A New Moulage Technique for Casting Animal Tracks

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The study of wildlife is an important part of science education, but it is often difficult to integrate into a classroom setting. Lack of storage facilities, care of specimens, local, state and federal laws, and costs often prohibit possession of live or prepared specimens, thus leaving the teacher to work with films and books. Observing animals in the wild also may be difficult if one teaches in an urban setting or in areas with limited access to wilderness, or because the animals are secretive or nocturnal. Appropriate field trips may be prohibitive because of their cost or because they are difficult to organize from an administrative viewpoint.

Learning to identify and interpret animal tracks is an ideal way of gaining knowledge about animals without actually having to observe them. Tracks of one kind or another are readily available in wet or muddy areas such as the edges of ponds, lakes, streams and rivers and in many other areas following rainy periods. In some areas animal tracks can be observed after animals have walked in the snow. It is also possible to create places for observing animal tracks by preparing an area of soft mud where animals habitually travel, such as on trails or near dens, or one can use bait or scents to attract animals to these sites.

Tracks are valuable for more than just the identification of animals that made them (Bailey 1921; Murie 1954; Leutscher 1960; Bang 1974; Headstrom 1983). They can provide information about an animal's behavior. For example, the number of sets of tracks can indicate if an animal was traveling alone or in a group and the distance between successive tracks may indicate if the animal was walking or running. Associated signs such as discarded food, feathers, fur, scat, bones, blood and tracks of other animals may indicate what was eaten or whether the animal was a predator or prey to something else.

Making a tracing of a track on transparent acetate with a felt tip pen is a simple way of returning a record of track characteristics to the classroom. Similarly, freehand drawings of tracks with notations of size and spacing are valuable (e.g., Nelson 1930; Leutscher 1960; Grossenheider 1961; Burt & Grossenheider 1964) although details of texture are often difficult to record. In the classroom, a comparison of the structure of tracks from different animals can be related to the behavior of the animals or to the habitats in which they live. Tracings and drawings, or more permanent methods such as track casting, can provide a record of the animals in an area and can become part of a permanent collection. Exchanges with teachers who have access to different species can broaden one's collection.

This article briefly reviews several common methods of casting animal tracks. We then describe a new technique for casting tracks which uses a moulage of rosin and paraffin wax. This method is an improvement over other techniques because of its versatility, high resolution of detail and durability, and because the materials can be reused if the cast is not to be kept.

Track Casting Methods

Mud

Rarely is it possible to cut around a track with a knife and to lift it out of the ground intact for return to the classroom. Murie (1974) used this method with coyote and antelope tracks in the mud of a dry lake bed, but the tracks were understandably fragile.

Paraffin Wax

Paraffin wax can be melted and poured into a track or wax from a candle can be dripped directly into a track (Hillcourt 1970; Bang 1974). Without an ample quantity of melted wax to pour quickly an irregular surface typically results. The cast also lacks contrast, making it more difficult to interpret than casts from colored material.

Water Putty

Murie (1974) reported on experiments using water putty, a yellowish-brown powder mixed with water and used for patching cracks in cement and plaster. The powder is mixed with water to the consistency of a thin batter. The cast can be made stronger by incorporating 25 percent sand to the mixture.

Plaster of Paris Moulage

Plaster of Paris is probably the most commonly used method of preserving animal tracks (e.g., Aiken 1930; Leutscher 1960; Hillcourt 1970; Bang 1974). This method requires:

- Plaster of Paris (in a waterproof container)
- Stirrer/Pouring stick
- Forceps
- Casting frame
- Water
- Salt
- Talcum powder
- Straw

All debris should be cleaned from the track with a forceps and a fine dusting of talcum powder blown into the tracks. A casting frame should be large enough to encircle the track. Frames can be made by slicing a ½ gallon waxed milk carton like a loaf of bread; these can be conveniently folded to fit into a backpack. In the field the plaster should be added to a small quantity of water in the mixing container to the consistency of pancake batter and carefully poured into the track. Salt can be added to the mixture to increase setting time. For large

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tracks the durability of the cast can be improved by adding sticks or wire to the cast while the plaster is still wet. After the cast has set for approximately ½ hour, one should cut around the edges with a knife and gently lift the cast out of the ground. Dirt and debris should not be removed from the cast until it has dried for 24 hours to one week. Because the medium is heavy and heat is generated in the chemical reaction when Plaster of Paris contacts with water, this method is unsuitable for track casting in snow.

Rosin and Paraffin Moulage

We have developed a moulage of rosin and paraffin wax which is an improvement over Plaster of Paris in mass, strength, versatility and detail of reproduction. We recommend a mixture of 1 part rosin to 3 parts paraffin. If field time is short, then a few minutes can be saved by increasing the proportion of rosin. However, this reduces the setting time at the expense of durability, a factor that should be maximized if the casts are intended for classroom use.

A rosin-paraffin moulage field kit should contain the following items:

- Foil boat of rosin-paraffin moulage
- Candle
- Candle base
- Chimney stand
- Casting frame
- Forceps
- Matches

Rock rosin can be purchased from many local hardware stores.

Before going to the field, foil "boats" of moulage must be prepared by melting the rosin and paraffin in a double boiler. A double boiler can be fashioned by placing a 1 lb coffee can into a boiling water bath. A word of caution: rosin can ignite if placed directly on a heat source. After the rosin and paraffin have completely melted and been thoroughly stirred, the moulage should be poured into boats fashioned from double thickness heavy-duty aluminum foil. Each boat should contain enough moulage for one track.

In the field, the moulage can be easily remelted with a candle held upright in a candle base, made from a cross-slitted plastic coffee lid. A chimney prevents the candle from being extinguished and serves as a stand for the moulage boat. A ½ gal waxed milk carton with both ends removed serves well in both capacities and has the advantage of folding flat for easy transport in a backpack. The top corners of the carton can be bent down and used to support the boat at the proper height above the candle (if too close the moulage will burn, if too far it will not melt) and provide additional support for the boat. To melt the moulage, the candle should be inserted into the candle base and the chimney placed over the candle and on top of the base. The candle should be ignited and the foil boat positioned on top of the chimney. The track should be prepared by removing debris with forceps and by surrounding the track with a casting frame. After the moulage has melted, the candle should be extinguished and the moulage allowed to cool until it becomes opaque around the edges. Holding the boat as close to the track as possible, the ends of the boat should be lifted upward and toward each other producing a natural spout as the boat buckles in the middle. The cast can be removed when it is completely opaque and firm to the touch.

Unlike Plaster of Paris, which generates its own heat as it hardens, moulage is easily adapted to casting tracks in the snow. While the moulage is melting, the track should be prepared by spraying it with a fine mist of water from an atomizer. This creates a thin film of ice which maintains the integrity of the track, even in the finest snow. Time should be allowed for the track to freeze before repeating the spraying or pouring the moulage. The moulage should be poured very carefully, perhaps using a small runway constructed on one side of the track.

Once the moulage has hardened and the cast has been removed from the track, it should be labeled appropriately, noting the date of collection, location, and collector's name. Moulage casts can be stored indefinitely at room temperature and used repeatedly for demonstration in the classroom. Teachers and students can use them to make their own "track" impressions in a tray containing mud or fine sand. These impressions can also be cast with moulage, providing copies of the original track to share with others. Practice with a moulage kit and prepared tracks prior to casting in the field can often provide the experience, confidence, and enthusiasm needed for observing and recording animals tracks in nature.

Summary

The study of wildlife is an integral part of a science curriculum, but maintaining animals in the classroom or observing animals in the wild is often difficult, if not impossible. Animal tracks and track casting can supplement or serve as an alternative to conventional methods of presenting lessons on wildlife and ecology. A moulage of 1 part rosin and 3 parts paraffin is suggested as the best way to preserve animal tracks for use in the classroom. This method also is easily adapted for casting tracks in the snow.

References