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PAPERS

NATURE OF THE ALTERATIONS WHICH FORM ON PYRITE AND MARCASITE DURING COLLECTION STORAGE

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Abstract. - The processes involved in the decomposition of specimens of pyrite and marcasite are incompletely understood. An important step is to determine what secondary minerals have formed and whether these minerals exhibit any change with variations in relative humidity. Twelve sulfates were found to have formed on museum specimens of pyrite and marcasite. They were identified by optical and X-ray diffraction techniques. The ferrous sulfates (szomolnokite, rozenite and melanterite) change hydration state with changes in humidity. Rhombociese, roemerite and melanterite deliquesce at high humidity. With a fall in relative humidity, some of these do not recrystallize but form what appear to be hardened colloids. These colloids may play a significant, but as yet undetermined, role in corrosion of pyrite and marcasite. The presence of aluminum-bearing sulfates, alunogen and halotrichite, indicates that clay in sulfide specimens may promote decomposition. Other secondary minerals which were not observed to change during the year are komelite, coquimbite, quenstedtite, gypsum and a phase tentatively identified as hydronium jarosite.

CONSERVATION OF A DINOSAUR TRACKWAY EXHIBIT

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Abstract. -In 1939, large sections of a dolomitic Lower Cretaceous dinosaur trackway from Glen Rose, TX, were removed for exhibition at the American Museum of Natural History, Texas Memorial Museum, and a few other museums. The TMM section of the trackway, housed in a small building outside the main museum, shows severe deterioration, including surface spalling and exfoliation associated with growths of epsomite crystals. Comparable damage has been reported in no other section of the trackway exhibited in museums, and spalling has been noted in only a few in situ tracks exposed to simultaneous high water saturation and freezing. The surface deterioration appears to be the result of the development of epsomite and other soluble salts as the result of prolonged exposure to excessive humidity and temperature fluctuations, caused in part by the breakdown of the moisture barriers once provided by the trackhouse. Contemporary documentation suggests that the materials and design of the dinosaur trackhouse, combined with the physical damage caused by removing the blocks, have contributed to the problem. Plans for stabilizing the trackway include surface cleaning of the breakdown debris, immediate and long-term modifications of the building, and ongoing environmental

monitoring.

INSTITUTION-WIDE POLICY FOR SAMPLING

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Abstract. -Numerous disciplines have recognized the need for policies and procedures to handle requests for destructive sampling of collection specimens. Recognizing that specimens were collected in order to be used for research, the intention of such policies is primarily to minimize the impact of invasive procedures. An analysis of existing literature, policy statements, and workshop discussions involving representatives of various disciplines revealed common concerns among the disciplines. These concerns are addressed with five primary aspects of an institutional policy for destructive sampling: intent of the policy, relevance to collections and institution, establishment of authority and responsibility, evaluation of requests, and establishment of operational policies.

EFFECT OF RELATIVE HUMIDITY ON CRANIAL DIMENSIONS OF MAMMALS

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Abstract. -Mammalian systematics relies heavily on morphometric analyses of cranial dimensions with special care given to the critical evaluation of natural variation attributed to individual, age, sex, and geography. Because bone is anisotropic, responding to moisture changes in different amounts and directions, the effect of relative humidity on cranial dimensions was addressed. A series of skulls of the same species was selected to minimize recognized forms of variation. These skulls were measured at 25% and 85% relative humidity, which simulate conditions known to occur in collections. Results showed that differences do exist, but the magnitude was not sufficient to question most morphometric studies.

However, it is recognized that this statistical evaluation cannot necessarily be equated with material responses to environmental conditions.

APPROACHES TO MOLD DESIGN AND CONSTRUCTION

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Abstract - Many factors must be considered in the design and execution of high quality molds. The ethics of molding and casting and the rights of ownership with regards to preservation of the object, possession of the mold and distribution of any casts must be observed. In designing any mold the factors that must be considered include: the purpose of the casts and the number of casts required; choice of molding compound; material incompatibilities; molding stress on the object; consolidants; separators; shape of the original object; positioning of flanges, air vents and pour spout (possibly including a registered pour spout plug) in order to minimize air bubbles in casts and reduce demolding stress on the original object, the mold and subsequent casts. In preparing the object for molding, flanges and the pour spout are fabricated from a neutral flanging material, must be large, neat, and include keys (sufficient in size and number) and identification marks; flanges are perpendicular to the surface of the object. The use of fabric reinforcement allows production of a mold of complex design, but of a minimum of pieces, and adequate strength with an

economy of molding compound. Removable vermiculite/latex filler plugs simplify mother mold construction.

Reviews

- The care and conservation of geological materials: Minerals, rocks, meteorites and lunar finds, by F. M. Howie, ed
- Guide to environmental protection of collections, by B. Appelbaum