribution of these 5 species within the cave ecosystem. The interactions between the 5 species have been investigated.</abstract>
<keywords>Arachnida, Araneae, Opiliones, Insecta, Lepidoptera, Diptera, France</keywords>
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<title>On the Bathynella from Romania: B. (B.) boteai Serban, B. (B.) vaducrisensis n. sp., B. (B.) plesai Serban et B. (B.) motrensis Serban (Bathynellacea, Bathynellidae). Part II.</title>
<abstract>In the second part of the note a discussion is given dealing with the importance of different characters in the systematics of the genus Bathynella Vejdovsky and with species individualisation in the sub-genus Bathynella (Bathynella) Vejdovsky. We emphasize the differentiation of some elements of the VIIIth male pereiopodes, these appendages never having the same morphology in different species. Taking into account the structure of the apical end of the pennian anterior plates, we suggest to group separately boteai with vaducrisensis and plesai with ruffoi. The main conclusions of the recent studies on the European Bathynella are also given.</abstract>
<keywords>Crustacea, Syncarida, Romania</keywords>
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<title>Stenasellus bragai n. sp., Crustacea Isopoda Asellota from subterranean waters of Southern Spain.</title>
<abstract>This small species has been found in the underflow of Guadalquivir River (Jaèn Province). It belongs to the phyletic line of Stenasellus breuili Racovitza, distributed in the underground waters of the Iberic Peninsula.</abstract>
<keywords>Crustacea, Isopoda, Spain</keywords>
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<title>Lethargy in the cavernicolous Chiroptera in Central Africa.</title>
<abstract>From his personal research undertaken in the subterranean field (natural and artificial cavities) in Shaba (ex-Katanga, in S.E. Zaire) and Rwanda, the author briefly defines the macroclimate of the prospected regions as well as the microclimate of the subterranean habitat (humidity and temperature). A reversible hypothermia has been noticed in the dry season only (from May till August) in eleven species of troglophile Chiroptera belonging to the following families: Rhinolophidae (7 species of Rhinolophus), Hipposideridae (only Hipposideros ruber) and Vespertilionidae (Miniopterus inflatus rufus, Miniopterus schreibersi arenarius & M.s. natalensis, Myotis tricolor). No sign of lethargy has been noticed in the Megachiroptera (Lissonycteris angolensis, Rousettus aegyptiacus leachi), Emballonuridae (Taphozous perforatus sudani), Hipposideridae (Cloeotis percivali australis) or Nycteridae (3 species of Nycteris). There could be correlations between lethargy and breeding if one takes into account the phenomena of late ovulation and delayed implantation. The entry into lethargy is not caused by the scarcity of food. It does not concern all the individuals of a colony or in various populations of a cave. The degree of humidity appears to be more important than the temperature as far as the conditions for hibernation are concerned.</abstract>
<keywords>Chiroptera, lethargy, Congo, Rwanda</keywords>
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<title>First International Symposium on Groundwater Ecology. Introduction: sense and course of the meeting.</title>
<abstract>Short introduction on the meeting on Groundwater Ecology held at Shlitz (Germany) in 1975.</abstract>
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<title>Hydrological and chemical investigations of running waters of the Schlitzerland (Western Germany). A. Springs, I. Survey.</title>
<abstract>In a Triassic sandstone woodland (Schlitzerland in Hesse, Western Germany) 17 springs were hydrologically and hydrochemically investigated throughout one year (April 1973 - April 1974). Measurements were carried out on water volume, temperature, electrolytical conductivity, pH, aikalinity, chlorinity, dissolved molecular oxygen, dissolved organic material (COD), ammonia, nitrite, nitrate, and free phosphate. Among the hydrochemical factors investigated the pH-value was closely related especially to the micro-climate in the spring drainage area. In particular the pH rose both with increasing length of the drainage area and within the same spring with decreasing water supply. On the other hand the pH-value diminished with increasing altitude of the drainage area. Simultaneously the highest values were found on SW-slopes and the lowest ones in NE-exposures.</abstract>
<keywords>Hydrogeology, Geochemistry, spring, water, Germany</keywords>
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<title>The distribution of the fauna in the interstitial habitats of the riverine sediments of the Danube and the Piesting (Austria).</title>
<abstract>The interstitial fauna living in the riverine sediments of the Danube and Piesting have been investigated in Lower Austria. The nematodes, oligochaetes and cyclopoids are the most abundant groups (they represent up to 80% of the total fauna). The harpacticoids, the insect larvae, the isopods, the amphipods, the cladocera and the limnohalacarids are poorly represented (generally under 20% of the total fauna). The absence of hydrachnellids is striking. The vertical distribution of the interstitial fauna shows for several groups i.e. limnohalacarids, ostracods, isopods, harpacticoids, that the epigean species are quantitatively better represented in the upper sediment layers instead of the hypogean species which are more abundant in the deeper layers. At one of the sites where samples were taken down to 3 m, most of the interstitial fauna was concentrated in the upper 1.50 m. The occurrence of limnohalacarids in the wells from the Danube Valley and the Piesting area shows that the repartition of this group is not restricted to the rhitrostygal zone. The distribution of the interstitial fauna in connection with the pollution of the river is discussed. High pollution inside

the interstitial habitat eliminates the hypogean fauna and the epigeans disappear mainly in those areas with marked chemical reducing conditions.</abstract>
<keywords>Interstitial fauna, Danube river, Piesting, Austria</keywords>
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<title>The animal population of the hyporheic interstitial in a primary rock stream under the influence of the supply of allochthonous organic matter.</title>
<abstract>The Mettma, a mountain stream in the Black Forest, W. Germany, was investigated for effects of input of nutrients and energy by domestic waste water and effluent from a brewery introduced at one specific point. The investigation time ranged from May 1970 to February 1971. Initially, there is an impoverishment and structural changes of the biocoenosis in the hyporheic interstitial. There is an almost complete O2-depletion immediately after the waste water has been added. In winter, temperatures in the interstitial were higher than those in the current. No direct correlation between population densities and amount of organic matter were observed where allochthonous nutrients had been added. Population densities of multicellular animals were from 0 to 1.2 X 105 per 0.1 m3 of sediment. 4.1 km further downstream the fauna is similar to that above the waste water inlet, while at 7.35 km downstream of it is slightly less dense.</abstract>
<keywords>Interstitial fauna, stream, Black forest, Germany</keywords>
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<title>Recent karyological research on cave planarians from Europe.</title>
<abstract>Very few studies have been involved with karyology in Planarian living in total darkness. The first results indicate however, that most of the hypogeous Paludicoles have a diploid chromosome number notably superior to the similar surface forms. In another connection a relative uniformity of the morphology of the chromosome is observed in the same group, so that the studied karyotypes show a similar general aspect.</abstract>
<keywords>Planaria, genetics, karyology, Europe</keywords>
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<title>Remarks about the psammic Asellid Proasellus walteri (Chappuis, 1948) (Crustacea, Isopoda, Asellota).</title>
<abstract>P. walteri, an eyeless species of tiny size and thin body, shows numerous original characters. By its general morphology, it is one form of Asellid best adapted to the phreatic waters where it exists in large settlements. It is also able to live in the psammic biotope in a manner similar to Microparasellids. The females lay only 6 to 10 normal sized eggs. There is no indication of oostegits outside the breeding period. In some populations, the small number of eggs, correlated with the small size, seems to be compensated by a sex-ratio favorable so the females.</abstract>
<keywords>Crustacea, Isopoda, France</keywords>
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<title>Studies on subterranean drift of stygobiont Crustaceans (Niphargus, Crangonyx, Graeteriella).</title>
<abstract>In two groundwater canals of a water work in West Germany the drift of stygobiont groundwater organisms was investigated. The collections were made at two-hour intervals. Niphargus aquilex Schiodte, Crangonyx subterraneus Bate and Graeteriella unisetigera (Graeter) were considered more closely, because they were caught in greater numbers than other organisms. These stygobionts show no sign of dial periodicity.</abstract>
<keywords>Crustacea, Amphipoda, ecology, Germany</keywords>
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<to>92</to>
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<title>Ecological and biogeographical trends in Harpacticoids.</title>
<abstract>The majority of harpacticoids show a great dependence on the peculiarities of their habitat. This research attempted to detect the possible existence of biogeographical and ecological trends. The limited biogeographical data is discussed, so this is applied the method of analysis of morpho-ecological correlation (Jakobi, 1962) developed to determine ecological trends. This way, all characteristics of the harpacticoidean body selected were studied to check their adaptative value. Based on those results it was possible to establish and to define ecological units. Data were then subjected to statistical tests of homogeneity for variance and significance. Graphs are used to demonstrate the natural adaptation process. Diagrams permit one to recognize the general tendencies as well as degrees of specific evolution. Nevertheless, quite different principles such as type formation and atomic orbit model analogy, were applied to understand biogeographic trends. The change of the endopodits of the 4th leg of adult males (Enp. P4 male) is utilized as an example.</abstract>
<keywords>Ecology, Biogeography, Crustacea, Copepoda</keywords>
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<title>New data on the population of Proasellus slavus ssp. n. Sket (Crustacea, Isopoda) in the hyporheic water of the Drava river near Legrad.</title>
<abstract>An analysis of the population in the hyporheic medium of the Drava river shows that Proasellus slavus ssp. n. is one of the smallest known Asellids. It is living in an interstitial biotope as a permanent population in which density varies in space and time. Our observations show that reproduction takes place throughout the year, however with a maximum rate at the beginning of summer. Females may produce a relatively great number of offspring, notwithstanding the smallness of the species.</abstract>
<keywords>Crustacea, Isopoda, Croatia</keywords>
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<title>The role of groundwater in eutropication of a lake in glacial outwash terrain.</title>
<abstract>The nutrient contribution of groundwater in glacial outwash terrain was evaluated at Lake Sallie in north-central U.S.A. (46°46' N., 95° 54' W.). Groundwater entering the lake was collected with seepage meters consisting of bottomless cylinders vented to a thin membrane bag. A theoretical flow net and comparison of nutrient concentrations in well and seepage water indicated that seepage meters can be used in high velocity discharge areas to obtain site-specific water samples of groundwater for nutrient analyses. Based on an average value of 0.25 mg/l PO4, groundwater inflow along an 800 km segment of shoreline transported 37 kg of phosphorus per year into the lake. Groundwater inflow was nitrate rich along shoreline adjacent so land used for agriculture and lakeside septic tanks, but there was no apparent pattern regarding land use and phosphorus content of groundwater inflow. A nearby eutrophic lake was a suspected source of phosphorus in groundwater inflow. Because surface flow has carried large quantities of nitrogen and phosphorus into this lake, its present eutrophic condition cannot be attributed to nutrient influx by groundwater. However, groundwater nutrient influx could be highly significant in other lakes where surface nutrient influx is small.</abstract>
<keywords>Groundwater, Pollution, United States of America</keywords>
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<title>The vertical distribution of stygorhithral ciliates in the Fulda-River (Contribution to the knowledge of mesopsammal ciliates in running freshwater).</title>
<abstract>19 species of ciliates were found in interstitial biotopes of the Fulda Headwater. Two of these were new: Haplocaulus hengsti, n.sp. and Epistylis rotti, n.sp. (Peritrichida). The number of ciliate species decreases from the surface down so deeper layers; in a depth of 50 cm, only three

species were found: Haplocaulus hengsti and Epistylis rotti and another small ciliate Trachelophyllum apiculatum. There was little detritus in this layer, and so, the abundance of the ciliates was low. On the other hand, there is little predation in deeper layers of stygorhithral sand and gravel. Small, long and thin ciliates seem so be specially adapted to life in deeper regions of the stygornithral Stygorhithral ciliates are related to custygal species with respect to several characteristics of their morphology and general biology.</abstract>
<keywords>Protozoa, groundwater, Germany</keywords>
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<title>Remarks on the biology and ecology of Stenasellus virei Dollfus (Crustacea Isopoda Asellota of subterranean waters).</title>
<abstract>Recent observations indicate that a laying season seems to exist, in karstic as well as in phreatic populations. Nevertheless, a single female cannot lay each year, because the reproductive intermolt averages 15-16 months and is always followed by one (9-10 months) or several non-reproductive intermolts. So, the minimum laying rhythm of female St. virei is biennial. The cavernicolous population (St. v. virei) of the Padirac swallow-hole is not a relict, but a colony separated from the main settlement of the alluvial waters of the Dordogne river. On the contrary, it is possible to find, close to each other, karstic and phreatic populations which belong to different subspecies (St. v. hussoni and St. v. boui) and live independently.</abstract>
<keywords>Crustacea, Isopoda, biology, ecology, groundwater</keywords>
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<title>An introduction to Japanese groundwater animals with reference to their ecology and hygienic significance.</title>
<abstract>1) Nearly two hundred species of troglobites are known from the groundwaters of Japan. Most of these troglobiontic species, sixteen of seventy-seven genera, and what is more, four of fortyseven families are endemic to Japan. Uchidastygacaridae, Nipponacaridae, and Kantacaridae are endemic acaridan families of Japan. The coleopterous family, Phreatodytidae, is alto endemic to Japan. 2) Though studies on Protozoa, Turbellaria, Annelida, Aschelminthes, and Ostracoda, etc. remain sparse, the interstitial fauna is actively investigated recently and many specimens of Bathynellacea, Ingolfiella, Bogidiella, Microcerberus, Pseudovermis (Opisthobranchia), and Nerillidae, etc. have been collected from freshwater and marine environments. 3) None of the troglobites is known to be directly detrimental to human health and most of them have been collected from well-waters which are regarded as chemically clean in many cases, but they have also been obtained occasionally from bacteriologically contaminated well-waters. 4) Ecological and taxonomic knowledge, of even the limited amount which we possess at present, has enabled us to utilize various animals which occur in well-waters as biological indicators of well-water pollution and to have some insight as to the origin of the pollution.</abstract>
<keywords>Groundwater, invertebrates, Japan, ecology</keywords>
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<title>The dynamics of population in the Isopod Proasellus slavus ssp.n. and the larvae of Chironomids in the hyporheic water of the river Drava with regard to pollution.</title>
<abstract>If we sum up the data and observations derived from our researches on the Drava river, we conclude after consideration of surface water fauna and after comparison of chemical parameters that it influences the hyporheic water of a rough gravel-sandy alluvium more than 2 m deep, while in the compact sandy substratum it has less influence. The next conclusion is that the horizontal and vertical distribution of Proasellus slavus ssp.n. in the alluvium of the Drava river, depends upon the granulation of substratum, with reference so the largeness of interstices; that the populations vary in density and structure according to the nature of water which irrigates these alluviums; and finally upon the quantity of detritus which this water contains. Concerning the influence of the sewage waters the effect of a sudden action of very polluted water is not known but it is certain that the increasing of decaying material to the alfa-meso saprobial level of the river water does not threaten either the existence or the development of the populations of Proasellus slavus ssp.n.</abstract>
<keywords>Crustacea, Isopoda, Croatia</keywords>
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<title>New data on the Foraminifera of the groundwaters of Middle Asia.</title>
<abstract>New data obtained during the expedition to Middle Asia (1973) essentially enlarge our knowledge of foraminifera living in underground waters. Seven new species were discovered in the wells of the Kara-Kum and Ust-Urt deserts. All of them contain cytoplasma. The wells are situated in the region of bedding of underground waters of the heightened salinity in the zone of balance of runoff and evaporation. The majority of the species described in our work like many of the species recorded from the underground waters earlier (Brodsky, 1928; Nikoljuk, 1968; Jankovskaja and Mikhalevich, 1972) belong to the genera living in coastal brackish parts of tropical seas. This fact confirms the supposition of Brodsky about the transition of the marine coastal foraminiferal fauna to underground habitats after the regression of the sea. This fauna is a part of the underground fauna called by Nalivkin (1965) "the planetar fauna of the new type".</abstract>
<keywords>Sarcodina, Foraminifera, groundwater, Russia</keywords>
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<title>Hydrogeological investigations into discharge of salt-containing water from a stream into an aquifer.</title>
<abstract>An aquifer in a horseshoe bend of the Weser river was investigated regarding the processes of the river water infiltration. The geology and geometry of the aquifer was ascertained by means of numerous borings. The hydraulic situation before and after infiltration was determined by water table maps. The intrusion of a salt-freshwater lens could be reconstructed from the beginning of infiltration until ten years later by means of previous results of chemical analysis. By new chemical analysis it was proved that river water infiltrates into the aquifer. Additionally it was established that the relatively high concentration of chloride is reduced during the passage of the groundwater both by mixing with recharged groundwater and by adsorption of the ground. Furthermore temperature measurements in the groundwater at selected stations confirm qualitatively the river water infiltration into the polder.</abstract>
<keywords>Hydrogeology, Chlorine, groundwater, distribution, Germany</keywords>
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<title>The ecology of Metazoa in a settling basin of the Berlin Water Works and its importance in the process of purification of percolated surface water.</title>
<abstract>Based upon the hypothesis that the Metazoa (nematoda and rotifera) in the interstitial stratum of a slow sand filter are of importance in the process of purification of surface water, a filter was built to check the substrate characteristics of different grain sizes compared with the natural soil. It was found that the granulometric composition of sands as found in the settling basins did have the best comparative screening properties. This was demonstrated by chemical analyses of NH4, NO2, NO3, PO4, KMnO4-consumption and O2-saturation. Only the NO3-graph is shown here. The importance of Metazoa in the process of filtering water was studied by inoculating metazoic microorganisms into the most efficient filter. Chemical analyses of the water did not reveal a significant change of water quality over that from a non-inoculated filter. Because of this result the Metazoa do not appear to act as an important component in the water purification by sand filtration.</abstract>
<keywords>Metazoa, geochemistry, pollution, purification, groundwater, Germany</keywords>
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<title>Critical evaluation of recent work on the systematics of subterranean Crustacea (with description of two new genera of Parabathynellidae, Bathynellacea).</title>
<abstract>This paper reviews critically some recent work on the systematics of subterranean Crustacea, in particular Jakobi's work on the Parastenocarididae (Copepoda), Serban's work on the Bathynellidae (Bathynellacea, Syncarida) and Schminke's revision of the Parabathynellidae (Bathynellacea, Syncarida). Is is pointed out that three different approaches have been adopted in each of the three cases and advantages and shortcomings of each of them are analysed. Finally descriptions are given of two new genera of Parabathynellidae, Afrobathynella gen. n. and Nunubathynella gen. n., from a locality near Port Elisabeth (South Africa).</abstract>
<keywords>Crustacea, Copepodan Syncarida, systematics, South Africa</keywords>

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<title>Groundwater inhabitants in Poland.</title>
<abstract>This paper states the present progress achieved in research regarding the ground-water fauna of Poland.</abstract>
<keywords>Archiannelida, Oligochaeta, Hydracarina, Ostracoda, Copepoda, Amphipoda, Rhizopoda, Turbellaria, Rotatoria, Gastrotricha</keywords>
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<title>The invertebrate fauna of tropical American caves, Part III: Jamaica, an introduction.</title>
<abstract>The scattered literature on the physical speleology and biospeleology of the West Indian island of Jamaica is brought together. As a result of recent field work, a summary of the Jamaican vertebrate and invertebrate caves is given. The invertebrate fauna is known to include some 150 free-living macroscopic species. These are mostly troglophilic scavengers and predators associated with guano accumulations. However, some 25 species, mostly terrestrial and undescribed, are known to be troglobites. This is one of the largest known assemblages of tropical troglobites. Brief descriptions are given for the 54 cave sites which have been biologically studied.</abstract>
<keywords>Biospeleology, Jamaica, Invertebrates, Vertebrates, Tropics</keywords>
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<title>Karstic Fills in the Clusette Tunnel (Jura of Neuchatel Switzerland).</title>
<abstract>The piercing of a road tunnel in the flank of a limestone (Malm) anticline in the Neuchatel Jura uncovered karstic forms transformed for the most part, by decarbonated soils. Mineralogical analysis of these latter, through the use of X-ray diffraction, reveals a great analogy with the surface soils. At more than 200 meters depth, the same allochtone mineralogical suite of aeolian origin which constitutes the largest part of the soils of the High Jura Mountains in Switzerland, is found: an abundance of ferriferous chlorite, and of quartz, plagioclase and potassic feldspar. The various factors favouring this deep infiltration are discussed.</abstract>
<keywords>Artificial tunnel, karst, sedimentology, mineralogy, Switzerland</keywords>
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<title>Three new troglobitic asellids from Western North America (Crustacea, Isopoda, Asellidae).</title>
<abstract>Fleming's arguments (1973) for reducing Conasellus to a synonym of Asellus are considered inadequate, but the name Conasellus is replaced by its senior synonym Caecidotea. Two new troglobitic species of Caecidotea are described, C. chiapas from caves in Chiapas, Mexico, and C. sequoiae from Liburn Cave, Tulare County, California. Asellus califomicus is reported from springs in Napa and Santa Clara Counties; the male pleopod 2 is redescribed, and the species is assigned to the subgenus Phreatoasellus. A new genus and species, Salmasellus steganothrix, is described from Horseshoe Lake, Alberta, Canada.</abstract>
<keywords>Crustacea, Isopoda, United States of America, Canada, Mexico</keywords>
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<title>On the Bathynella from Romania: B.(B.) boteai Serban, B.(B.) vaducrisensis N.Sp., B.(B.) plesai Serban and B.(B.) motrensis Serban (Bathynellacea, Bathynellidae). Part I.</title>
<abstract>In the first part of the note we present a minute description of the species B.(B.) boteai Serban, B. (B.) motrensis Serban and B. (B.) plesai Serban. The provisional diagnosis of these species were already published in 1971. A new species B.(B.) vaducrisensis is also described. The genus Bathynella Vejdovsky is now known in the Romanian fauna with 6 species: four of them already mentioned, plus B. (B.) paranatans Serban and B. (B.) scythica Botosaneanu and Damian.</abstract>
<keywords>Crustacea, Syncarida, Romania</keywords>
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<title>Pseudosinella styriaca sp. N. (Collembola: Entomobryidae) a new collembolan species from the Styrian cave "Raudner-Hohle" (Austria).</title>
<abstract>Description of a new cavernicolous species of Pseudosinella, P. styriaca. The species was found in the cave "Raudner - Hohle" (Styria, Austria). P. styriaca sp. n. belongs to the Mediterranean group of Pseudosinella.</abstract>
<keywords>Insecta, Collembola, Austria</keywords>
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<title>Interaction between competition and predation in cave stream communities.</title>
<abstract>Predation by salamander larvae (Gyrinophilus porphyriticus) reduces the density of one of its prey (the isopod Asellus recurvatus) but increases the density of the other (the amphipod Crangonyx antennatus in a Virginia cave stream. This happens because predation on the isopod reduces its competitive effect on the amphipod. Both prey populations tend to occur more frequently in refugia when predators are present. In another cave where there are no prey refugia, the predator reduces the density of both species. It appears that it is easier for a predator to invade a community than to reach a stable equilibrium with the prey, if the prey have refugia, persistence of the prey system and the predator/prey system is constrained more by low population sizes than by the instability of the interaction coefficients.</abstract>
<keywords>Competition, predation, cave streams, ecology, United States of America</keywords>
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<title>Developmental chronology and evolution of calcium storage and urate containing cells in Niphargus schellenbergi Karaman.</title>
<abstract>The intra-marsupial development of Niphargus schellenbergi is divided into three phases: within the chorion, embryonic intermoult and juvenile intermoult. The disappearance of the chorion divides the first phase from the second. A double exuviation exists between the last two. The chronology of the embryonic development and of the beginning of post-embryonic development is established. On hatching the juvenile N. schellenbergi has one pair of hepatopancreatic caeca. During the first post-embryonic intermoults the ventral hepatopancreatic caeca, posterior caeca and anterior caecum are formed. The relation between posterior caeca and the aorta is described. The study of calcium storage before moulting showed that calcareous concretions located in posterior caeca and midgut have the typical form, volume, quantity and distribution of the species. This calcium accumulation process occurs in the midgut following the first posternbryonic exuviation. It is only when the sixth exuviation is attained that storage in the posterior caeca is similar to the one in adults. The urate containing cells located at the lower face of the pericardial septum begin to accumulate urate spherules 15 days before hatching. They vary in form, volume, localization and composition, and so may be considered as storage sites for urate, pigments and various ions (P, K, Ca, S, Cl, Na, Mg) which are returned to circulation.</abstract>
<keywords>Crustacea, Amphipoda, physiology</keywords>
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<title>Distribution of Indiana cavernicolous crayfishes and their ecto-commensal Ostracods.</title>
<abstract>Six species and subspecies of crayfishes and four species of entocytherid ostracods are known to inhabit the subterranean streams of southern Indiana. Cambarus (E.) laevis (troglophile) appears to be the most widely distributed crayfish and occurs in both karst areas within the State. The troglobite, Orconectes inermis (2 subspecies), is restricted to the larger karst area in solution cavities of Mississippian carbonate rocks. The remaining crayfishes, Orconectes immunis, Orconectes propinquus and Orconectes sloanii, are not common inhabitants of cave waters and are probably trogloxenes. All of the crayfishes except O. sloanii were found to host at least one species of ostracod. From data presented, Sagittocythere barri might be expected to be found commonly in association with Orconectes inermis, Donnaldsoncythere donnaldsonensis, Uncinocythere xania and Dactylocythere susanae, however, are more commonly associated with C. (E) laevis, indicating a near host-specific relationship among these taxa. Whether these are host-specific associations or ones imposed by certain ecological parameters will require additional investigations. Although a fair understanding of the distribution of these crustaceans in the larger, Mississippian limestone belt has been obtained, additional field work on the perimeter of the spelean ranges of the several species will probably prove productive. Furthermore, considerable cave exploration and biospeleological surveys are needed in the Silurian-Devonian limestones of southeast Indiana before our knowledge of these crayfishes, entocytherids and other cave-dwelling species approaches that for the Mississippian karst of the State.</abstract>
<keywords>Crustacea, Decapoda, Ostracoda, United States of America</keywords>
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<title>Symposium on Life Histories of Cave Beetles.</title>
<abstract>Overview of the six papers presented at the Symposium on Life Histories of Cave Beetles held at the 1973 annual convention of the National Speleological Society at Bloomington in Indiana (USA).</abstract>
<keywords>Symposium, Coleoptera, United States of America</keywords>
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<title>The life cycle of a Kentuky cave beetle, Ptomaphagus hirtus, (Coleoptera; Leiodidae; Catopinae).</title>
<abstract>Ptomaphagus hirtus has been successfully kept in laboratory culture at 12.5°C with food in surplus at all times. Eggs hatched in 18.5 days. Three larval instars were present, which had a total larval life span of 42 days. The pupal stage lasted 32 days. Adult males and adult females had average life spans of 2.2 years and 1.6 years respectively. Maximum adult longevity was 4.2 years. Females reached reproductive maturity a month after eclosion, young and old females produced one egg every 3.5 and 3.8 days respectively, and were reproductively active for as long as 2.5 years. Compared to European cave catopid beetles, this is a primitive or unmodified life cycle.</abstract>
<keywords>Coleoptera, Leiodidae, physiology, laboratory, United States of America</keywords>
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<title>A population study of the cave beetle Ptomaphagus loedingi (Coleoptera; Leiodidae; Catopinae).</title>
<abstract>Baited pitfall traps were used in Barclay Cave, Alabama, in 1965 to study a blind Ptomaphagus beetle population. A 40m2 area in the cave yielded 95% of the 897 adult and larval beetles trapped in the cave at 9 stations. This represented a population density of about 13 beetles/m2. Tests of different baits showed decayed meat to be the most attractive. Adults were most abundant in mid-August when substrate conditions were moist, were reproductively active, and were not newly emerged from pupal cells. Larvae were most abundant in late August. The population was studied by mark-recapture methods for 8 years after the pitfall trapping, and it was judged to have recovered to former densities after about 6 to 8 years. The use of traps which kill cave invertebrates is not encouraged for most future cave ecology studies. Population densities of beetles at baits in Cold Spring Cave were found to be 139 adults/m2 in 1968, and to much lower in three later years.</abstract>
<keywords>Coleoptera, Leiodidae, physiology, population, United States of America</keywords>
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<title>Seasonal changes in a population of Pseudanopthalmus tenuis (Coleoptera, Carabidae) in Murray Spring cave, Indiana: a preliminary report.</title>
<abstract>A study of a population of Pseudanophthalmus tenuis is being conducted in Murray Spring Cave, Orange County, Indiana as one facet of a larger research project encompassing the entire terrestrial community of that cave. Changes in behaviour and abundance determined by census and mark-recapture methods and physiological changes determined from field-collected beetles indicates that these animals exhibit a seasonal reproductive rhythm probably mediated or controlled by winter and spring flooding of the cave.</abstract>
<keywords>Coleoptera, Carabidae, population, season, United States of America</keywords>
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<title>The ecology of a predaceous troglobitic beetle, Neaphaenops tellkampfii (Coleoptera: Carabidae, Trechinae). I Seasonality of food input and early life history stages.</title>
<abstract>The adaptations in the life history of the Carabid beetle Neaphaenops tellkampfii has been investigated in respect to seasonal food input. The following characters have been studied: copulations, egg production, larvae and pupae. </abstract>
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<title>The ecology of a predaceous troglobitic beetle, Neaphaenops tellkampfii (Coleoptera: Carabidae, Trechinae). II Adult seasonality, feeding and recruitment.</title>
<abstract>In deep cave areas with loose substrate and sufficient moisture, the life history of Neaphaenops tellkampfii (Coleoptera: Carabidae, Trechinae) is synchronized with the seasonal pattern of its primary food sources, the eggs and first instar nymphs of the cave cricket Hadenoecus subterraneus (Orthoptera Gryllacridoidea, Rhaphidophoridae). Neaphaenops reproduction coincides with an order of magnitude increase in Hadenoecus egg input in the spring. Our 46 observations of predation by Neaphaenops suggest some switching to other cave animals as cricket egg and first instar nymph densities decrease during the summer. Neaphaenops life history in areas of Hadenoecus egg input is as follows: (1) female Neaphaenops reach maximum fecundity at the time of the maximum density of first instar Hadenoecus nymphs; (2) early instar Neaphaenops larvae appear in late summer and fall; (3) last instar Neaphaenops larvae appear in early spring and pupation occurs shortly thereafter; (4) lightly coloured teneral adults emerge two to three months later, a time consistent with laboratory estimates of the length of the pupal stage. Seasonal changes in sex ratio due to differential mortality appear to be consistent with this seasonal pattern. A comparison of Neaphaenops with two other species of carabid cricket egg predators suggests the importance of seasonal food abundance in determining life history seasonality. Darlingtonea kentuckensis has a food resource pattern which appears identical to that of Neaphaenops, and the life history seasonality is also parallel. Rhadine subterranea, however, seems to have a much more equitable food input throughout the year, and appears to have an aseasonal life history.</abstract>
<keywords>Coleoptera, Carabidae, ecology, United States of America</keywords>
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<title>Studies on the niche separation in two Carabid cave beetles.</title>
<abstract>Population, habitat and behavioural studies carried out on Pseudanophthalmus menetriesi and P. pubescens in the south central Kentucky karst area are described and discussed. Differences which exist in the timing of population recruitment, habitat preference, habitat niche breadth and in the degree of agression are all important in lessening competition between these two species.</abstract>

<keywords>Coleoptera, Carabidae, ecology, United States of America</keywords>
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<title>Observations on the biology of Stenasellus virei (Crustacea Isopoda Asellota of subterranean waters)</title>
<abstract>St. virei has been bred in the laboratory for many years (1960-1974). Most of the St.v.hussoni were captured in karstic waters, near the Moulis subterranean laboratory. Some St.v.virei from the Padirac sink-hole; St.v.buchneri from Cantabrian caves; St.v.boui and St.v.virei from phreatic waters; and St.buili and St.breuili have also been bred. Since Stenasellids are unable to swim, very low aquariums are used, with a bed of cave clay, some calcareous stones, dead wood and dead elm tree leaves. Little depth of water is necessary. Stenasellus was originally carnivorous, being able to capture and devour living prey, such as Chironomid larvae, but the populations of cave waters have developed a different diet: silt, guano, plant remains..., because they have been often insulated from their original phreatic biocenosis. Nevertheless, the existence of cannibalism among them points out that the predatory behaviour has not completely disappeared. Adult St.virei can be fed with Cerophyl. Some observations on the burrowing activity and on the reactions to light, temperature and salt water have been made. All postmarsupial molts of Stenasellus occur in two steps (isopodian molts). The intramolt is extremely long (from 83 h 30 mi for the first molt of the free young), to 8-12 days, for the adult male and female, 14 days for female reproductive molts and 16-21 days for the molts of aged or senile individuals). The intermolts last from 2 1/2 months (first intermolt of the free young), to 9-12 months (non-reproductive ones of the adult) and 12-18 months (average: 15-16), for reproductive 9 intermolts. The normal lifespan of karstic subspecies of St.virei and related species must be estimated as 12 years (males) and 15 years (females). All these values are 10-20 times longer than these of an epigean Asellid of the same size (Asellus aquaticus). The reproductive cycle has been studied. The adult female is larger than the male. There is no precopulatory pairing ("nuptial ride"d 6-7 years or more, fur the female. In the juvenile male, the morphogenesis of I and II pleopods takes place normally on intermolts 4-9 and lasts 3 years or more. On intermolt 10, it seems that the male is able to mate.</abstract>
<keywords>Ccrustacea, Isopoda, biology, France</keywords>
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<title>Investigations into the vertical distribution of organisms and chemical substances in the groundwater in valleys and terraces; methods and first results.</title>
<abstract>In the alluvial ground of the river Fulda valley and in the diluvial terrace of the river Weser assortments of tubes of various lengths were sunk into sandy and gravely underground to bring to light groundwater of different depths. The installation of these groundwater pump stations was effectuated by two different methods: 1. with the aid of an apparatus for bringing down bore-holes, 2.by ramming in the pump tubes with the aid of a pneumatic hammer. The first biological and chemical investigations in these subterranean water research stations indicated that the vertical distribution of groundwater organisms and chemical substances in special cases may depend on the nature of subterranean water currents and the infiltration of polluted water into the sandy and gravely underground of valleys and terraces.</abstract>
<keywords>Groundwater, drill-holes, chemistry, biology, vertical distribution</keywords>
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<title>Contributions to the study of the cavernicolous and endogean Zonitidae (Gastropoda) from Romania.</title>
<abstract>This paper is a contribution to the study of the species of cavernicolous and endogean Zonitidae from Romania. For each of the 24 species belonging to 6 genera we present the geographical distribution, their relation to the country's territory and data concerning the morphological characteristics, the genital apparatus included. The paper ends with a short faunistic, zoogeographical and ecological analysis.</abstract>
<keywords>Gastropoda, Pulmonata, Zonitidae, Romania</keywords>
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<title>Stenasellus kenyensis n .sp., Crustacea Isopoda Asellota from subterranean waters of Kenya.</title>
<abstract>Description of the first cavernicolous Stenasellid discovered in Kenya. St. kenyensis n.sp. is related to Somalian and Euasiatic species of the genus.</abstract>
<keywords>Crustacea, Isopoda, Asellota, Kenya</keywords>
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<title>Millipedes in the collection of the AMCS. III. Reddellobus troglobius, n. gen., n. sp., an unusual troglobite from Puebla, Mexico, and other records of the Family Spirobolellidae (Order Spirobolida, Class Diplopoda).</title>
<abstract>During the past several years, members of the Association for Mexican Cave Studies have made some surprising additions to the knowledge of the invertebrate fauna of Mexico. None of their finds is more exciting than the species described here, a millipede much larger than the nearest epigean relative in an order outstanding for its scarcity of troglobitic adaptations. The absence of ocelli and the reduction of body pigment in the known epigean typhlobolellids suggest that they are deep humus dwellers preadapted for cave life.</abstract>
<keywords>Diplopoda, Spirobolida, Mexico</keywords>
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<title>A new species of Parajapygidae from the Caribbean shores of Cuba collected by Pr. L. Botosaneanu during the second cuban-romanian biospeleological expedition to Cuba 1973.</title>
<abstract>P. (P.) botosaneanui n.sp. has been collected in the interstitial habitat of the Caribbean shores on the eastern coast of Cuba. This note is divided into 6 parts: 1) the description by L. Botusaneanu of the stations where this species has been collected and data on the possibility for the specimens of this taxa to swim and to creep between the grains of sand; 2) the description and the affinities of the n. sp., which is closely related to bonetianus Silv. from Mexico; 3) the study of the male genitalia made possible the definition of 4 instars (male 1 to male 4) which seem common to all the Parajapyx; 4) the study of the 9 genitalia, which possess always the same number of phanera, whatever the size may be, does not permit the identification of instars; 5) the study of the armature of the internal margin of the cerci shows for the first time among the Parajapygidae a striking dimorphismus both between the sexless and sexed instars and between male and female, these latter retaining, when "adult", an ornamentation identical to that of juvenil males: 6) the study of evolution and progressive complication of the chetotaxy from the sexless instars to the elder ones.</abstract>
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<title>A new Discoptila from anatolian caves (Orthoptera, Gryllidae).</title>
<abstract>A new troglophilous cave-cricket, Discoptila beroni n.sp. is described and figured. It is common in the caves Maara near Mersin and Damlatas near Alanya in South Anatolia. The characteristic features of the males, as well as of the females, by which the new species is distinguished from the other eight species of the genus, all distributed in the Mediterranean, are pointed out. D. beroni n.sp. has already been reported erroneously from the cave Damlatas as D. fragosoi (Bol.) and as D. brevis B.-Bien.</abstract>
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<title>A new species of Sipuncula (Aspidosiphon exiguus n.sp.), belonging to the interstitial fauna of marine beaches collected by Mr. L. Botosaneanu during the second Cuban-Romanian biospeleological expedition to Cuba 1973.</title>
<abstract>Aspidosiphon exiguous, a new species of Sipuncula, is decribed, belonging to the interstitial fauna of the beaches. The specimens were collected during the second Cuba-Romanian biospeleological expedition in 1973.</abstract>
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<title>Cavernicolous Pseudoscorpions from Macedonia.</title>
<abstract>A cavernicolous pseudoscorpion of the genus Neobisium Chamberlin 1930 is living in Kalina Dupka cave in the Bistra Highland of western Macedonia. This pseudoscorpion clearly differs from the other members of the subgenus Blothrus Schiodte 1849, and belongs to the new species N. (B.) princeps, the principal features of which are described in this study. The nearest relatives of this species are N. (B.} spelaeum (Schiodte) 1849, and N. (B.) stygium Beier 1931, both from Slovenian and Croatian caves. From chelal dentition N. (B.) princeps may be considered as the most primitive element of the princeps-stygium-spelaeum series. This new species is in a subterranean mode of life of extreme specialization. Relating to biogeography, it belongs to the endemic pseudoscorpion fauna in Macedonia. After finding pseudoscorpions in Zmejovica cave (Porece mountainous area), we confirmed the presence of the species N. (E.) karamani (Hadli) 1929 in west Macedonia. Morphologic analysis of male specimens from that new locality enabled us to complete description of this species previously based on a single female specimen. The comparison of Hadzi s species with N. (E.) remyi Beier 1939 from west Serbian caves, with N. (E.) brevipes (Frivaldsky) 1866 and N. (E.) leruthi Beier 1931 from Turda and Bihar caves in southern Carpathians, leads to the conclusion that these pseudoscorpions belong to a closely related species group. Judging by actual distribution of these species, the possibility exists that a wide area in the ancient Balkanic dry land had been populated by the initial form of that series. As for its preferences for habitat N. (E.) karamani is an exclusive inhabitant of subterranean environment. Relating to biogeography, it may be considered as a relic of Mediterranean Tertiary fauna and its endemic differentiation as developed under the conditions of the evolution of karst relief in southern countries of the Balkan Peninsula. In conclusion, from actual knowledge and the results of this study caves in Macedonia are inhabited by three endemic species of pseudoscorpions of genus Neobisium (Blothrus), namely: N.(B.) ohridanum Hadzi 1940,N. (B.) karamani (Hadzi) 1929, and N. (B.) princeps Curcic 1974. Judging by known blothroid pseudoscorpions, it is possible Macedonia represents one of the centres of origin and genesis for autochthonous and residual fauna of the Tertiary age.</abstract>
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<title>A new interstitial Asellid from southern Spain: Bragasellus boui n.sp. (Crustacea Isopoda Asellota) and some reflections on European Asellidae genera.</title>
<abstract>Description of a new, unpigmented and eyeless Asellid, belonging to the iberian genus Bragasellus Henry et Magniez, 1968. Eragasellus boui, n.sp., lives on the bottom of a river that is a tributary of Guadalquivir River (Southern Spain). Bragasellus, Proasellus, Stygasellus and Synasellus are four genuine phyletic lines of European Asellidae, all of them independent of each other, and the authors confirm their validity as true genera.</abstract>
<keywords>Crustacea, Isopoda, interstitial fauna, Spain</keywords>
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<title>Subterranean Crustacea Decapoda Macrura collected by Mr. L. Botosaneanu during the 1973 Cuban-Romanian biospeleological expedition to Cuba.</title>
<abstract>During the 1973 Cuban Romanian Biospeleological Expedition to Cuba 5 species of cavernicolous Decapod Crustacea were collected: the Palaemonidae Troglocubanus gibarensis Chace, T. eigenmanni (Hay) and Macrobrachium faustinum lucifugum new subspecies. The second of these species now is reported for the first time from Isla de Pinos. The third form proved to be a new subspecies of Macrobrachium faustinum (De Saussure), a freshwater shrimp which is widely distributed in the West Indies. The new subspecies is not only known from Cuba, but also material from Jamaica, Curacao and Bonaire is reported. A new locality is reported for Barbouria cubensis (Von Martens). The Astacid Procambarus niveus Hobbs & Villalobos was collected near its type locality.</abstract>
<keywords>Crustacea, Decapoda, Macrura, Cuba</keywords>

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<title>A cavernicolous Japygidae Diplura from Corsica, Dipljapyx beroni n.sp.</title>
<abstract>Dipljapyx beroni n.sp. has been collected from two caves in Corsica. From its antennae with 31 articles, chaetotaxia of urites and subcoxal organs well-characterized, it appears to be an endemic Corsican species, situated between D. humberti Grassi found in the western Alps, and D. italicus Silv. peculiar to the Italian Peninsula. It is closely related to the first of those two species. There is no morphologic feature indicating it as a troglophilic species.</abstract>
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<title>Free amino acids, cave beetle, Darlingtonea kentuckensis, Coleoptera, Carabidae, troglobite.</title>
<abstract>Free amino acids of Darlingtonea kentuckensis were investigated by two-dimensional, thin-layer chromatography on Silica Gel G. Thirteen amino acids which could be identified (alanine, glutamic acid, glycine, histidine, isoleucine and/or leucine, lysine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine) and seven unidentified ninhydrin-positive spots were found. Beta-Alanine, alpha-amino-butyric acid, arginine, aspartic acid, cystine, hydroxyproline and methionine were not detected. No difference was observed in the free amino acids with respect to sex of beetle, time after feeding and method of sample preparation.</abstract>
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<title>Size and growth of the eyes of the troglobitic Salamander Typhlotriton spelaeus.</title>
<abstract>The eyes of larval T. spelaeus grow by negative allometry, but in allometric coefftcients they are not greatly different from E. lucifuga. The major differences in eye size, both absolute and relative to body size, between T~ spelaeus and E. lucifuga are established prior Io the larval growth period. The eyes of T. spelaeus cease to grow at metamorphosis and are reduced in size thereafter. In addition, there is increased individual variability and bilateral asymmetry of eye size in adult T spelaeus compared to both adull E lucifuga and larval T. spelaeus. This variability, expressed as relative dispersion about mean eye size, is significantly greater than in E luci.fuga, and appears to result from three factors: 1) postmetamorphic cessation of eye growth, 2) wide variation in body size and eye size al metamorphosis, and 3) postmetamorphic shape changes and reduction of eye size.</abstract>
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<title>Geology and hydrogeology of the El Convento cave-spring system, Southwestern Puerto Rico.</title>
<abstract>Whereas the North Coast Tertiary Limestones of Puerto Rico are classic karst locales, their southern counterparts are almost devoid of karst development. The El Convento Cave-Spring System is the most prominent feature of the only large scale karst area developed on the South Coast Tertiary limestones. The karst topography is localized on the middle Juana Diaz Formation, which is a reef facies limestone, apparently because of the high density and low permeability of this zone as compared to the surrounding chalks and marls. In the El Convento System a sinking ephemeral stream combines with the flow from two perennial springs inside the cave. The surface drainage has been pirated from the Rio Tallaboa to the east into El Convento's subterranean course. The climate is generally semi-arid with 125-150 cm of rain falling principally as short, intense showers during Sept., Oct., and Nov. Sinking flood waters are absorbed by a small sinkhole and appear two to three hours later in the cave. In the dry season this input is

absent. The two springs within the cave have a combined inflow to the system of 1.0 m3/min at low flow but half of this leaks back to the groundwater before it reaches the resurgence. The spring waters are saturated with CaCO3 and high in CO2 (26.4 ppm). As the water flows through the open cave it first becomes supersaturated by losing CO2 and then trends back toward saturation by precipitating CaCO3.</abstract>
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<title>Biology and ecology of the El Convento cave-spring system (Puerto Rico).</title>
<abstract>The El Convento Cave-Spring System is located at the head of the Quebrada de Los Cedros, approximately 20 km. west of Ponce, southwestern Puerto Rico. Although situated in an arid environment, the gorge receives sufficient moisture from the cave-spring system to support an abundant flora, with Bucida buceras and Bursera simaruba as the dominant trees. The cave is frequently flooded and possesses a rich nutrient substrate in the form of bat guano. Numerous orthopterans (Aspiduchus cavernicola and Amphiacusta annulipes), decapoda (Macrobrachium carcinus and Epilobocera sinuatifrons), and chiroptera (Brachyphylla cavernarum and Artebius jamaicensis) are present. In addition, approximately a dozen other species of invertebrates are found in lesser abundance throughout the system. None of the forms collected demonstrated specific cavernicolous adaptations. Because of the numerous entrances and frequent flooding the possibility of the presence of troglobites is minimal.</abstract>
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<title>Observations on Stenasellus virei in its natural biotopes (Crustacea Isopoda Asellota of Subterranean Waters).</title>
<abstract>Thanks to intensive exploration and to new methods for capturing aquatic underground fauna. 117 localities are now known for Stenasellus virei. The description of some typical biotopes suggests that the species lives as well in karstic waters as in phreatic ones, inside the different environment of the hydrogeological classification of subterranean waters. St. virei buchneri and St. v. hussoni are almost cavernicolous. St. v. angelieri is distributed in the underground waters of Catalonia. St. v. boui is located in the underflow of Salat river basin. St. v. virei is widely distributed in the alluvial water-level of Garonne and Ebro rivers basins. The dispersion of St. virei into the alluvial environment explains the process of colonization of continental underground waters. It explains also the existence of an apparently insulated population into the sink-hole of Padirac. The actual distribution of the five subspecies is explained by important restrictions of the area in quaternary glacial ages, followed by local (in the water-level of the tributaries of Garonne river) spreading during postglacial time. The postglacial reconquest of the Salat river underflow by this species seems to have been responsible for the latest subspeciation (St. v. boui). The endemic populations of fossil karstic systems seem to have an abnormal composition. They include unusually large adults, juvenile stages being rare. They differ from the phreatic populations, which exhibit a normal distribution is size groups, with a formal percentage of juveniles. These differences between karstic and interstitial populations may result from the fact that in caves, Sr. virei is often insulated from its original phreatic biocoenosis: an intraspecific competition between size classes has taken the place of normal heterospecific struggle for existence.</abstract>
<keywords>Crustacea, Isopoda, subterranean water</keywords>
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<title>Studies on the abdominal musculature of the subterranean Mysid, Lepidomysis longipes (Pillai and Mariamma).</title>
<abstract>The musculature of the hypogean mysid, Lepidomysis longipes (Pillai and Mariamma) is remarkably modified. It shows the absence of many muscles and poor development of others in the abdominal region. This is correlated with the subterranean nature of the animal.</abstract>
<keywords>Malacostraca, Mysid, musculature</keywords>
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<title>Momonisia phreatica n.gen., n.spec. (Momoniidae, Hydrachnellae) of subterranean waters of Bulgaria.</title>
<abstract>Recent borings in the Veleka River drainage area (South Eastern Bulgaria) have shown a phreatic fauna with a new representative of Hydracarian of the family Momoniidae which constitute the type of a new genus: Momonisia phreatica n. gen. n. sp. The description is here given by the author. The most closely related Momoniid appears to be Momonia karelica Sokolov from Russian Carelia.</abstract>
<keywords>Arachnida, Acari, Hydrachnida, subterranean water, Bulgaria</keywords>
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<title>Ecological and Faunistic Data on the Stenasellidae (Crustacea Isopoda Asellota of Subterranean Waters).</title>
<abstract>Some important morphological features, which are discussed here, point out that the Stenasellids (Crustacea Isopoda Asellota) must be considered as a true family (Stenasellidae), independent from the Asellidae. A definition and a renewed diagnosis of the Stenasellidae Dudich, 1924, are given. Their relationships must be pursued, especially in the marine Parastenetroidea and in the psammic Microcerberidae. Until 1938, the group was known only from subterranean waters of southern Europe. Now, several genera and many thermophile species from north-tropical underground waters have been discovered in Africa (5 gen., 12 sp.), Asia (1 gen., 2 sp.) and Central America (1 gen., 4 sp.). The Stenasellids are very active burrowers. Such a behaviour explains how their phyletic lines had colonized the continental underground waters, by migrations from the littoral gravels to the underflow of rivers, phreatic alluvial waters and finally, to the karstic waters. The typical medium for the life of the group is represented by the phreatic zones of African shields arenas. In European phyletic lines, the speciation seems to be linked with tertiary subsidences (within the Tyrrhenian area, for the line of Stenasellus virei). The European species which have survived quaternary glaciations may have diversified themselves (rising of subspecies), recolonizing newly vacant biotopes in postglacial ages.</abstract>
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<title>A new Centromerus from Bulgarian caves (Aranaea, Linyphiidae).</title>
<abstract>A new species, Centromerus milleri, is described, which was collected in the cave "Karangil" near the town of Kardjali, Bulgaria. Centromerus milleri n. sp. belongs to the group of C. pabulator.</abstract>
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<title>Fluorescent dye determination of groundwater movement and contamination in permeable rock strata.</title>
<abstract>A preliminary inquiry to the extent and boundaries of subterranean waterways within the Mystery Cave System was explored. Rhodamine WT dye in 500 ml quantities was used in fluormetry determinations of surface flow to ground water basins. A Turner Model 111 fluorometer was utilized for detection purposes powered by a portable 12 volt, 220 amp hour battery-inverter system. It was shown that water entered underground passageways through sinkholes or highly creviced limestone/dolomite rock strata and reappeared several kilometres downstream. The outflow appears in the form of "springs". The possibility exists that contaminated surface water may seep through the soil for long distances. It is obvious there is acute danger of underground contamination of municipal and private water supplies situated in this area.</abstract>
<keywords>Hydrogeology, tracer, dye tests, groundwater movement, pollution, United States of America</keywords>
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<title>Observations on the aquatic subterranean fauna of Cuba.</title>
<abstract>A short account on some achievements of the cubano-romanian biospeleological expeditions to Cuba in the study of the aquatic subterranean faunas. The following divisions of the aquatic subterranean realm are reviewed together with their most characteristic faunal elements: "guano pools" and rimstone pools in the vadose zone of the caves; underground streams; water table (and other) lakes in the caves; "pozzos" carved in the limestone, and "grietas" which are vertical clefts in the limestone of marine terraces, giving access to fresh- or to brackish water; the interstitial of the marine beaches; the underflow of running waters. At present, thorough biospeleological research is being carried out almost everywhere in Central America; Cuba, which remained until recently rather poorly investigated, proves to be one of the most remarkable areas from this point of view. A few of the most interesting problems rose in the course of the study of the underground aquatic fauna of Cuba are listed. An interesting biogeographical problem is the following: some of the subterranean aquatic elements prove to be related to elements belonging to the fauna of the other Antilles and of Mexico, but not to the South-American fauna (as is the case for some terrestrial groups). The research undertaken will be a contribution to the problem of the divisions of the aquatic subterranean realm and of their reciprocal relations, in a warm and humid climate; it will also contribute an answer to the problem of the differences between temperate and tropical cave communities; finally, it allows one to perceive in its very progress the process of colonization of the subterranean freshwaters by elements of marine origin, either through the interstitial realm or through the fissures of the littoral limestones.</abstract>
<keywords>Aquatica subterranean fauna, Cuba</keywords>
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<title>Branchiobdellids (Annelida: Clitellata) from some Eastern North American caves, with descriptions of new species of the Genus Cambarincola.</title>
<abstract>Branchiobdellids are found as epizoites on crustaceans of the orders Isopoda and Decapoda (cambarine crayfishes) in caves of eastern North America. Species that may be considered as troglobites, since they are not known from epigean waters, appear to be confirmed to truly troglobitic isopods and possibly a few troglobitic crayfishes from Florida and the Tennessee-Kentucky Highland Rim cave belt. The majority of the records of branchiobdellids from caves are of representatives of common epigean forms epizootic un crayfishes. Cross-referenced lists of branchiobdellids, their hosts and cave localities are presented. Some of the new species described are apparently troglobitic or troglophilic, but they present no consistent phylogenetic or geographical pattern and separate origins for them from primitive stocks of the genus Cambarincola are postulated.</abstract>
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<title>The second International Colloquium on the Genera Niphargus and Gammarus, Lyon, 1973. Review on the Niphargus working group.</title>
<abstract>Following the First Colloquium held at Verona in 1969, it was planned to hold at Lyon in July, 1973, the Second International Colloquium dealing with the genus Niphargus and also with the genus Gammarus. As subject matter in discussions dealing with the first of these genera, the meeting was devoted mainly the balancing the various viewpoints (based on the European approach) and initiating a collective study of the systematics of these hypogean Amphipoda. The systematics are currently quite confused. Several modifications of the propositions of the Colloquium at Verona (published in 1972) were discussed. A third Colloquium, with the same objectives, is planned after an interval of three years.</abstract>
<keywords>Crustacea, Amphipoda, Colloquium, France</keywords>
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<title>A new troglobitic Isopod of the Genus Lirceus (Asellidae) from Southwestern Virginia, with notes on its ecology and additional cave records for the Genus in the Appalachians.</title>
<abstract>Lirceus usdagalun new species, the first known troglobitic species of the genus, is described from three caves in Lee County, Virginia. The potential taxonomic value of the endopod tip of the male second pleopod, heretofore dismissed as a diagnostic character in this genus, is pointed out. Some general ecological data for the new species are presented, and cave records for other populations of Lirceus spp. from the Appalachians are given.</abstract>
<keywords>Crustacea, Isopoda, United States of America, ecology</keywords>
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<title>A new cavericolous Asellid from Central Spain: Bragasellus lagari n.sp. (Crustacea Isopoda Asellota).</title>
<abstract>Description of a new, unpigmented and eyeless Asellid, belonging to the Iberian Genus Bragasellus Henry et Magniez, 1968. The new species lives in the underground stream of the Cueva del Tornero (Checa, province of Guadalajara, central Spain).</abstract>
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<title>The evolution of the Eastern North American Isopods of the Genus Asellus (Crustacea: Asellidae).</title>
<abstract>This paper is the second in the three part series dealing with the evolution of the North American isopods of the genus Asellus. The generic status of Asellus is discussed with emphasis placed on the newly proposed genera of Henry and Magniez (1968). Use is made of comparative anatomical and where feasible statistical methods during this investigation. The first, shorter portion of the study deals with the presentation of evidence supporting the viewpoint that if 'Pseudobaicalasellus" is to be considered a valid genus then it must include the members of the Cannulus Group of Steeves (1965). The second portion of the study is concerned with the determination of the generic status of the eastern North American isopods. From the data presented it is felt that it is inadvisable to elevate species - groups of Asellus to the rank of genera. A generic diagnosis of the genus Asellus is presented. A list of North American species of the genus Asellus as well as a key to North American species of Asellus is included. The reduction to synonymy of certain nominal species of the genus Asellus is also given.</abstract>
<keywords>Crustacea, Isopoda, United States of America</keywords>
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<title>Notes on the distribution of Trichoniscidae in Sardinia (Crustacea, Isopoda, Oniscoidea).</title>
<abstract>The study of the biogeography of the eight species of Isopoda Trichoniscidae from Sardegna brings to consider the faunistic relationships happened in the past between the island and the Pyrenees. Two of the species are eutroglophilous and rather widespread; the other six are troglobic and endemic to Sardinia. Five of the latter show strong affinity to Pyrenees forms. A detailed description is given of the distribution of the various species. This distribution makes possible some observations on the history of the fauna of the island.</abstract>
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<title>Breeding and fecundity in a subterranean Mysid, Lepidomysis longipes (Pillai and Mariamma).</title>
<abstract>The hypogean mysid, Lepidomysis longipes has a breeding period extending from December to April with the peak period in March. A secondary breeding period appears in August and September. The females have low fecundity and carry a maximum of nine eggs. Development is delayed due to lack of nourishment in the environment. The mysids breed only once a year.</abstract>
<keywords>Crustacea, Mysidaceae, India</keywords>
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<title>The Spider communities in tropical caves (Aranaea).</title>
<abstract>The so called "tropical" caves (most of which are also geographically "tropical") are distinguished from the "temperate" caves by the much larger trophic resources. Spiders are common in both kinds of caves, but the groups present in one kind are mostly absent in the other (notwithstanding that many families are distributed over at least one temperate and one tropical region). As in all temperate caves more or less the same groups of spiders can be found, so the tropical caves have a typical spider fauna, composed of different groups (often also more than those present in the temperate caves). In the temperate caves the most typical groups are the Leptonetidae, the Dysderidae, many Araneoidea and some Agelenidae; these groups are either absent or rare in the tropical caves. In these the typical groups are some Orthognatha and many primitive spiders of the Haplogynae (Oonopidae, Tetrablemmidae, Ochyroceratidae, Scytodidae, Pholcidae, Telemidae) with a few Araneoidea (Theridiosomatidae and Symphytognathidae). From an ecological point of view, the detriticolous groups are not common in temperate caves, but are exceedingly common in tropical caves. In these live also often some groups which could be considered not strictly detriticolous, but more exactly "microcavernicolous" (i.e. living "normally" in more or less permanent crevices etc. of soil and rocks). In temperate caves are on the other hand more common groups living typically on vegetation, not very close to the soil. Ethologically, in tropical caves the existence of groups is possible which either ambush their prey or search for it actively whereas most spiders of temperate caves capture it with a web.</abstract>
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<title>Ecological and evolutive aspects of the communities of temperate and tropical caves: observations on the biological cycles of some species of Ptomaphagus (Coleoptera Catopidae).</title>
<abstract>Differences between tropical and temperate cave communities are an important topic in the actual biospeleological thinking. Among the most striking differences is the paucity of terrestrial troglobites in tropical caves. This fact may depend on the higher energy input into tropical caves which lessens the selection pressures for energy-economizing troglobite adaptations. Consequently evolutionary rates would be slowed in tropical caves and, in a date group, troglobites would appear later in such caves than in temperate ones with lower energy input. In order to investigate this point the authors studied the degree of adaptation to the cave environment in two species of Mexican Ptomaphagus which, being phylogenetically related, probably descend from the same epigean ancestor. Among these species the first one, P. troglomexicanus Peck, lives in a typical temperate cave (i.e. cold, high altitude cave, with scarce food supply) in the Sierra de Guatemala (Tamaulipas), the other one, P. spelaeus (Bilimek), populates tropical caves (i.e. warm, lowland cave, with rich food supply) in the State of Guerrero. In addition a comparison is made with P. pius Seidlitz, an epigean species from southern Europe. The results show a striking difference between P. troglomexicanus on a side and the other two species. Differences chiefly concern morphological features such as relative antenna length, structural complexity (i.e. the number of sensilla) of the antenna chemioreceptor organs in the 70, 90, 100 segments, degree of reduction of eye, wing and pigmentation and physiological ones such as the length of the life cycle. The possible causes of these differences are discussed. According to the authors these differences appear due to the different selection pressures acting in the two types of caves. In addition a comparison between the "tropical cave" species, P. spelaeus, with the epigean one, P. pius, does not point out the differences that one could expect by the diverse ecology of these species. These observations support the idea that evolutionary rates in cavernicoles are strongly affected by the ecology of the cave, mainly depending on the degree of energy input, and are poorly consistent with the hypothesis that mutations affecting degenerative processes are selectively neutral.</abstract>
<keywords>Coleoptera, Catopidae, tropical and temperate caves, ecology, evolution, Guatemala, Mexico, Italy</keywords>
<from>337</from>
<to>347</to>
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<title>Considerations on cavernicolous and endogen Carabids of the Anataloian peninsula (Coleoptera, Carabidae).</title>
<abstract>The cavernicolous and endogeous Coleoptera Carabidae, actually (1972) known from the Anatolian peninsula (here considered together with Armenia, the Caucasus and the mountains of Lebanon), are examined and discussed. They belong to the tribes of Anillini, Trechini (Neotrechus, Aphaenops and Duvalius lines), Pterostichini, Molopini, Sphodrini. The cavernicolous and endogeous Anillini, Pterostichini and Sphodrini from this region have clear relations with the balkanic groups and may be considered as East-Mediterranean faunistic elements. On the contrary, the Trechini of the Neotrechus line are more related to the Caucasian groups, those of the so-called Aphaenops line are endemic of the Caucasus and of the Crimea, and the Duvalius are partly related to the Caucasian species, partly isolated and with uncertain relationships (perhaps with some Greek species or with the Algerian Trechopsis, and perhaps with some species of the Apennines).</abstract>
<keywords>Coleoptera, Carabidae, Turkey, Armenia, Russia, Lebanon</keywords>
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<title>Present state of the knowledge on hypogean Histeridae.</title>
<abstract>The author makes some considerations on troglobitic and endogeous world Histeridae. All these species present extreme reduction of eyes or are completely blind; all are wingless and only one is brachipterous. The Histeridae described here belong to the following genera: Speleacritus Jeannel and Spelaeabraeus Moro (Abraeinae), Sardulus Patrizi, Bacanius Le Conte, Troglobacanius Vomero and Geoculus Wenzel. (Dendrophilinae, Bacanius group). Finally some considerations on troglophylic and guanobitic Histeridae are made, reporting the recent discovery of a new genus and of some new species belonging to guanobitic biocoenosis of Mexican tropical caves.</abstract>
<keywords>Coleoptera, Histeridae, Turkey, Mexico, United States of America, Sardinia, Italy</keywords>
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<title>Feeding behaviour of the Salamander Gyrinophilus porphyriticus in caves.</title>
<abstract>The feeding responses of salamander larvae (Gyrinophilus porphyriticus) from caves in the Powell Valley in Virginia were investigated in the laboratory. The larvae locate prey by mechanoreception and capture the prey by a rapid sucking action, much like cave-limited salamanders do. Feeding success is greater with the isopod Asellus recurvatus (about 90 per cent) than with the amphipod Crangonyx antennatus (about 50 per cent), and this largely accounts for the higher frequency of A. recurvatus taken in choice experiments. G. porphyriticus readily ingested the unfamiliar isopod Lirceus usdagalun, but it took four weeks before it was digested as well. Small larvae tend to take small prey and large larvae take both large and small prey. Occasionally, larvae lunged at prey, which was usually unsuccessful. This behaviour seems to be a holdover from an evolutionary history in epigean environments where vision could be used to locate prey.</abstract>
<keywords>Amphibia, Urodela, Salamander, ecology</keywords>
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<title>A new Troglohyphantes from Bulgarian caves (Araneae, Linyphiidae).</title>
<abstract>A new species Troglohyphantes drenskii is described, which was collected in the cave "Suchata pestera" near Velingrad, Bulgaria. Troglohyphantes drenskii n.sp. belongs to the group of T. orpheus and is related to T.salax and T.pademontanus.</abstract>
<keywords>Arachnida, Aranaea, Linyphiidae, Bulgaria</keywords>
<from>103</from>
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<title>Spiders from the Philippines. I. A new cavernicolous Althepus of Mindanao Island (Araneae, Ochyroceratidae).</title>
<abstract>Althepus noonadanae n.sp. is described (female; male unknown; loc. typ.: Latuan Cave, Curuan district, Mindanao, Philippines); it can be distinguished from the other known species by the morphology of the chelicerae and of the female genitalia. It is not related to any of the very few described species. A key for the female Althepus is given.</abstract>
<keywords>Arachnida, Aranaea, Ochyroceratidae, Phillipines</keywords>
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<title>Redescription of Centromerus bulgarianus (Drensky 1931) and Centromerus lakatnikensis (Drensky 1931) (Araneae, Linyphiidae).</title>
<abstract>The type specimens (lectotypes) of Centromerus bulgarianus and C. lakatnikensis, preserved in the collection of the Zoological Institut BAN, Sofia, are redescribed. The redescription is necessary, because the original description is superficial and the drawings are inexact. Moreover, the male of C. lakatnikensis was unknown.</abstract>
<keywords>Arachnida, Aranaea, Linyphiidae, Bulgaria</keywords>
<from>117</from>
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<title>A new cavernicolous species of the Pseudoscorpion Genus Roncus L. Koch, 1873 (Neobisiidae, Pseudoscorpiones) from the Balkan peninsula.</title>
<abstract>Roncus (Parablothrus) pljakici, a new species of cave living pseudoscorpions, is described from the cave 'Pecina u selu Vrelo' on Mt. Stara Planina, East Serbia. The problem of its taxonomic position in the subgenus is discussed. The new species is the first representative of Parablothrus to be found in Serbia. It seems possible that R. (P..) pljakici represents an endemic species, specialized for a cavernicolous way of living. The analogies of this and other species of the subgenus point to some similar phenomena which occur in other genera of Balkan false scorpions (Curcic 1972). In all these cases, a close relationship among the species inhabiting East Serbia, Macedonia and Herzegovina was noticed. It is probable, therefore, that the three regions represent the autochthonous areas of the original populations of the analysed groups of species, out of which new species came into existence.</abstract>
<keywords>Arachnida, Pseudoscorpiones, Greece, Dalmatia, Bosnia, Hercigovina, Macedonia, Bulgaria, Turkey, Serbia</keywords>
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<title>On a new subterranean Amphipode of Bulgaria Niphargus kochianus melticensis n. ssp.</title>
<abstract>A new subspecies of Amphipode is described, being the first representative of the Niphargus kochianus group in Bulgaria. The new subspecies resembles N. k. tamanini Ruffo, N. k. petrosani Dobr. et Manolache, N. k. Labacensis Sket, N. k minor Sket, for the maxille I having one single hair on the internal lobe and a single combed spine on the external lobe. However, it differs neatly from all other subspecies by the length of the nails on the dactyl and by the peculiar form and the chetotaxia of the telson.</abstract>
<keywords>Crustacea, Amphipoda, Bulgaria</keywords>
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<title>XLIX contribution to the knowledge of the Amphipoda. On three Niphargus species (Fam. Gammaridae) from the Balkans.</title>
<abstract>Three Niphargus species from the Balkans are studied. Niphargus adbiptus, n. sp. is described from Ravanica cave in Serbia. Niphargus stygius ravanicanus S. Kar. 1943 from the same cave (Ravanica) is redescribed. N. valachicus Dobr. Man. 1933, is newly recorded from Bulgaria (Devnja).</abstract>
<keywords>Crustacea, Amphipoda, Serbia, Bulgaria</keywords>
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<title>Trichonisciidae of the Su Mannau cave, Southwest Sardinia (Crustacea, Isopoda).</title>
<abstract>Description of three eyeless and apigmented new species of Trichoniscidae which have been found in Su Mannau cave in Sardinia. Two of them belong to the genus Catalauniscus Vandel: Catalauniscus hirundinella n.sp. offering few relationships with the spanish species C. espanoli Vandel, and Catalauniscus puddui n.sp. which has also similar features to an iberian form, C. bolivari Arcangeli. The third (Scotoniscus janas n.sp.) belongs to

the endemic genus Scotoniscus Racovitza, until now monospecific and represented by a series of subspecies from the Northern Pyrenees, all nearly related to the specific form S. rnacromelos Racovitza. The discovery of those three new species brings forward additional arguments to the thesis of a Tyrrhenian origin of these taxa of Trichoniscidae.</abstract>
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<title>Description of the male of Mexistenasellus parzefalli (cavernicolous Crustacea Isopoda Asellota of Mexico) and observations on this species.</title>
<abstract>Description of the male of the Mexican cavernicolous Stenasellid Mexistenasellus parzefalli Magniez, 1972, from Huizache Cave, San-Luis Potosi State, Mexico. In the female with a brood pouch, the coxopodit of the maxilliped contains two provisional, oostegit-like plates, whereas the ovigerous female of european Stenase1lids have only the inner one. This temporary sexual female character is known in other Isopods, such as the cavernicolous Caecosphaeroma burgundum Dollfus.</abstract>
<keywords>Crustacea, Isopoda, Asellota, Mexico</keywords>
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<title>Temperate preference responses of some aquatic, cave-adapted Crustaceans from Central Texas and Northeastern Mexico.</title>
<abstract>The temperature preference responses of five species of troglobite crustaceans were studied in a 15°-30°C gradient. Stygonectes hadenoecus, S. russelli and Asellus reddelli had no discernible temperature preferenda. Speocirolana bolivari had a weak preference for 20-30°C. Cirolanides texensis had a pronounced preference for 20-30°C, temperatures much warmer than that of its habitat. The lack of temperature preferenda in three species agrees with the hypothesis that imprisoned troglobites tend to lose responses to those environmental variables which are constant in caves. S. bolivari may retain its temperature selectivity because of a slow rate of cave-adaptation. It is hypothised that C. texensis is recently descended from a tropical, epigean, freshwater ancestor.</abstract>
<keywords>Crustacea, Amphipoda, ecology, Mexico, United States of America</keywords>
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<title>Feeding efficiency in the cave Salamander Haideotriton wallacei.</title>
<abstract>Selection for efficiency in food capture may be a dominant influence in the evolutionary biology of predaceous cave animals. A sample of 8 Haideotriton wallacei from a natural population contained 21 feeding boluses in their digestive tracts. Fourteen of these boluses contained food, demonstrating success in at least 67% of the feeding attempts.</abstract>
<keywords>Amphibia, Urodela, Salamander, ecology, United States of America</keywords>
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<title>The colonisation of some caver in the Jura by Niphadobota alpine Bezzi (Dipt. Tipulidae).</title>
<abstract>Three new localities of Niphadobota (=Chionea) alpina in the French southern Jura allow the author to state that this insect's climatic requirements explain the biogeography of the species; the origin of the colonization of caves by this dipteran is considered.</abstract>
<keywords>Insecta, Diptera, France</keywords>
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<title>The natural populations of Stenasellus virei Dollfus (trgoglobic Crustacea Asellota).</title>
<abstract>Many cavernicolous and phreatic localities are known for the species Stenasellus virei. Some of these, which harbor a rather abundant population have been studied for several years. The endemic populations from permanent waters of some fossil karstic systems seem to have an abnormal composition. They include especially large individuals (juvenile stages being rare). They differ from the phreatic populations, which exhibit a normal distribution in size groups with a normal percentage of juveniles. These differences in the structure of populations may result from physical differences between the habitat in free waters of caves and in phreatic water, and from differences between the associations of species that these two types of hypogean habitat may support.</abstract>
<keywords>Crustacea, Isopoda, Asellota, France</keywords>
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<title>Biotope and description of Niphargus altagahizi n.sp., subterranean Gammarid Amphipod from Lebanon.</title>
<abstract>Description of a small warm cave situated along the Mediterranean shore; the temperature of water varies from 14 to 19°C. Inhabiting this cave is Niphargus altagahizi, a new species related to orcinus s.l. group. Description of this species and comparison with the other Lebanese species, N. nadarini.</abstract>
<keywords>Crustacea, Amphipoda, Lebanon, biotope</keywords>
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<title>Observations on marked and unmarked Trichoptera in the Barehohle in Lonetal (Swabian Jura).</title>
<abstract>1.The Bàrenhòhle, one of the ten caves situated in the episodically water-bearing valley of the Lone (Swabian Jura), serves as summer quarters for the total of ten species of Trichoptera, most of which are Micropterna nycterobia and Stenophylax permistus. 2.Counts carried out in this cave from 1967-1972 and observations of flood and dry-periods of the Lone during the same years make evident that the number of Trichoptera flying into the cave seems to depend in a large measure on the seasonal activity of the creek: a steady flow of water makes the undisturbed development of larvae possible and results in high numbers of individuals entering by air, while intermittent water-flow disturbs the development of the larvae and results in few individuals entering. 3.Such factors as darkness, humidity, and temperature which cause or favour the active entrance by air of Trichoptera into the cave as well as the "diapause" taking place in the subterranean region are considered. 4.Dynamically climatized caves or caves which are too small are rarely occupied by Trichoptera; they evidently prefer larger caves with climatically balanced regions (comparatively low temperatures and high atmospheric moisture) not too far from the entrance. 5.Trichoptera start flying into the Barenhohle generally in May; the highest number of individuals and copulating couples may be found as early as July. They start flying out by the end of July or in August/September, the last of them leaving the cave generally in September or October. 6.Two attempts at marking (on 28th June all Trichoptera to be found in the cave were marked with black ink, on 4th July all yet unmarked with red ink) gave better evidence of their disposition and time of copulation as well as of the number of arriving unmarked and departing marked specimens. 7.The Trichoptera marked with black ink stayed in the cave for a maximum of 85 days, the ones marked with red ink for a maximum of 79 days. Food intake was not observed during this period, and there was no indication of the insects' leaving the cave during their diapause. 8.Trichoptera are characterized by a remarkably long time of copulation: a specimen marked twice was in copula for 22 days, and before copulation it had been in the cave for 49 days. </abstract>
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<title>Research on Gregarines (Gregarinae: Stenophoridae) of the troglobic Diplopod Typhloiulus bureschi Verhoeff in Bulgaria.</title>

<abstract>A study of the parasitic fauna, particularly the Gregarines, found in a troglobitic diplopod Typhloiulus bureschi Verhoeff, one of the Iulidae from Bulgarian caves is presented. Data on morphology and taxonomy of the Eugregarines are included. There is a description of a new species, Stenophora typhloiuli This species is compared with other species of the genus Stenophora.</abstract>
<keywords>Parassites, Gregarinida, Diplopoda, Bulgaria</keywords>
<from>87</from>
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<title>The evolution of the Eastern North American Isopods of the Genus Asellus (Crustacea: Asellidae).</title>
<abstract>This paper is the first in a three part series concerned with the evolution of North American isopods of the genus Asellus. It contains the descriptions of four new species of isopods and a list of pertinent new range data of presently known species. </abstract>
<keywords>Crustacea, Isopoda, United States of America, evolution</keywords>
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<title>The cuticular surfaces of the gnathopods of two Amphipod Crustaceans: Niphargus (hypogean Gammarid) and Gammarus (epigean Gammarid).</title>
<abstract>Niphargus virei and N. schellenbergi (hypogean Gammarids) as also Gammarus pulex pulex (epigean Gammarid) show on the Gn1 and Gn2 of both sexes ornamented areas which were studied with a scanning electron microscope. The ornamentations are built up of teeth. These are simple in Gammarus pulex pulex and present a sexual dimorphism on the meropodite. In N. schellenbergi and N. virei they are as often as not grouped by three. In Orchestia (Talitrid) the teeth have their bases fusioned which forms pectinate scales showing a sexual dimorphism. Outside these areas, the gnathopod cuticle of N. virei, N. schellenbergi and Gammarus pulex pulex is ornamented with ovoid papilla, each of them surmounted by a finger-like process covering over a depression.</abstract>
<keywords>Crustacea, Gammaridae, France</keywords>
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<title>A new genus of Bulgarian cave spider (Protoleptoneta bulgarica n.g., n.sp., Leptonetidae).</title>
<abstract>A new genus Protoleptoneta (P. bulgarica n. g., n. sp.) is described, which was collected in caves of the Western Balkan mountains - Bulgaria. The new genus unites features of the genera Leptoneta and Paraleptoneta but there are many differences, which divide it from these genera. It differs from Leptoneta as follows: the tarsus of male palp does not possess the characteristic apophysa of Leptoneta; the tarsus is less depressed and does not branch out; the teeth of chelicerae are equable and equidistant. It differs from Paraleptoneta as follows: the femora of male palp is spineless; near the top of tarsus, on ectal side, there is a thicker spot, provided with a strong spine longer than others; the tarsus is more depressed. Paraleptoneta italica is placed in the new genus Protoleptoneta. The origin and relationships between the genera Protoleptoneta, Leptoneta and Paraleptoneta are discussed; a hypothesis is that the genera Leptoneta and Paraleptoneta had been developing as independent phyletic groups and the origin of the two had been Protoleptoneta.</abstract>
<keywords>Arachnida, Araneae, Bulgaria</keywords>
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<title>On the cavernicolous fauna of Bulgaria. III. Results of the biospeleological researches from 1966 to 1970.</title>

<abstract>The present research follows two other earlier papers on the Bulgarian cave fauna (1962 and 1967). The three papers regroup the data on 431 Bulgarian karst caves, more or less studied from a biospeleological point of view. In this paper one will find a list of 147 new caves and pits with 293 animal species, of which 154 have not been mentioned in the earlier papers. A reference list containing 55 titles has been attached.</abstract>
<keywords>Bulgaria, cave fauna</keywords>
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<title>Spatial biometrie in the subterranean ecosystem: distribution of Meta menardi Latr. (Argiopidae).</title>
<abstract>The spatial distribution of 113 individuals from the species Meta menardi Latr. (Argiopidae) divided in 10 different populations living in 8 Belgian caves has been studied. A grouping test and the calculation of R according to Clark et Evans (1954), based on the measurement of the distance to the nearest neighbour, have been used. Results show that the individuals are distributed at random inside their biotope.</abstract>
<keywords>Arachnida, Araneae, biuometry, ecosystem</keywords>
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<title>Biospeologica sovietica. XLIX. The first troglobite representative of Trechinae (Coleoptera, Carabidae) in Ciscaucasia.</title>
<abstract>During a recent exploration of caves in western Ciscaucasia there was collected, among others, a new species representing a new genus of Trechini (Coleoptera, Caraboidea), the description of which is given here; it has been named Birsteiniotrechus ciscaucasiens n.gen., n.sp., in memory of Prof. J.A. Birstein, famous Soviet biospeleologist, the founder and promotor of the "Biospeologica sovietica" series who passed away recently (cf. I.J.S., 4, part.2). The interest of Birsteiniotrechus lies in the fact that, until now no troglobite or endemic species of Trechini was known from the Ciscaucasian mountains; this genus belongs to the phyletic series of Neotrechus and is nearly allied to Troglocimmerites, but differs from it by its labial characters.</abstract>
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<title>Temperature and relative humidity responses of two Texas cave-adapted Millipedes, Cambala speobia (Cambalida: Cambalidae) and Speodesmus bicornourus (Polydesmida: Vanhoeffeniidae).</title>
<abstract>The temperature and relative humidity preferences and tolerances of two Texas species of cave-adapted millipedes, Cambala speobia (Chamberlin) and Speodesmus bicornourus Causey, were studied. Both species showed gross preferences when tested in gradient chambers for temperatures and relative humidities approximating those of their cave environments. But C. speobia, the less adapted species morphologically, was the more selective of the two species for such conditions. S. bicornourus was far less tolerant of elevated temperatures and reduced relative humidities than was C. speobia. Discussed is a possible reason why a terrestrial troglobite like S. bicornourus would combine intolerance with a lessened ability to perceive those factors to which it is intolerant. Discussed also are the possible causes of the present distribution of Cambala and Speodesmus in the caves of central Texas.</abstract>
<keywords>Diplopoda, Temperature, Relative humidity, cave adaptation</keywords>
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<title>Biospeologica Sovietica L.: a new cavernicolous species of Harpolithobius (Chilopoda, Lithobiidae) of the Caucasus, Harpolithobius birsteini n.sp.</title>

<abstract>A new troglobite species belonging to the genus Harpolithobius has been discovered during a recent biological exploration of Caucasian caves; l male and 2 females were collected in Avidzba cave and are described here. Harpolithobius birsteini n.sp. is the second troglobiotic Lithobiid known from URSS caves. The other species collected must be considered as mere troglophilous.</abstract>
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<title>Comparative study of the feeding habits of two cavernicolous fishes.</title>
<abstract> whose dominant vertical orientation is determined, in Anoptichthys, by the type of feeding material used during the pre-experimental period. This does not hold for Caecobarbus, who shows a definite preference for the substrate in these conditions. It is remarkable that, in spite of the more rigid polarisation on the substrate shown by Caecobarbus, the preferential orientation to the lower level is not followed by an active exploratory behaviour as in Anoptichthys. This dissociation between substrate polarisation and exploratory behaviour is to be interpreted, once more, as a sign of deeper phyletic degeneration in the ethology of Caecobarbus. In Anoptichthys the effects of the group seem to favour the preferential reaction for the vertical level at which food is present, whereas in Caecobarbus , the presence of specific mates is rather inhibitory.</abstract>
<keywords>Alimentation, cave fish</keywords>
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<title>Observations on a darkness-bound Asellus of France: Proasellus racovitzai n.sp. (Crustacea Isopoda Asellota).</title>
<abstract>This paper reports the description of a new species of the genus Proasellus Dudich. Proasellus racovitzai n.sp. is widely depigmented. The eyes are reduced. It lives in the underground stream of the Goueil-di-Her cave system (Haute-Garonne, France). The species is an old, endemic form of the phyletic line of the modern epigean species P. meridianus (Racovitza). Chromosome number of the new species: 2n = 22.</abstract>
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<title>The fiftieth anniversary of the first speleological institute of the World.</title>
<abstract>Description of the activities carried out by the first speleological institute of the World, the Institutul de Spéologie "Emil Racovitza", founded in 1920 at Cluj in Romania.</abstract>
<keywords>Speleological Institute, research, Romania</keywords>
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<title>A new African species of the genus Stenasellus (Crustacea Isopoda Asellota) of the Niger basin.</title>
<abstract>The representatives of the genus Stenasellus (sensu lato) in Africa have been previously known from Cote d'Ivoire, bassin of the Congo and Somali. The new species of this genus was collected from the well in the town Sicascau (Mali). This species differs from all others in the structure of the carpopodites of pereopods II-IV which are enlarged and armed with multiple curved spines. This character shows a distinct sexual dimorphism. In all other features St. laticarpus sp.n. belongs to the group of St. gjorgjevici Rac. and shows the closest resemblance to St. africanus Monod. It is now preferable to conserve the unity of the genus Stenasellus (sensu lato). The validity of the African endemic genera Metastenasellus Magniez, Parastenasellus Magniez and Magniezia Lanza needs to be confirmed.</abstract>
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<title>Two new cavernicolous Stenasellidae of Central America: Mexistenasellus parzefalli n. sp. Et Mexistenasellus wilkensi n. sp. (Crustacea Isopoda Asellota).</title>
<abstract>Description of the females of two new species of the family Stenasellidae (anophthalmous and unpigmented Asellota from underground waters). They were found in a little cave of San-Luis Potosi state (Mexico).</abstract>
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<title>Concerning Stenasellus laticarpus Birstein (Crustacea Isopoda Asellota).</title>
<abstract>The species Stenasellus laticarpus Birstein is closely related to three west-African Stenasellidae, forming the genus Magniezia Lanza. It belongs to the same genus: Stenasellus laticarpus = Magniezia laticarpa (Birstein).</abstract>
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<title>A cavernicolous asellid of southern Spain: Proasellus solanasi n. sp. (Crustacea, Isopoda, Asellota).</title>
<abstract>Description of a new, unpigmented and eyeless species of the genus Proasellus Dudich, from an underground stream in the province of Malaga (Southern Spain). It belongs to the phyletic line which gave rise to the modem epigean water-slater Proasellus rneridianus (Racovitza).</abstract>
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<title>On the food and feeding habits of Lepidomysis longipes (Pillai and Mariamma) (Crustacea Mysidacea).</title>
<abstract>The amount of food available to the subterranean mysid, Lepidomysis longipes (Pillai & Mariamma, 1964) in its habitat has been calculated and analysed. Lepidomysis appears to feed mainly on decaying vegetable matter. Lepidomysis shows many modifications in its external morphology. Consequently, the mode of feeding has undergone some marked changes from that of its epigean relatives. L. longipes is a discontinuous feeder.
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<title>Optic regression in a subterranean Mysid (Crustacea, Mysidacea).</title>
<abstract>The eyes of the blind subterranean mysid, Lepidomysis longipes are stalked and paired in the embryonic condition. They fuse together in the adult and the optic ganglia are enclosed in a single eyeplate. The ganglia are arranged in the form of an arc on either side anterodorsal to the brain inside the single eyeplate.</abstract>
<keywords>Crustacea, Mysidacea, adaptation</keywords>
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<title>Campodeid Diplura from the caves of Pendjab (Simlacampa clayae).</title>
<abstract>Four new specimens of Simlacampa clayae Condé, found in two caves in Pundjab (India), give opportunity to improve the original diagnosis and to describe two males and one immature.</abstract>
<keywords>Insecta, Diplura, India</keywords>
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<title>The cavernicolous japygidae of the French fauna.</title>
<abstract>Twelve species of Japygids are cites from France. Six are known with certitude from caves. None of them shows any morphological modification which can be ascribed to cavernicolous life. All of them are found outside caves except Metaj. doderoi Silv. which is known from a unique female from Castel Mouly cave. To take into account the selection which seems to occur among the species, the term "subtroglophile" is proposed to include those which can be found in the caves.</abstract>
<keywords>Insecta, Diplura, France</keywords>
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<title>The migration of cavernicolous Trichoptera. Evidence from light traps.</title>
<abstract>The Trichoptera from the group "Stenophylax" are frequent in caves. Until now, following Jeannel's thought (1926), most authors believed that these animals were found in caves by hazard and were doomed to perish in them. With the use of a light trap it is now demonstrated that cavernicolous Trichoptera not only stay in caves during the entire summer, but also that during autumn (September-Oktober) they leave the caves to lay their eggs in the nearby rivers.</abstract>
<keywords>Insecta, Trichoptera, France</keywords>
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<title>Research on the nervous system of Hexaurus merkli J. Frivaldzsky (Coleoptera, Bathysciinae).</title>
<abstract>The central nervous system of the beetle Hexaurus merkli J. Frivaldzsky corresponds to the formulae 2+2 / 0. The relative proportion of the corpora pedunculata reaches 5.5% and that of the olfactive lobes 6.8% of the total mass of the upper-exophagus ganglion. The under-exophagus ganglion corresponds to 29.5% of the total mass of the head-ganglion. It is furthermore demonstrated both in the upper- and under-exophagus ganglion that neurosecretory cells exist. Corpora allata and corpora cardiaca are also present.</abstract>
<keywords>Coleoptera, Bathysciinae, nervous system, Bulgaria</keywords>
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<title>Note on Lepidoptera from Bulgarian caves.</title>
<abstract>This paper is a report on Lepidoptera collected in 1960 and 1970 in some caves of the Lakatnik region in the Stara Planina Mts. (Bulgaria). The following species were found: Digitivalva granitella (Tr.), D. pulicariae (Klim.), Thiphosa sabaudiata Dup. and Autophila limbata Stgr. Two species, D. pulicariae (Klim.) and A. limbata Stgr. are new for the cave-fauna and fauna of Bulgaria.</abstract>
<keywords>Insecta, Lepidoptera, Bulgaria</keywords>
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<title>Two new Monolistrinae (Crustacea, Isopoda) of underground waters of Croatia.</title>
<abstract>A new subspecies and a new species are described: Monolistra (Monolistra) caeca meridionalis nov. subspec. was found in three caves in the northern part of Croatia, Yougoslavia. It is distinguishable from the typical form principally by the thin, acuminate form of the protuberance of the protopodite of the IInd male peraeopod, by the endopodite of the Ist pleopod which bears 3-4 setae (1-2 in M. c. caeca), by the somewhat wider endopodite of the IIIrd pleopod and by the shorter, only slightly curved uropods. A sketch shows the situation of 6 newly discovered localities in northern Croatia, 3 of the typical form and three of the new subspecies. Microtistra sketi is the 6th species known of its genus and lives in a cave, in stagnant water of a periodic spring, tributary to the river Gacka in Croatia. The number (three pairs), and the length of the spines of the carapace and the pointedness of the epimers of the pereion are intermediate between those of the spiny forms living in Slovenia and the tubercular species M. pretneri Sket from Dalmatia and M. schottlaenderi (Stammer) from the vicinity of Trieste.</abstract>
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<title>Note on Lepidoptera from Bulgarian caves.</title>
<abstract>This paper is a report on Lepidoptera collected in 1960 in some caves of the Stara Planina Mountains (Bulgaria). In three caves in the environs of Lakatnik the following species were found: Acrolepia granitella Tr., Acrolepia pulicariae Klim., Autophila limbata Stgr., and Triphosa sabaudiata Dup. Two species (Acrolepia pulicariae Klim. and Autophila limbtia Stgr.) are new for both the cave fauna of Bulgaria and fauna of Bulgaria.</abstract>
<keywords>Insecta, Lepidoptera, Bulgaria</keywords>
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<title>The subterranean fauna associated with the blind palaemonid prawn Typhlocaris galilea Calman.</title>
<abstract>Exploration of the subterranean tract of the spring of En-Nur (at the North end of Lake Tiberias) by scuba diving and by use of new collecting methods, led to the discovery of a living community associated with the blind prawn Typhlocaris galilea. A rich growth of sulphur bacteria and of pigmentless Cyanophyceae from the trophic basis in this peculiar biotope. Representatives of three hypogeic crustacean orders have been found as well as some peculiar gastropods, nematods and oligocaets. The latter are the main food of Typhlocaris galilea.</abstract>
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<title>Four new Bathynella (Crustacea, Syncarida) of Romania; again on the "Dilemma Bathunella natans Vejd".</title>
<abstract>The paper presents the diagnosis of 4 new Bathynella species found in Romania: B. paranatans nov. sp., B. boteai nov. sp., B. motrensis nov. sp. and B. plesai nov. sp.; a discussion on B. cf. scythica Botosàneanu et Damian is also given. The morphological features which were used are the general and the fine structure of the genital pereiopode of the male (Pl. 5 8), the chaetotaxy of the maxillula, maxilla, thoracic appendages, uropods and furca. The presence of the distal (coxal) epipodite on the first pereiopod in E. paranatans nov. sp., distinguishes this species from the others (Pl. 1 4). The true taxonomical value of the VIIIth pereiopod of the male is pointed out, which - at least in the case of these species - shows, by its general structure, the relationships, the heterogeneous morphology of the anterior plate (Pl. 5- 8, a), marking the speciation.</abstract>
<keywords>Crustacea, Syncarida, Romania</keywords>
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<title>A new cave amphipod Crustacea from Japan.</title>
<abstract>A new eyeless Amphipod Crustacea 5 mm long was found in Himisé-dò Cave in Tokushima Prefecture, Shikoku. The inner ramus of its third uropod is nearly as long as the unijointed outer ramus. The accessory flagellum of the first antenna consists only of a single joint. The first maxilla is distinctive in its small palp which does not extend beyond the apical margin of the outer plate and bears only an apical seta. In these characteristic features the present form is different from any known species of the genera of the Crangonyx and Hadzia groups and seems to belong to a new species, on the basis of which the new genus Awacaris is created.</abstract>
<keywords>Crustacea, Amphipoda, Japan</keywords>
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<title>Food and feeding habits of the troglobitic Carabid Beetle Rhadine subterranea</title>
<abstract>Food and feeding habits of a population of the troglobitic carabid beetle Rhadine subterranea inhabiting Beck's Ranch Cave, Williamson Co., Texas, were investigated. Observational and experimental data demonstrate that a primary food source of this beetle is the eggs of cave crickets (Ceuthophilus spp.). The beetles locate eggs by selective digging into substrata where cave crickets have oviposited. Chemoreception and mechanoreception are important in the location of oviposition sites.</abstract>
<keywords>Insecta, Coleoptera, Carabidae, United States of America, ecology</keywords>
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<title>Distribution and dispersion of the troglobitic Carabid Beetle Rhadine subterranea</title>
<abstract>Intracave distribution and dispersion patterns within a population of the troglobitic carabid beetle Rhadine subterranea were studied. Distribution was markedly heterogeneous, the beetles being almost entirely restricted to substrata of deep, uncompacted silt. Dispersion of the beetles on the silt substrata did not depart from random expectation. It is shown, however, that this is a functionally emergent pattern resulting from an intrasex repulsion related to feeding which tends to produce regularity counterbalanced by an intersex attraction related to reproduction which tends to produce contagion.</abstract>
<keywords>Insecta, Coleoptera, Carabidae, United States of America</keywords>
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<title>Preference responses and tolerances of the troglobitic Carabid Beetle, Rhadine subterranea.</title>
<abstract>Studies were made on the preference responses and tolerances of the troglobitic carabid beetle Rhadine subterranea to light, temperature, and relative humidity. The beetles are weakly photonegative and appear to have a strong preference far atmospheres of low saturation deficit. Both these responses seem to be orthokineses. They have a strongly developed temperature sense, and their temperature preferendum shifts seasonally. This response seems to be a klinotaxis. They are neither strongly stenothermal nor stenohygrobic. The preference responses, especially that of temperature, are probably mechanisms tending to restrict the beetles to their habitat. The tolerance data suggest that the epigeum could, at times, be used as a dispersal route.</abstract>
<keywords>Insecta, Coleoptera, Carabidae, United States of America</keywords>
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<to>304</to>
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<title>Stenasellus skopljensis thermalis ssp. n. (Crustacea, Isopoda) of a hot spring in Bosnia.</title>
<abstract>The new subspecies Stenasellus skopljensis thermalis, from Banja Luka (Bosnie, Yugoslavia) is described. From the ecological point of view this form differs from the others because it inhabits underground waters of elevated temperature (240°C). Another constantly abundant species, St. hungaricus thermalis Mestrov, also occurs in Yugoslavia under the same ecological conditions, in the warm springs of Podsused near Zagreb. This indicates that these underground waters at elevated temperature are not accidental but preferred habitats for these forms, and confirms once again that thermal waters of this type are the biotopes-refuges in which certain relic forms are retained.</abstract>
<keywords>Crustacea, Isopoda, thermal spring, Bosnia</keywords>
<from>305</from>
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<title>Studies on the Biology of Oligochaetes from the phreatic water of an exposeds gravel bed.</title>
<abstract>More than twenty species of oligochaeta belonging to the families Enchytraeidae, Naididae, Tubificidae and Lumbriculidae were found in the phreatic water of the river bank gravels. Psammoryctes barbatus, Rhyacodrilus coccineus and Styludrilus heringianus were found throughout the year, attaining maturity in the spring. These three species may be univoltine under these conditions. The family Naididae and a few species of Tubificidae show well marked seasons of abundance, chiefly in the summer and autumn.</abstract>
<keywords>Oligochaeta, phreatic, United Kingdom, Great Britain</keywords>
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<title>A new species of the subterranean Amphipod genus Allocrangonyx (Gammaridae), with a redescription of the genus and the remarks on its zoogeography.</title>
<abstract>The systematics of the North American, subterranean amphipod genus Allocrangonyx are revised and two species are recognized - A. pellucidus (Mackin) and A. hubrichti, new species. Allocrangonyx is critically compared with the European genus Niphargus and several endemic North American genera of the Crangonyx group. Because of its unique morphological position, Allocrangonyx is removed from the Crangonyx group and placed in the newly designated Allocrangonyx group. Some factors believed to have influenced speciation within the genus are discussed in some detail.</abstract>
<keywords>Crustacea, Gammaridae, United States of America</keywords>
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<title>Duration of the molts and intermolts of adults and the life span of Stenasellus virei Dollfus (troglobe Asellote Crustacean).</title>
<abstract>The author's observations of numerous cases of molting in the hypogean asellid Stenasellus virei Dollfus, 1897 appear to show that the phenomenon occurs in two steps. The loss of the anterior exuvium is separated from that of the posterior exuvium by a period of 8 to 16 days in adults from cavernicolous populations of Stenasellus virei in the Pyrenees and Cantabrian Alps. The intermolts last from 9 to 18 months for the same individuals. One must allow, for this species, a minimun life span of 10 years. Values of the same order of magnitude are anticipated for the two other Pyrenees species, Stenasellus breuili Racovitza, 1924 and Stenasellus builli Remy, 1949. These observations agree with those previously made on other cavernicolous peracarid crustaceans, such as Caecosphaeroma burgundum Dollfus and Niphargus virei Chevreux, by Daum (1954), Husson (1959) and Ginet (1960).</abstract>
<keywords>Ecology, Crustacea, Isopoda, France</keywords>
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<title>The terrestrian Isopoda of the caves from Eregli to the Black Sea.</title>
<abstract>Dr Klaus Dobat (Tubingen) and Madame Dobat have collected the following terrestrial Isopods from caves of Eregli on the coasts of the Black Sea, North of Turkey: 1) Ligidium (Ligidium) assimile sp. nov., trogloxene widely distributed in the northern Anatolian territories; 2) Chasmatoniscus oculatus gen. et sp. nov., troglophile; 3) Trichoniscus (Trichoniscus) heracleotis sp. nov., troglobic; 4) Cylisticus (Platycylisticus) dobati subgen. et sp. nov., troglophile; 5) Cylisticus (Cylisticus) mechthildae sp. nov., troglobic. The author gives the descriptions together with figures of all these new Oniscoidea in this paper, M. Dobat describes the caves of Eregli and lists the animals herein found.</abstract>
<keywords>Turkey, Isopoda</keywords>
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<title>Contribution to the study of Mycetophilidae of Romanian caves with the description of two new species.</title>
<abstract>The study of Mycetophilidae collected in Romanian caves during these past years enables us to add 24 species to those already known from the country, among which two are new for science: Exechia dumitrescui n. sp. and Rhymosia matilei n. sp. Sixteen species belong to the Genus Macrocera, Zelmira, Leia, Exechia, Rhymosia, Allodia, Mycetophila, Zygomyia and Deolpsis have never been mentioned before for the subterranean environment. Some of these species are extremely rare: Exechia januari Lundst., E. parallela Edw., Rhymosia tarnani Dzeid., Phronia kowarzi Dzicd., Mycetophila rudis Winn.</abstract>
<keywords>Insecta, Diptera, Romania</keywords>
<from>387</from>
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<title>The living environment of Stenasellus virei Dollfus, 1897 (Asellote troglobe Crustacean): preliminary results.</title>
<abstract>Stenasellus virei is now known from 77 localities (caves, phreatic waters and underflow of some rivers) of the eastern Aquitanian basin, central and eastern Pyrenees, and of Spain. A classification of the different biotopes of the species is attempted herein, and some of their characteristics are summarily described. This cavernicolous species can now be viewed in a new light, as much ecological as systematic or biogeographic.</abstract>
<keywords>Crustacea, Isopoda, environment</keywords>
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<title>Occurrence of a new Genus of troglobitic Nicoletiidae (Ins. Thysanura) in Mexico.</title>
<abstract>The author examines two specimens of Nicoletia texensis Ulrich from the Quintero caves, Tamaulipas (Mexico). Among the most important characteristics of this species the exaggerated lengthening of the legs, cerci, antennae and other appendages has to be mentioned. Among Diplura, nearly the same degree of lengtheneing of the appendages may be observed in Plusiocampa dargilani (Moniez), a troglobitic Campodeidae of France. The structure of the median claw, completely different form other Nicoletia, probably will allow the institution of a new Genus for N. texensis.</abstract>
<keywords>Insecta, Thysanura, Mexico</keywords>
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<title>Trichoniscoides saeroeensis Lohmander, an Isopod Crustacean new to the British fauna.</title>
<abstract>The terrestial isopod Trichoniscoides saeroeensis Lohmander, new to the British fauna, is recorded fram the dark zone of disused mines in Lancashire; the paper includes notes on its systematic position and certain morphological characters as well as its affinities. The origin and geographical distribution of the species, together with that of the other two species recorded in England [T. albidus (Budde-Lund) and T. sarsi Patience], is discussed.</abstract>
<keywords>Crustacea, Isopoda, United Kingdom, Great Britain</keywords>
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<title>Contribution to the knowledge on cavernicolous Antroleocosomids (Diplopoda, Ascospermophora).</title>
<abstract>The family of the Antroleucosomidae is known from the Mediterranean region. In this paper the author describes the new genus Dacosoma with the species D. motasi of caves of the southern Carpathians together with two new species of Bulgarosoma, B. Ocellatum n. sp. of the caves of Mount Banat and B. meridionalis of the cave on Rhodope mountains. A new and complete description is also given for Antroleucosoma banaticum Verh. 1899 and B. bureschi Verh. 1926 based on the study of material coming from the type localities.</abstract>
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<title>Study of the behaviour of Man in the subterranean environment (results of 5 experiments).</title>
<abstract>In the course of live specially planned expeditions, the author studied the behaviour of man in the very special environment of caves. He explains the tests employed. The results obtained suggest that the human organism seems able to adapt to this uncommon environment but exhibits lethargy and reduced activity.</abstract>
<keywords>Adaptation, Man, France</keywords>
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<title>An analytical study of air circulation in caves</title>
<abstract>The different types of air circulation in caves are classified according to the origin of the circulation, as either static or dynamic. In a cave static causes are: (a) differences between inside and outside air density owing to: (i) air temperature; (ii) relative humidity; (iii) chemical composition; (b) atmospheric pressure variation. Dynamic causes are: (a) moving fluids: (i) inside the cave; (ii) outside the cave. Whenever possible the above mentioned phenomena have been considered from a mathematical point of view in order to obtain equations relating the different quantities involved.</abstract>
<keywords>Meteorology, Cave, Air, circulation</keywords>

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<title>On a new subspecies of Niphargus jovanovici Karaman (Crustacea, Amphipoda, Gammaridae) of Dijon, France.</title>
<abstract>The new subspecies, Niphargus jovanovici burgundus n.subsp., is described from a well at Dijon, France. The principal diagnostic characters are given and a comparison with other known subspecies of N. jovanovici is made. Two groups of subspecies in N. jovanovici are distinguished and some critical remarks on probable affinities of N. jovanovici with other species of Niphargus are made.</abstract>
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<title>On a new species of Earthworm from a Mexican cave.</title>
<abstract>Eodrilus mexicanus of the megadrile oligochaete family Acanthodrilidae is described along with some data as to development, regeneration and abnormality. Relationships with its American congeners, often inadequately characterized, are discussed and the present state of Eodrilus systematics is criticised. E. mexicanus seems likely to be of unusual interest as the second species of earthworm to have ovaries in segment xii.</abstract>
<keywords>Oligochaeta, Mexico</keywords>
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<title>Report on the International Conference of Speleology and Karstologie at Istanbul (24 Sept.-14 Okt. 1964).</title>
<abstract>Arranged by geologist Dr. Temucin Aygen, the International Conference of Speleology and Karstology at Istanbul, with the participation of about twenty foreign scholars, opened first at Beyazit de Stamboul University. For three days papers and discussions enlivened the sessions, broken by tours around the Bosporus. During the following two weeks the members of the Conference took a field trip across Anatolia, through Ankara, Konya, Mersin, Antalya, Burdur, Izmir, Bursa, and Istanbul. They thus had the opportunity to investigate the principal karstic phenomena of Turkey - the Konya obrouks, travertines of' Yerkòpru and Antalya, caves of the Mersin region, vauclusian springs of Irviz and Manavgat, and so forth. The interest of these occurrences of Anatolian karst is unquestionable - in addition to the scientific problems they pose, they represent a great economic value either as tourist centres or as producers of electric energy and sources of water for irrigation.</abstract>
<keywords>International Congress of Speleology, Turkey</keywords>
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<title>On living troglobes in the waters of an Iron Mine in Lorraine.</title>
<abstract>Two explorations of the galleries of the Orne-Pauline iron mine at Moyeuvre-Grande (Moselle), made one year apart, resulted in the collection on each occasion of varied and abundant material (5 spp. of peracarid crustaceans and a worm) of aquatic troglobites: 3 spp. of Niphargus, one of which is new to Lorraine (N. kochianus kochianus), 2 spp. of isopods, Asellus cavaticus and Caecosphaeroma burgundum (for which this is the northernmost locality), and finally a local form of Dendrocoelides collini.</abstract>
<keywords>Crustacea, Amphipoda, Isopoda, Planaria, Mine water</keywords>
<from>89</from>
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<title>On some cave Collembola of Romania</title>
<abstract>An important collection of Collembola from Romania contained six species. One of them is new - Onychiurus orghidani n.sp. found in one cave of Oltenia. The presence of Onychiurus boldorii Denis in Romania is reported for the first time, and the discovery of a large number of Beckerella spelaea Ionesco made it possible to place this species in the genus Xenylla. Finally, additions are made to the known geographic distributions of Mesachorutes ojcoviensis Stach and Lepidocyrtus serbicus Denis.</abstract>
<keywords>Insecta, Collembola, Romania</keywords>
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<title>Ecology, systematics and distribution of two sympatric in North-Germany living Bathynella species (Crustacea, Syncarida).</title>
<abstract>The sympatric occurrence of two bathynellids previously considered races of Bathynella natans - natans and stammeri - is evaluated as a natural ecological-genetic experiment. Since no hybrids appear in mixed populations, these forms are proven to be full species: Bathynella natans Vejdovsky and Bathynella stammeri (Jakobi). Besides the form of the mandibles, which until now was the only taxonomically useful diagnostic character in the genus Bathynella, 7 additional, suitably applicable morphological characters have been found (Table 3). The Bathynella biotope investigated is assigned to the "eustygopsammal" subterranean life province (Husmann 1966), which is associated with the "Parastenocaris-Bathynella" biocoenosis (Husmann 1962). This particular biocoenosis is evidently resistant to organic pollution of ground water. The sympatric existence of Bathynella natans and B.stammeri can be explained by consideration of the geo-limnological developmental history of the interstitial zone of the North German low plain. Sands and gravels were widely deposited in the North German Basin by northward-retreating glaciers, creating microcavernous living space and passages for the interstitial fauna. This microfauna could find passages in layers of sand under and along the northward-flowing streams. Primitive Ice-Age streams (,,Urstromtàler" of Keilhack) formed east-to-west cross-connections between the south-north distributional corridors. The great geographical expansion of the tributary river courses which reached the north German plain before, during, and after the Ice Age suggests that ground water habitats were temporarily separated and later rejoined by orogenic movements of the earth's surface. Such an orogenically caused, geomorphological isolation lasting for a sufficiently long geological period could have led to the result that species, originating in isolation from the same phylogenetic stock, subsequently were brought together again in the same biotope. This is particularly true for bathynellids, which as archaic types (Lebensformtypen) of the ancient, extreme "mesopsammal" biotope (Remane) are quite likely to have become sympatric in such a manner.</abstract>
<keywords>Crustacea, Syncarida, Germany</keywords>
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<title>Ecological studies in the Mamoth Cave System of Kentucky. I. The Biota.</title>
<abstract>The Mammoth Cave system includes more than 175 kilometers of explored passages in Mammoth Cave National Park, Kentucky. Although biologists have explored the caves intermittently since 1822, the inventory of living organisms in the system is still incomplete. The present study lists approximately 200 species of animals, 67 species of algae, 27 species of fungi, and 7 species of twilight-zone bryophytes. The fauna is composed of 22% troglobites, 36% troglophiles, 22% trogloxenes, and 20% accidentals, and includes protozoans, sponges, triclads, nematodes, nematomorphs, rotifers, oligochaetes, gastropods, cladocerans, copepods, ostracods, isopods, amphipods, decapods, pseudoscorpions, opilionids, spiders, mites and ticks, tardigrades, millipedes, centipedes, collembolans, diplurans, thysanurans, cave crickets, hemipterans, psocids, moths, flies, fleas, beetles, fishes, amphibians, birds, and mammals. The Mammoth Cave community has evolved throughout the Pleistocene concomitantly with development of the cave system. The troglobitic fauna is derived from 4 sources: (1) troglobite speciation in situ in the system itself; (2) dispersal along a north Pennyroyal plateau corridor; (3) dispersal along a south Pennyroyal plateau corridor; and (4) dispersal across the southwest slope of the Cumberland saddle merokarst.</abstract>
<keywords>Ecology, cave fauna, United States of America</keywords>
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<title>Quartzite Karst in Southeastern Venezuela</title>
<abstract>Minor weathering forms on the Roraima Quartzite in the Carrao River Basin of Southeastern Venezuela have the appearance of the karren that form on limestone surfaces in karst terrains. Climatological and chemical evidence indicates that these forms were generated by a solutional mechanism and that this area thus exhibits a minor karst topography on quartzite.</abstract>
<keywords>Speleogenesis, Quartzite, Venezuela</keywords>
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<title>Geographic distribution and validity of the troglobe species Asellus lusitanicus Frade (Asellote Crustacean).</title>
<abstract>The troglobitic Asellid Asellus lusitanicus Frade (1938) is now known from three caves of the Serra de Aire (Central Portugal). It seems to be a good eyeless species of the "coxalis" group.</abstract>
<keywords>Crustacea, Isopoda, Portugal</keywords>
<from>315</from>
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<title>The cavernicolous Mycetophilidae (Diptera) of the biospeleological collection (IV-VIII series of "visited caves").</title>
<abstract>Study of the Mycetophilidae of the Biospeologica collection (Series IV te VIII of "Grottes visitées" was the objective of the present study. Thirty species have been identified, including Exechia peyerimhoffi n. sp. and Rhymosia pseudocretensis n. sp. The cave fauna contains several rare species - Exechia pollicata Edw., E. unguiculata Lundst., and Rhymosia cretensis Lundst. The ovipositors of Exechia coremura Edw. and E. landrocki Lundst. are figured for the first time.</abstract>
<keywords>Insecta, Diptera, Romania</keywords>
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<title>On the faculty of absorption of coloured substances by the cuticle of Caecospaeroma burgundum Dollfus, Isopod Crustacean of underground waters.</title>
<abstract>The discovery, in certain subterranean waters, of "pigmented," brown or black Caecosphaeroma burgundum, led to the systematic study of the action of pigmented substances on these crustaceans. The results of these experiments demonstrate that the colorations thus obtained or observed in nature are due to the agglutination of coloured substances on the surface of the carapace and, in certain cases, to an impregnation of the cuticle itself.</abstract>
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<title>On the knowledge of Mammal fauna of the Banat Caves (Romania).</title>
<abstract>The authors assembled from about 70 caves a rich collection of osteological material and specimens of living or fossil mammals. A list of the caves is given with an enumeration of the identiied species for each cave. Under each species the caves which supplied the material are listed. This is followed by an inventory of the osteological material and by observations on the living animals (especially bats). Fifty-three mammal species (fossil and living) were accurately determined (14 carnivores, 6 artiodactyls, 1 lagomorph, 10 rodents, 3 insectivores, and 19 bats).</abstract>
<keywords>Mammalia, palaeontology, biospeleology, Romania</keywords>
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<to>353</to>
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<title>Two new Halacariens of Israel Limnohalacarus capernaumi n. sp. And Lohmannella heptapegoni n. sp.</title>
<abstract>Two new species of Halacarinae of a thermal slightly brackish spring near the Tiberiade lake in Israel are reported. Limnohalacaras capernaumi n. sp. Has certain characteristics typical of other species of the Genus, but is clearly distinguished by proper elements. Lohmannell heptapegoni n. sp. resembles Lohmannella stammeri Viets, of which it is distinguished by the structure of the dorsal plates, the palp and the morphology of the genital apparatus. </abstract>
<keywords>Arachnida, Acarida, Israel</keywords>
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<title>Neobisium (Roncobisium) allodentatum n. sg., n. sp. of Neobisid pseudoscorpion (Arachnida) living in a cave of the Department of Saone-et-Loire, France.</title>
<abstract>Neobisium (Roncobisium) allodentatum, a species inhabiting a cave in Saone-et-Loire, France, belongs to a new subgenus of Neobisium of which the essential characters are the possession of accessory teeth on the chelae (fig. 14) and a relative position of trichobothria eb and esb (fig. 8) recalling that of the species of Roncus. A determination key fixes the position of this new subgenus with respect to the four other known subgenera of Neobisium.</abstract>
<keywords>Arachnida, Pseudoscorpionida, France</keywords>
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<title>Underground solution canyons in the Central Kentucky karst, U.S.A.</title>
<abstract>Solution canyons are underground voids 1 to 15 + meters wide, 3 to 45 + meters high, and 30 to 300 + meters long. Floors are stepped, ceilings level. Size increases downstream. Their course is sinuous, with some angularity. They occur parallel to and directly under or slightly offset from the thalwegs of re-entrant valleys tributary to major karst valleys. A section across a re-entrant and underlying solution canyon shows a rough hour-glass shape. Solution canyons are related genetically to solutional vertical shafts, forming where removal of the impermeable sandstone caprock permits the vertical descent of water through jointed limestone. Surface runoff concentrates along re-entrant thalwegs where a largo quantity of water goes underground. This water, plus subsurface water flowing over the caprock breached by the valleys, follows the easiest route to baselevel down major vertical joints oriented parallel to the thalwegs. Solution by water seeping down these joint planes forms solution canyons.</abstract>
<keywords>Speleogenesis, canyons, United States of America</keywords>
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<title>The Lampen-Moss flora of the BeatusHohle and comparison with other European caves.</title>
<abstract>The Bryological flora on the lamps of the St- Beatus Hohle is analysed. A statistic comparison of lampenflora from other 18 European caves shows the composition and the type of this flora is related to the humidity and to the difference in substratum. Ten species can be referred to as typical flora of show caves. </abstract>
<keywords>Show cave, lampenflora, environmental impact, Switzerland</keywords>
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<title>Further investigations into Bacterial and Algal populations of caves in South Wales.</title>
<abstract>Some physical data collected over a period of a year in seven locations of the Ogof Ffynnon Ddu cave system in South Wales are reported, including humidity, air and water temperature, pH of the water, as well as the organic oxygen demand of the water. It is shown that seasonal variations in the physical constant in this particular cave system are not well marked. Algae and bacteria were isolated from the soil samples and from calcareous deposits. A total of 30 algal species, of which 13 belong to the Cyanophyta, 22 to the Chlorophyta, and 7 to the Chrysophyta~Baccilariophyceae were found. Thirty-eight heterotrophic and 7 autotrophic bacteria were isolated. The thin films on water surfaces, besides diatoms, contained several flagellates and some ostracods, while some protozoa were found associated with the bacteria and algae in the soft calcite deposits.</abstract>
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<title>Summary of the results obtained during a preliminary investigation into the bacterial and botanical flora of caves in South Wales.</title>
<abstract>The results of an investigation into the bacterial and botanical flora of South Welsh caves are presented in tabular form. Bacterial counts and species isolated from the caves both from soil and water samples as well as from the air, also the macroscopic plants found in the photic zone are enumerated.</abstract>
<keywords>Bacteria, Algae, United Kingdom, Great Britain</keywords>
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<title>A psychrophilic yeast from Mammoth Cave, Kentucky.</title>
<abstract>Samples collected in Mammoth Cave, Kentucky, revealed the presence of a psychrophilic yeast, tentatively identified as a strain of Candida albicans. The yeast is saprophytic on dead animal tissues and exhibits a pale yellow colour when growing in the cave. In vitro, the yeast grows poorly at 37°C. and well at 130 and 200, but loses its pigmentation. It is non-pathogenic in rabbits but appears to show low-grade parasitism in frogs.</abstract>
<keywords>Mycetes, Yeast, United States of America</keywords>
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<title>A new species of Gomphonema (Bacillariophyta) from Mammoth cave, Kentucky.</title>
<abstract>In some materials collected from Mammoth Cave, Kentucky, a diatom was found which could not be identified with any known species. A taxonomic description of Gomphonema hotchkissii nov. spec. is given.</abstract>
<keywords>Bacillariophyta, United States of America</keywords>
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<title>Bioluminescence in Melosira varians Ag.</title>

<abstract>Bluish green bioluminescence in a diatom, Melosira varians Ag. growing in an abandoned tin mine in Cornwall was observed. Upon microscopic examination the chloroplasts of the algae were found to be very pale but no other feature was seen which could be correlated with the luminescence.</abstract>
<keywords>Bacillariophyta, diatom, luminescence</keywords>
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<title>The ecological classification of cave and fissure water in the underground water habitats.</title>
<abstract>Bodies of waters in caves and in crevices of rocks are distinguished from the other subsoil water ecosystems ("eustygon", "stygorhithron", "stygopotamon") under the names "troglostygon" and "petrostygon". The colonisation of subsoil water biotopes involves a fundamental principle which controls the development of the main biotopes for the stygobiont undergroundwater organisms. According to this ecological rule, which is described in detail and formulated, the several interstitial biotopes (for example "eustygopsammal," "rhithrostygopsammal," "potamostygopsephal") are to be considered as the real biotopes of the stygobiont subsoil water organisms; waters in caves, on the contrary, are secondary biotopes of these animals. Caves which contain marine water are described as ecostystem "Thalassotroglon" in their relation to "limnotroglon" (= "stygotroglon"). In this why the contact between "limnospeology" and "thalassospeology" is established, and the limnic and marine microcavernal biotopes - "thalassopsammal" and "thalassopsephal" - are also taken in consideration. "Limnospeology" and "thalassospeology" as limnological and thalassological investigations of subsoil water are characterized as biological fields of work, which serve for the investigation of an ecological unit.</abstract>
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<title>Analysis of the feeding behaviour of the blind cavernicolous fish Anoptichthys Gen. and hybrids F1 (Astyanax x Anoptichthys) and F2.</title>
<abstract>The feeding behaviour of the blind cave fish Anoptichthys is characterised by two phases, an initial short chemioreceptic one and second one in which the fish explores the bottom systematically for a longer period. The whole process last approximately 30 seconds, both in adults as in youngsters.</abstract>
<keywords>Pisces, feeding, ecology</keywords>
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<title>Discovery of fluorescent substances in the yellow organ of Caecospaeroma burgundum Dollfus, Isopod Crustacean of underground waters.</title>
<abstract>Chromatographic analysis of the yellow organs of the fresh-water Isopod Crustacean Caecosphaeroma burgundum Dollfus revealed, through observation of the chromatograms in ultraviolet light, the occurrence of both absorbing and fluorescent substances. Among the latter, only isoxanthopterin has been identified. The yellow pigment, which probably has a pteridine nucleus, could not be identified as a known compound and will be the object of later investigations.</abstract>
<keywords>Crustacea, Isopoda, fluorescence</keywords>
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<title>Algal growth experiments in the Baradla cave at Aggletek (Biospeleologica hungarica XXI).</title>
<abstract>The author kept 108 algal strains (Cyanophyta 53, Chlorophyta 35, Chrysophyta 20), of axenic cultures from the Kol-Algotheca in the Botanical Division of the Hungarian National Sciences Museum in the Baradla Cave, at Aggletek (Hungary) in darkness for 204-420 days under different environmental conditions. The experiments have proven that several algal strains can tolerate well the complete absence of light. Furthermore, that

some algal strains show intensive development even under such conditions. These axenic cultures kept in the cave in metal boxes on inorganic medium have shown that the energy source used by these green coloured algae is not some by-product of chemotrophic bacteria, nor is it available organic material, but that it must be some kind of radiation which is able to penetrate even the metal boxes. The ability to adapt to the conditions existing in a cave is not a general characteristic of algal species, but is the capability of individual algal strains within that species. Most probably the algae living in the caves are aerophytes, terrestrial forms, and also some belonging to the edaphon. The cells were found to be smaller in the algae kept in the cave, there was almost no starch deposition in the cells, the pyrenoids were barely discernible, but the development of carotenes was more intense. Whether there are specific cave dwelling algal strains must be determined by future algological research conducted in caves. The composition of the algal floras of the caves may be equally dependent upon the chemical and physical characteristics of the biotope, as is the case in every other biotope.</abstract>
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<title>Homage to the memory of René Jeannel.</title>
<abstract>In this paper the author evokes the principal stages of activity in the life of the great French speleologist, René Jeannel. He records the admiration and respect attributed to Jeannel in the field of entomology. Emphasis is given to the work of Jeannel at Cluj, Romania, carried on with E. G. Racovitza and P. A. Chappuis. A summary is made of Jeannel's many travels. The significant conclusions of these are presented as well as an insight into the character of this prominent French naturalist.</abstract>
<keywords>Biospeleology, history</keywords>
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<title>The Crustaceans of the reservoir of the Fontaine des Suisses at Dijon.</title>
<abstract>Inventory of the Crustaceans collected in the basin of the Fonatine des Suisses at Dijon. The Copepoda are represented by 5 species: Macrocyclops albidits, Eucyclops serrulatus in two slightly different forms, Eucyclops serrulatus var. mihi, Acanthocyclops venustus, Acanthocyclops vernalis and Acanthocyclops robustus. The coexistence of these two last forms in this very tiny environment makes it probable that we have here to do with two distinct species. A determination key is given for the Genus Acanthocyclops. Amphipoda are represented by Niphargus virei and especially Niphargus kochianus kochianus of which more than 100 samples have been collected. Of this last small species some considerations regarding geography, the laying of eggs, sexual dimorphism and closely related species are also given.</abstract>
<keywords>Crustacea, Copepoda, Amphipoda, France</keywords>
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<title>A new species of Niphargus (Gammaridae, Amphipoda) of Bulgaria.</title>
<abstract>The author describes a new species, Niphargus toplicensis n. sp., of the spring «Toplitzata» near the village of Mussomischta (district of Goze Delcev). N. toplicensis n. sp. Is closely related to N. aquilex moldacicus Dobreanu, Manolache and Puscariu, 1953, N. smederevanus Karaman, 1950, N. anatolicus Karaman, 1950, N. pancici Karaman, 1929, N. pancici clkanovi Karaman, 1959 but differs for several characters (a greater number of setae on the internal lobe of maxilla I, the coxal plates longer than their width, different armour of the telson and of the uropods I etc.).</abstract>
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<title>Description of a new trap for Niphargus.</title>

<abstract>The description of a trap permitting the capture of Niphargus in deep waters is given. No handling or surveillance is necessary. The amphipods are caught automatically.</abstract>
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<title>Hurleya kalamundae n. g. n. sp. (Amphipoda, Gammaridae) from subterranean waters of Western Australia.</title>
<abstract>A new genus and species of freshwater Gammaridae (Amphipoda) from subterranean waters of Western Australia is described, Hurleya kalamundae n. g. n. sp. The genus apparently represents an aberrant line of the Crangonyx group of Gammaridae.</abstract>
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<title>Subterranean Hydracarida of Bulgaria. I.</title>
<abstract>A new species of Mideopsis (Nudomideopsis) motasi n. sp. coming from a well near Gorni-Ciflik, close to Belogradchik in NW Bulgaria, is described. For the structure of the palp it is distinguished from the other subterranean European species Mideopsis (Mideopsis (Nudomideopsis) longipalpis Szalay and Mideopsis (Nudomideopsis) fonticola Tanasachi et Orghidan and resembles some Japonese Mideopsis species found also in wells.</abstract>
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<title>Cavernicolous Diptera collected in Bulgaria.</title>
<abstract>We present the list of the Limnobiidae, Mycetophilidae, Anthomyidae and Helomyzidae species collected in the caves of Bulgaria, most part on occasion of the third international speleological expedition.</abstract>
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<title>On the Bathysciinae of Catalogna (Col. Catopidae).</title>
<abstract>Elencation of Speonomus and Speophilus (col. Catopidae) collected by different speleologists in relation with the Museum of Zoology of Barcellona in caves where no beetles had been found yet, completing the knowledge on cave Coleoptera on the Spanish side of the Pyrenees. The paper also contains the description of two new species (Speonomus aurouxi and Speophilus subilsi), and a short comment on Troglocharinus impelletierii Espaù. described as a race of hustachei Jeann., but different from this species by several characters that distinguish it very well, justifying its geographical isolation.</abstract>
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<title>Larval development of a cavernicolous Serpulid Marifugia cavatica Absolon et Hrabe (Polychaeta, Sedentaria).</title>
<abstract>Among material coming from Herzegovina some living trochoporae of the cave Serpulid Marifugia cavatica have been found. In the laboratory of the Biology Institute of Ljubljana the further development passing stages of metatrochophore and nectochaeta have been observed. The constitution of the trochophore is typical. The nectochaeta possesses three metamera and each of these has only one pair of setae. The nectochaeta once it gets attached to the bottom the neck and beginning of tentacles are beginning to develop. The tube, three paires of simple tentacles and the opercula are formed in further stages. For the period in which the tube is short and completely adherent, the animal reposes on the substratum with its dorsal side.
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<title>Notulae Orthopterologicae XXI The Dolichopoda of France and Spain.</title>
<abstract>parallelism at great distance are but apparent exceptions: for instance Dolichopoda baccettii and Dolichopoda graeca. As when there are no conditions of insularity causing a particularly remarkable differentiation specific to many entities the geographic barriers among the elements of each group are often very scanty, we can consider possible that after the two great immigrations from the East, by which two suhgenera, one after the other, were imported during the Tertiary period (Baccetti, 1960), the phenomena of speciation were largely favoured, in the Quaternary, by the acquisition of troglophilia which has greatly hindered any possible migration.</abstract>
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<title>Remarks on the species Asellus cavaticus Leydig (Hypogean Isopod Crustacea) and description of new sebspecies.</title>
<abstract>In Europe, Asellus cavaticus Leydig until 1963 was the only species known of a phyletic line that extended from Britain to Austria. Until the works of Racovitza in 1919 all the Asellus of the underground world were reported to this species, first known subterranean Asellus. The taxonomic criteria of Racovitza allowed to determine many subspecies. Later on Chappuis refuses to give names to the different encountered forms. Taking as type forms the individuals of the grotte de Sainte-Reine (Meurthe-et-Moselle), considered very similar to the original type forms, we think to be able to define a new subspecies puteanus for the Asellus of a well in Beaujolais. This form differs from cavaticus f. typ. for the form of the male copulation organ, the male pleopod and the number of spines on the dactlya and pereiopodes. A more detailed description of the subspecies valdensis Chappuis is given based on specimens from a cave of the Plateau of Crémieu (Isère).</abstract>
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<title>The genus Arrhopalites (Collembola, Sminthuridae) in the United States and Canada.</title>
<abstract>The members of the genus Arrhopalites (Collembola Sminthuridae) found in the U.S. and Canada are described and illustrated. These include six previously described forms and seven new species: A. altus, A. clarus, A. bimus, A. bellingeri, A. dubius, A. hirtus, and A. amarus. Two forms known only from incomplete specimens are described, but not named. Nine of the species are found in caves, but only four of these are at present unknown from surface localities. The characteristics of the genus are described and discussed, and the genus Pseudarrhopalites Stach is placed in synonymy with Arrhopalites. New methods are developed for formulizing the structure of the female subanal appendage, and identifying the cephalic spines and setae.</abstract>
<keywords>Insecta, Collembola, Sminthuridae, United States of America, Canada</keywords>
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<to>73</to>
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<title>A preliminary study on the effects of organic pollution of banners Corner Cave, Virginia.</title>
<abstract>Four pools were observed in Banners Corner Cave, Russell County, Virginia, over a 28 month period from November, 1961, to February, 1964. Three of these pools were visibly polluted with sewage which had seeped into the cave from septic tanks located on the hill above. All four of these pools, at one time or another during the study, contained large populations of planarians, Phagocata subterranea Hyman and isopods, Asellus recurvatus Steeves. Physicochemical and microbiological analyses of the pool waters indicated that oxygen tension is a low as 2.8 mg./l. in one pool and that coliforms and other forms of bacteria (probably saprophytic) are abundant in the contaminated waters of the cave. Microscopic examination of the pool waters revealed a rich and varied microfauna, especially protozoans and rotifers. In addition, the polluted pools contained large amounts of colloidal materials which are believed to be rich in organic content. The influx and accumulation of sewage rich in organic matter is believed to be the basic trophic input in the contaminated pools. It is suggested that this material serves as an important food source for saprophytic bacteria as well as for much of the aquatic fauna, including both micro- and macroforms. Precise trophic relationships between the larger aquatic organisms have not been worked out but several significant feeding responses have been observed. </abstract>
<keywords>Environment, pollution, Planaria, Crustacea, Isopoda, United States of America</keywords>
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<title>The geographical distribution of Australian cave dwelling Chiroptera.</title>
<abstract>Of the 56 species of bats currently recorded from Australia, 22 are known to occur in caves. The geographical distribution of each of these species is detailed, and from this data, the species are divided into four groups according to their pattern of distribution. Group I comprises those species found only North of 18°S latitude, all of which either also occur in New Guinea or are closely related to New Guinea species. Group II, including both endemic Australian genera, occurs over that area North of 28°S latitude. This area largely comprises desert or semi-desert terrain, with its characteristics of low humidity and a wide range between extremes of temperature. Group III occurs in the Eastern Coastal Region, with one species extending to a limited degree along both Northern and Southern Coasts. Although temperature is extremely varied over this range, there are common environmental factors of moderate to high humidity and a moderate to low range of temperature variation. Group IV species are all widespread, in many cases over the whole continent, are all members of the Vespertilionidae, and occur in caves only occasionally or only in certain parts of their range. These species are more commonly found in trees or buildings. The possible factors contributing to the origin of these distributional patterns are discussed, and some areas for future investigation suggested.</abstract>
<keywords>Chiroptera, Australia</keywords>
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<title>Haptolana trichostoma, a new genus and species of troglobitic cirolanid isopod from Cuba.</title>
<abstract>Haptolana trichostoma, described from 2 specimens collected in a cave in Camaguey Province, Cuba, is distinguished especially by the expanded peduncle of antenna 1, the posteriorly directed mandibular palp, and in having all 7 pereopods prehensile. This is the second recorded occurrence of a troglohitic cirolanid in Cuba and the eighth species reported from the Western Hemisphere.</abstract>
<keywords>Crustacea, Isopoda, Cuba</keywords>
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<title>Material on the ecology and biology of Sphaeromides bureschi Strouhal.</title>
<abstract>The acquatic cave Isopod Sphaeromides bureschi Strouhal was discovered by I. Buresch in the underground water of two caves in western Stara-Planina. In this paper the author describes a new station, a spring, in the same region and then exposes the results of ecological and biological observations on this species (biotope, temperature, sex-ratio, feeding regime, locomotion).</abstract>
<keywords>Crustacea, Isopoda, Bulgaria</keywords>

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<title>Contribution on the study of European Bathynella: Bathynella natans Vejdovsky, a dilemma to resolve.</title>
<abstract>After a minute study of the structure of the 8th male pereiopod in some Bathynella populations from Romania and England, the structure differences which were found allowed to identify two well individualized kinds of pereiopods; they were named type natans and type stammen. Taking into account the striking differences between these two types, B. stammeri (Jakobi), which since 1954 is considered to be a subspecies of the natans species, was separated out of the species B. natans sensu Jakobi (1954). The populations understudied were collected in England and Romania, their minute study being the object of an other note, collaboration with T. Gledhill. The facts led to the conclusion that Jakobi s opinion (1954), which dominated the taxonomy of this group, doesn t entirely correspond to the reality, the two taxonomical units being characterized as follows: - Bathynelta natans Vejdovsky, characterized by the 8th male pereiopod (fig. l A) with a triangular, well developed anterior plate (fig. 3 A-D-a; 7 A-D), of the same length with the exopodit, a cylindrical internal lobe (fig. 3 A-D-b,) and a little lobe (fig. 3 A-D-c) of a reduced size; - Bathynella stammeri (Jakobi) differing from the first with respect to the anterior pinte (fig. 2 A-D-a; 6A-C) which is rectangular in shape and has a prolongation in the distal outer angle, to the conelike internal lobe (fig. 2 AD-b), and to the little lobe (fig. 2 A-D-d) which is twolobed in this case. After discussion on the relationship between B. catena Vejd. and B. stammeri (Jakobi) it is shown that differences observed in the 8th male pereiopod structure give important indications about the above species to the effect that they are not very closely related. If one takes into account also their wide spreading area, and the individualisation of some populations due to important, characteristic traits - we are obliged to classify them into two different sub-genera. In the first one, the species catena is included - which will keep by this way the very name of the genus, and in the second, termed here Antrobathynella, the species stammeri. In conclusion, what was till now considered as Bathynella natans Vejdovsky sensu Jakobi, was divided into two distinct species each of them pertaining to two different sub-genera, that is: Bathynella (Bathynella) natans Vejdovsky and Bathynella (Antrobathynella) stammeri (Jakobi). It is demonstrated that the synonymy Jakobi made between B.chappuisi and B. natans is perfectly true under the new conditions too, because it was Delachaux (1919) who rediscovered B.natans Vejd., not Chappuis (1914). The material found by Chappuis in Basel (1914) appears to pertain to B. stammeri (Jakobi) differing both from the individuals from the Grotte de Ver (Delachaux, 1919) and from Prague (Vejdovsky, 1882).</abstract>
<keywords>Crustacea, Syncarida, Romania, United Kingdom, Great Britain</keywords>
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<title>Three new species of Cymbella from Mammoth cave, Kentucky.</title>
<abstract>During an investigation of the diatom flora of Mammoth Cave, Kentucky three Cymbella species were noted which could not be identified with any yet described forms. This paper contains a taxonomic description of the three new species: Cymbella clausii, Cymbella gerloffii, Cymbella hohnii. A common feature of all three species is the rather broad central area which may have been the result of a special adaptation to the cave environment.</abstract>
<keywords>Protista, Bacillariophyceae, Diatom, United States of America</keywords>
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<title>Algological studies in the cave of Matyas Mount, Budapest, Hungary.</title>
<abstract>Experiments were designed to test the ability of the aphotic speleoenvironment to support algal growth. The first series contained gelatin cultures of Scenedesmus placed in the cave at different localities in order to establish whether or not the microhabitats have any particular effect on the multiplication of the algae. No differences were found in the cultures after a three month incubation period in the cave, which could be traced to influences of microenvironmental conditions. Chlorella cultures in sterile Knop's solution showed measurable growth in the cave whereas if the cultures were installed into sterilized cave water or were shielded by lead against possible radiation effects, no appreciable growth occurred. The presence or absence of magnetic field did not noticeably influence algal development. The experiments seemed to indicate that the algae tested are able to utilize soma kind of radiation in the complete darkness of the cava since, in the absence of organic material, appreciable amounts of molecular hydrogen or symbiotic activity, with iron bacteria, considerable growth occurred in a simple, strictly inorganic medium, whereas the cave waters seam to be deficient in some kind of inorganic salt required for algal nutrition. An investigation of algae living in the cave led to the determination of ten different taxa, the majority of which were Cyanophytes. Besides them, however, the cave may contain a more diversified algal population.</abstract>
<keywords>Algae, Hungary</keywords>
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<title>On cave living Mosses.</title>
<abstract>Among the mosses collected by Dr. K. Verseghy in the caves of the environment of Lillafured Eucladium verticillatum (E.) Br. Eur. was found which had some peculiar bulbillae composed of two to many cells on the ends of the filaments. They may represent special reproductive organs as yet unknown in this genus. None of the mosses living in the caves developed sex organs.</abstract>
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<title>Algae from the cave of Matyas Mount, Budapest, Hungary.</title>
<abstract>Seven collections containing scrapings of speleoclay or samples from the cave waters were received from L. Hajdu and were cultured in light in a modified Knop's solution. The cultures yielded 21 different algal taxa, of which five species belong to the Cyanophyta four to the Bacillariophycaea class of the Chrysophyta and twelve to the Chlorophyta. From the species distribution the cave shows a similarity to the nearby cave of Pàlvolgy, namely both of them contained more than 50 per cent Chlorophyta. Among the Cyanophyta the occurrence of Baradlaia speluncaecola Palik is noteworthy. This species seems to be a true troglobitic alga, since the genus is known only from caves.</abstract>
<keywords>Algae, Hungary</keywords>
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<title>Calcite-Aragonite speleothems from Hand-dug cave in Northeast Kansas.</title>
<abstract>Speleothems in the form of stalactites, linear stalactitic growths, flowstone, and crusts, from a hand-dug cave in Northeast Kansas (Sec. 2 NENW, T2S, R22E) are composed of calcite and aragonite. If the estimated age of the cave is correct, i.e., 150 to 200 years old, the stalactites have grown at a maximum rate of 0.20 to 0.15 millimetres per year along their vertical axes. All of the speleothems examined contain about one percent strontium (based on qualitative emission spectrograph analyses). Rate of supply and evaporation of the vadose waters may dictate whether aragonite or calcite is the polymorph that precipitates from the cave waters.</abstract>
<keywords>Mineralogy, speleothem growth, United States of America</keywords>
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<title>New citations on Spanish bats.</title>
<abstract>Short citation on new findings of bats in Spanish caves.</abstract>
<keywords>Chiroptera, Spain</keywords>
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<title>Contribution to the systematics of African Stenasellinae (Asellote Crustaceans).</title>
<abstract>From 1897 to 1962, many species have been described as belonging to the genus Stenasellus Dollfus. Among all these the forms from Central Africa and one of Western Africa are not conform to the generic description of Racovitza 1924 obliging us to institute two new genera, Metastenasellus and Parastenasellus. The archaeic Asellota belong to the genus Stenasellus Dollfus, Johannella Monod, Metastenasellus nov.gen. and Parastenasellus nov. gen. are thus grouped in a sub family of Stenasellinae and the relationship between the different groups has still to be explained.</abstract>
<keywords>Crustacea, Isopoda, Africa</keywords>
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<title>Ephemenoptera and Plecoptera from Bulgarian caves.</title>
<abstract>The mayfly Ecdyonurus venosus (Fabr.) and the stonefly Perla marginata bureschi (Schoenemund) have been previously recorded from Bulgarian caves. The author has found the following additional species in the material collected by his colleagues in Bulgarian caves: Ephemeroptera - Habroleptoides modesta (Hagen), Paraleptophlebia tumida Bengtss. and Paraleptophlebia sp.; Plecoptera - Nemoura sp. and Dinocras cephalotes (Curtis). All these species are trogloxenes.</abstract>
<keywords>Ephemenoptera, Plecoptera, Bulgaria</keywords>
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<title>Contribution to the knowledge on Speophilus of the group kiesenwetteri Diek.</title>
<abstract>The author has studied the group kiesenwetteri of the genus Speophilus (Col. Catopidae), endemic of Catalogna (Spain). The paper comprises a geographical and geological analysis of the by this group colonised massifs, with a study on the geological isolation of the species and a faunistic study of the 5 actually known forms, one of which new.</abstract>
<keywords>Insecta, Coleoptera, Catopidae, Spain</keywords>
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<title>New contribution to the study of Bathynella (Bathynella) natans Vejd. And Bathynella (Antrobathynella) stammeri (Jakobi).</title>
<abstract>In an earlier paper the author separated Bathynella stammeri (Jakobi) (formerly considered a subspecies) from B. natans Vejd. sensu Jakobi and showed that this new species justified the erection of a new subgenus (Antrobathynella) of Bathynella. Study of the morphology of the mandible, and the 8th pereiopod of the male and female, and examination of the chaetotaxy of the uropods have revealed new diagnostic characters which permit the unequivocal separation of B. natans and B. stammeri. A diagnosis of both species is given. The present study is the result of examination of numerous specimens from many stations in Romania and one station in England.</abstract>
<keywords>Crustacea, Syncarida, United Kingdom, Great Britain, Romania</keywords>
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<title>Pelodrilus bureschi Mich. 1924 (Oligochaeta Haplotaxidae) of the caves of Banat (Romania).</title>
<abstract>Pelodrilus bareschi Mich., one of two species of limicolous oligochaetes strictly confined to a subterranean environment and previously known from several caves in Bulgaria and Yugoslavia, was recently found in three caves in the Banat Mountains, Romania. Examination of sexually mature worms showed that they are within the range of variability of P. bareschi and that there is no reason to describe a form peculiar to the caves of Banat.

Pelodrilus has almost always been found in the mud or clay covering the bottom of pools of variable size, which are filled by periodic flooding of underground water courses. The Banat colonies are small. </abstract>
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<title>Note on cavernicolous beetles of Bulgaria. V.</title>
<abstract>Three caves of the central part of the Bulgarian Balkan (Stara planina, close to the village of Etropolé) host cavernicolous beetles of the subfamily Bathysciinae (family of Catopidae) that constitute a new genus of the Brachyscapes group. In this paper the diagnosis of this new troglobe genus together with the description of the type species Balcanobius etropolensis, gen.n., sp.n. are given. The new genus is then inserted in the dichotomic table as defined by R. Jeannel, placing it close to the other two Yugoslavian genus Parapropus and Spelaeodromus.</abstract>
<keywords>Insecta, Coleoptera, Bulgaria</keywords>
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<title>Caves of Banat (Romania) explored in 1963.</title>
<abstract>The paper contains the description of 23 natural or artificial underground cavities in the Banat mountains, grouped in karst zones. It is in all respects a continuation of a preceding volume (Botosaneanu, Negrea & Negrea,1963) on the caves of the Romanian Banat.</abstract>
<keywords>Speleology, caves, Romania</keywords>
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<title>On subterranean confluences.</title>
<abstract>The development of a subterranean drainage system depends on the way in which subterranean confluences between different rivers can be formed. Different from surface, in which confluences are determined by processes related to the surface runoff of water, in subterranean karst confluences have a random pattern and are related to certain circumstances independent of the underground flow. These conditions are: pre-existence of circulation ways and the way they are distributed in space. At these the peculiar processes of subterranean karst flow determined by the flow under pressure, the only one that can explain the systematic appearance of confluences, have to be added. In function of these parameters a morphogenetic classification of subterranean confluences is given.</abstract>
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<title>Contribution to the knowledge on spring fauna in the Bela Reca river valley (Romania).</title>
<abstract>After an introduction, comprising a historical summary on the researches on well fauna, a description of the study area in which 13 water wells have been investigated is given. The authors explain the adopted working method and indicate the physical and chemical characteristics of the waters (temperature, pH, alkalinity, hardness, O2-content, fixed residuum, suspended matter, N2O5, P2O5, NaC1, Ca, Fe). The fauna of the wells of Mehadia (see systematic part) is composed of 34 species: 1 Triclade, 3 Oligochaeta, 2 Gastropods, 5 Cladocera, 1 Ostracod, 3 Copepods, 4 Isopods, 2 Amphipods, 1 Halacarida, 1 Collembola, empty puppies of a Trichoptera, 2 Coleoptera and 8 Diptera (larves and nympha). Among these species 15% can be considered phreatobionts: a blind Triclade (not identified), Candona eremita Vejd., Asellus (Proasellus) danubialis Lt. & M. Codr., Asellus (Proasellus) elegans Lt. & M. Codr., Niphargus jovanovici bajuvaricus Schell. and Niphargopsis trispinosus Dancau & Capuse. The remaining 28 species, counting for 85%, belong to the phreatoxenes. It is worth to mention that Vejdovsky (1882) in wells near Prague, Jaworowski (1895) in wells of

Cracovia and of Lwov, Moniez (1888, 1889) in wells in North-East France and Chappuis (1922) in those close to Bale, have found a much smaller proportion of phreatobe forma (e.g. Chappuis 2%).</abstract>
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<title>Preliminary note on the Algae of Crystal Cave, Kentucky.</title>
<abstract>Collections of a preliminary type carried out in Crystal Cave, Kentucky, resulted in the identification of seven algal taxa. A Chamaesiphon (Dermocarpales) and an Asterocytis (Bangioidea) are reported for the first time from a speleo-environment. As no correlation could be found among the algae occurring in Crystal Cave and those of nearby Mammoth Cave the conclusion is reached that the cave algal floras do not originate from the algal vegetation of the surface but may have gotten into the caves at the time of the latter's formation.</abstract>
<keywords>Algae, United States of America</keywords>
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<title>Algological investigations in Mammoth Cave, Kentucky.</title>
<abstract>Algological investigations carried out in the Mammoth Cave, Kentucky, revealed the presence of twenty-seven taxa representing all divisions of the Algae except the Pyrrhophyta and Phaeophyta; diatoms although observed in the samples were not dealt with in the present paper. One species, Oscillitoria clausiana spec. nov. and a form Lyngbya pusilla fa. tenuior fa. nov., both belonging to the Cyanophyta are new to science. In addition, several other rare and interesting algae were found. A comparison is made between the algal flora of the Mammoth Cave and algae found in several European caves. The ecology of the cavernicole algae is discussed.</abstract>
<keywords>Algae, United States of America</keywords>
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<title>Diatoms from Mammoth Cave, Kentucky.</title>
<abstract>Samples collected in Mammoth Cave, Kentucky, revealed the presence of a diversified but not too abundant diatom community in the cave. As the material was not subjected to culturing experiments but was investigated immediately after arrival, both in native and permanent preparations, it was possible to: 1. ascertain that the majority of the diatoms contained well developed, apparently healthy and functioning chloroplasts and 2. to get a rough estimate of the actual number of specimens present in a microhabitat. The identifications resulted in the recognition of 16 diatom taxa of which possibly 4 are new to science. Further studies are, however, required to ascertain this point.</abstract>
<keywords>Algae, Diatomea, United States of America</keywords>
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<title>Data on the Algal Flora of Kolyuk cave close to Manfa (Hungary).</title>
<abstract>The Kolyuk cave lies in the southern part of Hungary in the Mecsek Mountains, about 3 km. in distance from the village of Mànfa. The material accepted for investigation originated from a recently discovered and until now completely entombed part of the cave. It was collected by the geologist Gàbor Magyari and consisted of material scraped from the walls and ceiling of a cavity in the cave, which could be reached only by underwater swimming. From these scrapings cultures were installed with sterile Knopp solution and after the algae present in the collection reproduced, a diversified flora developed which consisted of the following: Cyanophyta - 20 species, varietates and formae; Bacillariophyta - 2 species and varietas; Chlorophyta - 7 species. There was a total of 29 different taxa. Since the cave from which the collections were made was completely devoid of light, it is especially

significant that a well developed blue-green algal flora was found. We thus have further evidence for our previously advanced theory (Claus, 1955, 1962 a, 1962b) that some algae were present in the caves at the time of their origin. They were able to survive in an actively assimilating vegetative state and not only in the form of cysts or arthrospores.</abstract>
<keywords>Algae, Hungary</keywords>
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<id_art>468</id_art>
<title>The world of plants in caves of Lillafured (Hungary).</title>
<abstract>The vegetation of the Forràs and Istvàn caves at Lillafured in Hungary is composed of algae, micro- and macrofungi and mosses. The algae in both caves are represented by unicellular Cyanophyta and Chlorophyta with small species numbers. The macrofungi are Coprinus and Polyporacea spp. while it was impossible to identify the microfungi. The moss flora is richly developed and it can be supposed to represent a secondary vegetation at the artificially illuminated places of the caves. In Forràs cave 7, and in Istvàn cave 15 different mosses were found, only 3 of which proved to be common to both caves: Rhynchostegium murale, Eucladium verticillatum and Pohlia sp. A rare and interesting species: Fissidens minutulus occurred at several localities in Forràs cave.</abstract>
<keywords>Bryophyta, Algae, Funghi, Cyanophyta, Chlorophyta, Hungary</keywords>
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<title>Eastern Group of Monolistrini (Crustacea, Isopoda): II. Biological part.</title>
<abstract>Following the first systematic part, in this paper the author describes the biological observations made on these Isopod Crustaceans of underground waters. The different sexual characters of the particular groups and the related differences in the behaviour before copulation are described. During the embryonic and larval development small differences between sub-genus are reported. To the differences in Caecospaeroma (according to Daum) the first and second "mancastadium" and another "postmanca stadium" with pereiopods VII not wholly formed have to be added. The author describes the growth of the different parts of the corps and the extremities, comprising the sexual characters.</abstract>
<keywords>Crustacea, Isopoda, biology, underground water</keywords>
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<title>The cave dwelling bats of Switzerland.</title>
<abstract>Bats, familiar to speleologists, play an important part in animal ecology in caves. Indirectly by their guano, they provide a source of food for numerous cave-dwelling animals and directly, by their own more or less constant presence. 26 species of bats are known from Switzerland, 15 of which occur in caves. Miniopterus schreibersi is considered the only true cave-dweller. The exact distribution of the rare species, including those occurring outside caves, is found in the text and is also indicated on the accompanying maps. </abstract>
<keywords>Chiroptera, Switzerland</keywords>
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<title>Contribution to the study of the biology of Asellus cavaticus Leydig (preliminary note).</title>
<abstract>The cavernicole asellid Asellus cavaticus Leydig has been reared in our laboratory for more than twenty months, permitting us to give some data on the sexual cycle of this species. Females provided with brood pouches seem to be more numerous in the spring, as is the case with the subterranean amphipod Niphargus virei Chevreux. The average length of the incubation period seems much shorter than that of other troglobitic species such as Niphargus virei Chevreux or Caecosphaeroma burgundum Dollfus, so that the life cycle of our species is nearer to that of epigean Asellus. The

number of young per brood appears to be related to the length of the female, as is suggested by our observations on 52 ovigerous females, but there must be other factors which influence this quantity. The comparison between our observations and those made on the North American cavernicole Asellus tridentatus Hungerford shows that the sexual biology of these two species is apparently quite different.</abstract>
<keywords>Crustacea, Isopoda, France, United States of America</keywords>
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<title>Contribution to the study of certain Lithobiidae (Chilopoda) of Romanian caves.</title>
<abstract>This paper comprises the ecological and zoogeographical data of 21 systematic units of Lithobiidae coming from 100 Romanian caves (Transylvania, Banat, Oltenie and Dobroudja). Initially the author describes in a summarising way the provenance of the studied material, after which he exposes fro every species the results of observations carried out by several authors and by himself. Finally he formulates the conclusions concerning ecology and biogeography resulting from his observations. These data are summarised in a synoptic table in which three species can be considered troglobionts, two of which are blind; these are Harpolithobius oltenicus Negrea; Lithobius decapolitus Matic, Negrea et Prunescu; Lithobius daeicus Matic; The other 18 species found are 5 troglophiles, 12 sub-troglophiles and 1 trogloxene.</abstract>
<keywords>Chilopoda, Romania</keywords>
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<title>Fauna of the brackish underground waters of Central Asia.</title>
<abstract>In the cave Kaptar-Khana (south-western Turkmenistan) was discovered a lake filled with water with a salinity of 11,68°/oo. This lake is inhabited by a fauna of marine origin - Foraminifera (three species), Molluscs (Pseudocaspia ljovuschkini sp.n.), Harpacticoida (genera Ectinosoma, Schizopera and Nitocra), Isopoda (Microcharon halophilus sp.n.) and possibly Nematoda (Oncholaimidae). The majority of the discovered species are related to species of circum-Mediterranean origin. Geological data do not permit to consider this fauna as a relict of any of the tertiary seas. The same applies to all other cases when animals of marine origin were discovered in subterranean waters of Central Asia (as for instance Microcharon kirghisicus Jank. on the shores of the lake Issyk-Kul). We can either admit a far greater anciennity of this fauna or an ability of its components to disperse very widely beyond the boundaries of marine transgressions.</abstract>
<keywords>Foraminifera, Mollusca, Crustacea, Isopoda, Nematoda, Turkmenistan</keywords>
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<title>Phreatobiological researches II.</title>
<abstract>The present note calls into question the opinion of different authors concerning the presence or lack of adult Niphargus near the phreatic table (superior layer of phreatic water) in zones prospected by Karaman-Chappuis method. Our investigations have proved the reason for which Niphargus adults were less frequent in the superior layer of the phreatic water is rather concerned with our investigation means - which are very approximate -, than with the ecological or ethological requirements of these animals. The assertion that the phreatic fauna performs downward migrations during the floods must be considered as doubtful. During floods it is impossible to dig into the alluvial deposits immediately near the stream, these being completely flooded; so, we are obliged to dig in regions more distant from the riverside, which are not flooded. It is well known that in this zone the biocoenosis contains always a greater number of phreatobius elements. One of the authors (C. Motas) introduce the terms: rithrobios - for the fauna inhabiting the epigean streams, phreatobios - for that inhabiting the phreatic water, and geobios - for the terrestrial world. </abstract>
<keywords>Crustacea, Gammaridae, ecology, phreatic fauna</keywords>
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<title>Subterranean occurrence of Anaspides tasmaniae (Thomson) (Crustacea, Syncarida).</title>
<abstract>Anaspides tasmaniae is recorded from a subterranean habitat for the first time. The only difference noted from surface forms was the smaller amount of pigment present.</abstract>
<keywords>Crustacea, Syncarida, Australia, Tasmania</keywords>
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<title>The presence of Bogidiella albertimagni Hertzog 1933 in Romania and some remarks on the European species of this Genus.</title>
<abstract>Studying several Bogidiella individuals collected from the phreatic biotope of Cerna Valley (Oltenia region) using Karaman-Chappuis method, authors announce the presence of Bogidiella albertimagni Hertzog in Romania. After a description of the studied individuals, the authors talk about some problems concerning the taxonomic value of B. albertimagni and B. skopljensis Karaman (this second species being formerly known in Romania) and the validity of B. denticulata Mestrov described from Yugoslavia.</abstract>
<keywords>Crustacea, Gammaridae, Romania</keywords>
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<title>On the snail Spelaeodiscus Brusina 1886 (Gastropoda, Pulmonata) in Yugoslavia.</title>
<abstract>In Yugoslavia there are 5 species of the Genus Spelaeodiscus (Gastropoda, Pulmonata): Sp. hauffeni (F. Schmidt), Sp. triaria (Rossmàssler), Sp. albanicus (A. J. Wagner), Sp. unidentatus Bole and Sp. obodensis sp. n., decribed here. The anatomical researches on Sp. hauffeni (F. Schmidt) and Sp. unidentatus Bole have proved that they belong to the family of the Pupillidae and not to the one of the Valloniidae. This fact confirms the opinion of Hudec, according to whom the genus Spelaeodiscus belongs to the family of the Pupillidae.</abstract>
<keywords>Gasteropoda, Pulmonata, Slovenia, Bosnia, Herzegovina, Croatia</keywords>
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<title>Karst-hydrological researches in Hungarian caves.</title>
<abstract>Although Hungary does not belong to the large Karst countries, extensive speleologic and karst-hydrologic investigations are carried out. On the one hand, Hungary owns one of the largest stalactite caves in the world, on the other hand the majority of raw materials and the connected industries are linked with Karst regions which pose particular water supply problems. The largest water supplying caves are in the North of Hungary. The best known cave is the Aggtelek cave with a length of 22 km, but there are numerous other, recently disclosed caves of a length of 1-5 km, which were discovered by way of artificial means and on the basis of many years of hydrologic observations. Of particular interest are the active thermal caves with waters of 30°C. In one of these latter a diver discovered and measured a siphon of a length of 300 m. By way of experiment, speleotherapic treatments were applied in some of these caves. By calculation of decades of series of measures an applicable formula was established for the calculation of the percent of seepage in the Karst regions. In several of these caves the influence of precipitation on the intensity of stalactite formation was measured. The indication of the so-called ,,year-rings" in the stalactites furnishes data concerning precipitation of bygone millenaries, which are also valuable for the investigation of periods. In several caves the changes in ion concentration of the water currents was measured and the correlation with the cross section of the caves was determined. On the basis of complex measurements in Karst sources the possibility of disclosing hitherto unknown cave systems arises. In this manner, recently several caves were artificially discovered.</abstract>
<keywords>Hydrogeology, karst, Hungary</keywords>
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<title>Laboratory and field evidence for a vadose origin of foibe (domepits).</title>
<abstract>Foiba (plural, foibe) is a term derived from the northeastern Italian karst region. The word is here suggested for use in preference to other terms referring to vertical cavities in soluble rocks. Foiba is defined as a cavity in relatively soluble rock which is natural, solutional, tends toward a cylindrical shape, and possesses walls which normally approach verticality. In laboratory experiments, limestone blocks were treated with dilute hydrochloric acid, and cavities resembling foibe were produced. Vertical walls developed only when a less soluble layer capped the limestone block or when the acid source was stationary, allowing acid to drip to the area directly below. Water analyses from foibe in central Kentucky and Missouri indicate that the water has had less residence time in the zone of aeration than other waters percolating through the rocks and entering the caves. In central Kentucky, foibe seem to be developed by migrating underground waterfalls held up by less soluble layers or by water moving directly down joints below less soluble layers. In Missouri, foibe are formed by joint enlargement below chert layers. Those foibe in the ceilings of caves are complicated by the enlargement of the lower part of the joints by cave streams during fluctuating water table conditions. In limestone caves of Kansas, foibe are formed in a similar manner as in Missouri. The foibe of the gypsum caves of Kansas are formed mainly on the sides of steep collapse sinkholes and lack joint control although they form beneath less soluble layers in the gypsum. Dripping water is necessary for the development of vertical walls by solution. Less soluble layers seem to be the unique feature which allows water to drip and pour into foibe. The floors of foibe are formed by less soluble layers or near the water table. If foibe intersect previously formed cave passages, no floors may develop.</abstract>
<keywords>Domepits, speleogenesis, foiba</keywords>
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<title>A preliminary study, using an electron microscope, on the microflora of cave clay sediments.</title>
<abstract>Researches on the microflora of cave clay sediments were carried out. The study of these micro-organisms necessitates the use of an enlargement of the order of 5,000. For this purpose the organisms were separated from the clay sediments by the foam flotation technique, followed by cultivation. Morphologically they can be divided into 5 types but together they form a group sufficiently homogeneous to justify their provisional grouping as the "Microfusiformetum." Experiments with enriched cultures from several sediments have shown that certain of the micro-organisms were indigenous, others were accidental inhabitants. </abstract>
<keywords>Microbiology, cave fauna, clay sediments</keywords>
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<title>Algae and their mode of life in the Baradla cave at Aggletek II.</title>
<abstract>The author provides additional data to his publication of 1955. In a table he shows his results concerning 81 algal species which were returned to the cave of Aggtelek on June 22, 1954. When carrying out his control tests he found the decrease in the number of species to be 9 after 6 months and 18 after a further 8 months. In December 1957, after culturing on sun light however he was able to show again the presence of 17 species, but in his cultures Synechoccus elongatus, Phormidium dimorphum, Gloecoccus schròterii, Chlorococcum infusionum, Chlorella miniata and Protococcus anulatus, appeared with the largest individual numbers and not the Cyanophyta as could have been expected.</abstract>
<keywords>Algae, Hungary</keywords>
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<title>The microvegetation of a small Ice-cave in Hungary.</title>
<abstract>The algal flora of a small, artificial, ice-cave located in Northern Hungary is described. In this cave 23 species of algae (see in Table 3) were found of which the Cyanophyta and Chlorophyta occurred with approximately equal number. (9 vers. 11) It was found that the primary limiting factor influencing the penetration of the algae into the cave is the low temperature and not the lack of light.</abstract>
<keywords>Algae, Hungary, ice cave</keywords>
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<title>A new Aulakochloris-species from a cave at Abaliget.</title>
<abstract>In the material collected by George Claus in the Cave of Abaliget (Hungary) an interesting, new, Chrysophyta, a silicified Aulakochloris species was found. The new species was named in honor of its collector A. clausiana nov. sp. and its description and occurrence in the Hungarian caves is given.</abstract>
<keywords>Chrysophyta, Hungary</keywords>
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<title>Progress in the biological exploration of caves and subterranean waters in Israel.</title>
<abstract>The article gives an account of the biological works carried out in the caves and other subterranean habitats of Israe1. The botanical and zoological investigations are summarized separately and a list of literature dealing with biospeleological research in Israel is supplied.</abstract>
<keywords>Biospeleology, cave fauna, flora, Israel</keywords>
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<title>On the algal world of Hungarian caves.</title>
<abstract>An account of the researches carried out on the algae living in the caves of Hungary is given. The results of the investigations concerning the algal flora of the Baradla, Peace, Abaliget, Pàlvòlgy, Kòlyuk caves are enumerated. Theories about the possible energy source utilized by these algae living in the complete darkness of caves such as radiation, symbiosis, chemosynthesis or auxothrophy are discussed. The question of the settling of algae into the caves is debated.</abstract>
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<title>On mosses that, under influence of electrical lights inside the Hungarian and Czechoslovakian caves, penetrate underground.</title>
<abstract>The introduction of electrical illumination into different caves makes the intrusion of some mosses and ferns into such depths of the caves possible which at previous occasions (i. e. before the installation of electrical light) were found sterile of these plants. Investigations of two caves in Czechoslovakia and 4 caves in Hungary revealed the presence of mosses thriving deep inside of these caves making use of the artificial illumination.</abstract>
<keywords>Bryophyta, Pterophyta, Czech Repubblic, Slovac Republic, Hungary</keywords>
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<title>Processes of limestone cave development.</title>
<abstract>Three processes successively predominate in enlarging original fractures within limestone into cavern passages: (I) early dissolving by acid produced by oxidizing reactions within the groundwater as it flows through the limestone; (2) dissolving caused by the initial undersaturation with respect to calcite of the groundwater when it enters the limestone; and (3) increased dissolving which occurs at the transition from laminar to turbulent

groundwater flow. Only those original fractures in limestone which are widest and which have a high hydraulic gradient acting across them will be enlarged into cavern passages. Until all available surface drainage has been diverted underground, cavern development takes place under a constant hydraulic head, and the rate of limestone solution increases with time. After all available surface drainage has been diverted underground, the discharge through the cave, rather than the hydraulic head, remains constant, and the rate of limestone solution decreases toward a constant value. These principles apply to caverns formed both by water-table flow and by artesian flow. </abstract>
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<title>Corrosion by mixing of waters.</title>
<abstract>Karst caves are prior to all due to corrosion. According to the well-known formula a CO2 supply is always needed. This type of dissolution explains only the corrosion in free circulation and, under reserve, the one in pressure conducts in the vadose zone. All corrosion in the phreatic domain is excluded, except for some rare cases in the upper levels. The corrosion by mixing of waters of different content in bicarbonates is effective in the entire karst, from the lowermost to the uppermost parts. Also the corrosion due to the lowering of temperature and by mixing of waters at different temperature has to be take into account. Excpet for some exceptional cases (e.g. thermal waters), this effect is very reduced.</abstract>
<keywords>speleogenesis, mixing, Bogli effect, corrosion</keywords>
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<title>Observations on the evolution of caves.</title>
<abstract>In this note, which results from a paper published in France, the author defines the "karst system" formed by several successive levels, at the heart of a limestone mass: joints of surface feeding, vertical chimneys, galleries which are alternatively dry and full of water according to the season, a network of continually drowned clefts. He then studies modifications in this system resulting from internal causes, corrosion, filling and sedimentation, concretion. Then he shows how this evolution of the karst system may be modified by general conditions: geology, tectonics, geography with the losses, resurgences and the role of surface formations. The deepening of the river level may create a structure of differing levels in the various karst system, but their positioning is always slower than the streams erosion and it comes about later. In any case, the caves in a dried karst system undergo an evolution on their own. Finally, the author gives the definition of the terms used to explain the evolution in the karst system: "embryonic galleries" in the network of clefts, "young galleries" in the zone which is alternately wet and dry, "mature galleries" where the concretion and the erosion are balanced, "old galleries" where the concretion is becoming more and more important, "dead galleries" where the cave is completely filled by the deposits and concretions. This classification will easily replace the inexact terms of "active galleries" and "fossilized galleries" which are too vague and lead to confusion. </abstract>
<keywords>speleogenesis, evolution, river, karst system</keywords>
<from>71</from>
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<id>496</id>
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<title>Detection of caves by gravimetry.</title>
<abstract>For gravimetric investigations, a naturally occurring limestone cave may be compared with a buried empty sphere or cylinder, depending on its shape. The practical limit of detection for a subsurface void, utilizing available equipment (Worden gravity meter) and standard field procedure, is 0.1 milligal. Most corrections normally required by the gravimetric method may be neglected in cave detection, but the altitude control for the field traverse must have an accuracy of ± 0.1 foot. The detectability of a limestone cave, based on field work done at Luray Caverns, Virginia, and at other localities, is related to its shape, Radius (R), and distance from surface to the cave center (Z). It follows a non-linear relationship. Detectability is possible only when R3/Z2 = 4.3 feet and R3/Z = 2.89 feet. For a cave room and a cave passage respectively. </abstract>
<keywords>Geophysical prospection, gravity, detection of caves, United States of America</keywords>
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<authors>Raymundo J. Chico.</authors>
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<id>497</id>
<id_art>441</id_art>
<title>Remarks on the significance of experiences in karst geodynamics.</title>
<abstract>Distinction is made between the experiment which "demonstrates" having an argumentative value - and the experiment which "questions" nature by isolating one factor and by determining the mode of its action. The concept of experiment in geology and in geodynamics and the distinctions between geodynamics and geophysics are discussed. Karstic geodynamics considers the action of fluids - mainly liquids - on a soluble rock. It is a science bordering the different branches of geochemistry, hydrology, the mechanics of rocks, and geophysics. Researches in karstic geodynamics are based upon measurements obtained through field surveys, or upon the utilization of a subterranean laboratory. However, in the laboratory this hardly surpasses the stage of experimental demonstration. A series of simple experiments are enumerated to exemplify the above statement, like the one where the attack of a diluted acid on a soluble rock is utilized, in order to enable us to classify the major problems encountered in karstic corrosion. The last chapter discusses the bicarbonate equilibriums of Ca-CO2. Experiment furnishes the empiric criterion on which scientific theory is founded. Each discipline has its own methodology dependent on the object under study having experimental criteria of different nature. This is particularly true in case of such distant phenomena which no longer have a common ground with human dimensions like space for astronomy or time for geology. In such cases the possibilities of "instrumental" experimentations are very limited. After a brief recollection of the principles of experimental procedure and the history of the experiments attempted by geodynamicians (tectonics, geomorphology, etc.) we will analyze several methods of investigation and by relying exactly on the example of karstic corrosion we shall determine those which have a value for the science of karstology. </abstract>
<keywords>Geodynamics, geophysics, experiments, observations, speleogenesis</keywords>
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<title>The birth of Biospeleology.</title>
<abstract>Modern biospeleology dates from May 15, 1907, with the publication of Racovitza's "Essai sur les problèmes biospéologiques." In this paper he posed - if he did not answer - every question raised by life in the subterranean world. He outlined a program of biospeological research, made an analysis of the conditions of existence in the subterranean domain and their influence upon cavernicoles, discussed the evolution of subterranean biota, their geographical distribution, etc. Racovitza modified Schiner's (1854) classification, dividing cavernicoles into troglobites, troglophiles and trogloxenes, terms later adopted by a great number of biospeologists. The "Essai", called "Racovitza's famous manifest" by Vandel, was considered the birth certificate of biospeology by Antipa (1927) and by Jeannel (1948), its fundamental statute. Jeannel also made major contributions to the young science through his extensive and detailed studies. The names of Racovitza and Jeannel will always be linked as the uncontested masters of biospeology, the founders of Biospeologica, and the authors of «Enumération des grottes visitées». Apart from Schiner, whose ecological classification of cavernicoles was utilized and modified by Racovitza, they had another forerunner in Viré, a passionate speleologist who often accompanied Martel in his subterranean explorations, once meeting with a serious accident in which he was on the brink of death. Viré (1897, 1899) studied subterranean faunas, establishing the world's first underground laboratory, where he carried on unsuccessful or ill-interpreted experiments. We consider Racovitza and Jeannel's criticism of him too severe. Let us be more lenient with our forerunners, since their mistakes have also contributed to the progress of science, as well as exempting us from repeating them. </abstract>
<keywords>History, Biospeleology</keywords>
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<title>The Eastern Monolistrinae (Crustacea, Isopoda): I. Systematics.</title>
<abstract>The author gives a diagnosis for all eastern Monoslistrinae known today, grouping them in the genus Monolistra and dealing with their geographical distribution. He also gives incomplete descriptions of some forms and also describes the new subgenus Monolistrella for M. velkovrhi Sket, the new species M. (Typhlosphaeroma) matjasici and M. (Microlistra) pretneri and the new subspecies M. (Monolistra) caeca intermedia, M. (Typhlosphaeroma) racovitzai pseudoberica and M. (Typhlosphaeroma) racovitzai conopyge.</abstract>
<keywords>Crustacea, Isopoda, East Europe</keywords>
<from>163</from>
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<title>Remarks on the Japygidae (Insecta, Diplura) reported for the underground environment.</title>

<abstract>About 50 japygids, belonging to 29 distinct forms of which 23 are recognizable, have been collected since 1874 in caves all over the world. A list is given, by continent and by countries. Ten species found both in the soil and in caves are called troglophiles to emphasize the sorting which seems to occur among endogenous species. Of the remaining 13 species, all considered troglobites, only 3 show morphological peculiarities which can be ascribed to adaptation to cavernicolous life: (1) Metajapyx moroderi ssp. patrizianus Pagés from Sardinia shows a slightly longer l0th urite and cerci than the f. typ.; (2) Kohjapyx lindbergi Pagés from Afghanistan is characterized by its very long l0th urite, its relatively slender cerci, and the presence of more than 8 placoid sensillae (maximum basic number in endogenous species) on the apical segment of the antennae; (3) Austrjapyx leleupi Pagés from the Lower Congo fits most closely the picture of the true troglobite - almost entirely depigmented, slender, with elongate legs, long setae, and the antennae with two of the trichobothria 4 to 5 times as long as the other typical 11, as well as 14 placoid sensillae on the apical segment. It is noted in the conclusion that, among the Diplura and Myriapoda, the almost exclusively phytophagous or saprophagous Campodeids and millipedes include a large number of true troglobites, in contrast with the carnivorous Japygids and centipedes, which have very few troglobites. </abstract>
<keywords>Insecta, Diplura, Japygidae, world</keywords>
<from>192</from>
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<title>Ecology of Fonticola notadena de Beauchamp (Turbellaria, Triclade) in the La Balme cave (Isère, France); suvival in a dry period.</title>
<abstract>During many months a year the acquatic Planaria (F. notadena) living in a small pool in the La Balme cave are subjected to a drought with the complete drying out of their biotope; they support in situ this lack of water and, living in a latent way inside the clayey matrix. Thanks to the great hygroscopy of the clay, enough humidity stays around the Planarians to enable them to survive. During this period the Planaria may undergo spontaneous divisions resulting in their asexual multiplication.</abstract>
<keywords>Planaria, ecology, France</keywords>
<from>204</from>
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<id_art>446</id_art>
<title>The meaning of Pleistocene birdfauna of Hungarian Middle Mountain caves.</title>
<abstract>In the present study, the fossil bird fauna of the caves of the Hungarian Middle Mountains is examined for evidence in support of the hypothesis that the Carpathian Basin may have served as a faunal refugee during the last Quaternary glacial period. As an introduction, the reasons for the refugee hypothesis, including paleobotanical and glacial theoretical aspects, are discussed. Since the first bird fossils of the cave fauna considered in this paper belong to the Wùrm I-II, the faunistic conditions of the Riss glacial period are not discussed in detail, The known faunas up to the Wùrm II are interstadial, which seems to serve only as indirect support for the refugee hypothesis. Paleobotanical evidence, both for and against the hypothesis, is also considered. In conclusion, the abundant cave faunas of all phases of the Wùrm III are cited as being - at least at the present time - the most convincing argument for the refugee hypothesis. The heterogeneous composition of these faunas permits certain tentative conclusions regarding the faunas of Wurm I and II. </abstract>
<keywords>Aves, Palaeontology, Pleistocene, Hungary</keywords>
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<title>Antrolana lira, a new genus and species of troglobitic cirolanid isopod from Madison cave, Virginia.</title>
<abstract>Antrolana lira, a new genus and species of troglobitic cirolanid isopod, is descnibed from Madison Cave, in the Appalachian Valley of Virginia. The problem of its origin from a marine ancestor is discussed. A supplementary description is given of Cirolanides texensis, and records of its occurrence are given. A key is given to the troglobitic Cirolanidae of the Western Hemisphere, and their known distribution is shown on a map. The subgenus Speocirolana Bolivar y Pieltain is raised to genus.</abstract>
<keywords>Crustacea, Isopoda, United States of America</keywords>
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<title>New cavernicolous Millipeds of the Family Cambalidae (Cambalidae: Spirostreptida) from Texas (U.S.A.) and Mexico.</title>
<abstract>The cavernicoles include: (1) Cambala speobia (Chamberlin), troglobitic in central and southwest Texas; (2) C. reddelli reddelli n. sp. and subsp., troglophilic in west Texas and epigean in New Mexico; (3) C. reddelli inornatus n. subsp., troglobitic in northwest Texas; and (4) Mexicambala russelli n. gen. and sp., troglobitic in southern San Luis Potosi. They are described and figured, and a key is given.</abstract>
<keywords>Diplopoda, United States of America, Mexico</keywords>
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