#1: find a dinosaur

Building a dinosaur begins with finding a dinosaur.

Dr. Sereno discovered the first skeleton of *Jobaria* with the help of Niger's Touareg tribesmen, who led him to a place where it's fossilized bones were exposed, jutting out of the desert rock. In Touareg legend, these bones come from a mythical beast named "Jobar."

After excavating this skeleton and others in the region, Dr. Sereno's team realized that "Jobar's" bones actually belonged to a new species of sauropod (or 'long-necked') dinosaur. In honor of the Touareg legend, Dr. Sereno and his team decided to name the sauopod *"Jobaria".*

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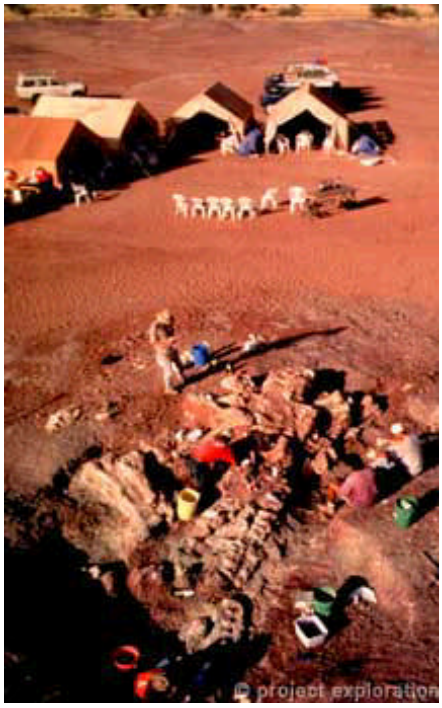
#2: dig the bones



After finding a dinosaur, you need to get the dinosaur bones out of the ground.

Jobaria is an enormous dinosaur. It was buried in nearly six feet of mud during a flash flood some 135 million years ago. As its bones fossilized the mud surrounding the bones turned to rock (lithified). Excavating this huge skeleton out of solid rock required a large-scale expedition and months of work.

The Sahara Desert is a long way from Chicago. So it took several years Dr. Sereno to assemble the right team and for the team to gather the resources and supplies they needed.

By 1997 they were ready. The 18-person, 4-month expedition spent nearly three months at the Jobaria site excavating the first skeleton and tracking down several new ones in the surrounding area.

#3: wrap the bones

#1: find a dinosaur

#2: dig the bones

#3: wrap the bones

#4: move the bones

#5: log the bones

#6: clean the bones

#7: build missing bones

#8: figure out the skeleton

#9: copy the fossils

#10: mount the copies

#11: share your discovery

If you want to get a bone out of the ground without damaging it, you need to wrap the fossil with a protective plaster jacket.

Using rock hammers, awls and chisels, the team began by removing the rock away from the top and edges of the bones. Now the fossils were ready to be wrapped in plaster-dipped burlap strips. First they covered the top and sides. Once the plaster dried then they turned the jacket over and covered the bottom of the fossil. Before they were done they numbered the jacket and logged the number in their field books. The hard plaster "jacket" would protect the bones for the long journey back to the lab in Chicago.

#4: move the bones

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#3: wrap the bones

#4: move the bones

#5: log the bones

#6: clean the bones

#7: build missing bones

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Sometimes moving fossil bones can be just as complicated as excavating them!

The jackets varied in size and shape. Some were heavy and some were VERY heavy. All of the ßjackets had to be loaded on to a truck without the use of mechanized eqipment. The team had anticipated this challenge: they had packed an aluminum tripod, pulleys, ropes and a chain. the jacket pictured above - which contained part of a skeleton of a juvenile *Jobaria* - weighed 2500 pounds.

More than 20 tons of fossil material had to be loaded and reloaded on several trucks. The jackets made a 1000 mile journey south to the port in Accra (Ghana). On the docks the team loaded the bones into containers and shipped them across the Atlantic to New Jersey. Next the jackets were transported by train and truck to the Dinosaur Lab at the University of Chicago.

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#5: log the bones

#1: find a dinosaur

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#4: move the bones

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Keeping jackets and their contents organized is a critical part of the process - especially when you are trying to build a 60-foot sauropod!

Organization was critical to the success of the expedition - and to the work in the lab. Building a sauropod requires a well thought out plan. Jackets belonging to *Jobaria* had to be opened in a particular sequence. Lab technicians relied on the jacket numbers and the field log to guide them so that each part of the skeleton could be cleaned and reconstructed in the right order.

#6: clean the bones

#1: find a dinosaur

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The methodical work of cleaning the bones and conserving them for the future takes place in the carefully-controlled preparation lab.

Lab technicians have to control their working conditions to be able to do a good job of cleaning delicate bones with pneumatic tools and stabilizing fragile cracks with glue. It took more than two years - hundreds of hours of work under bright lights - to clean all of the bones of the adult and juvenile skeletons of *Jobaria* .

In the picture above, paleontologist Jeff Wilson carefully frees the pelvic vertebrae of an adult *Jobaria* using a dental tool to gently pick away the rock.

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#7: build missing bones

#1: find a dinosaur

#2: dig the bones

#3: wrap the bones

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#6: clean the bones

#7: build missing bones

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Click on the play button to watch a quicktime movie of Dr. Sereno explaining how he reconstructed *Jobaria's* skull. (To get a free quicktime player, click here)

Even if you have discovered 95% of a dinosaur, you will still need to sculpt missing bones if you want to reconstruct a skeleton.

Once the fossils are cleaned, Dr. Sereno and his team are able to determine which of *Jobaria's* bones are damaged or missing. In the case of *Jobaria* , they had discovered almost all of the skeleton - more than 95%. The missing 5% of the skeleton had to be sculpted out of foam or in clay.

In the above photo, Dr. Sereno is holding the juvenile skull of *Jobaria* . The reddish parts of the skull are "missing bones" that have been recreated in clay, modeled after their symmetrical opposites or reduced in size from the adult skull. Dr. Sereno explains this process in the above Quicktime video.

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#8: figure out the skeleton

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When the fossils are cleaned and missing bones have been sculpted, it is possible to assemble them and plan the skeleton.

When the fossil bones of *Jobaria* were separated from surrounding rock and the missing pieces were sculpted, it was finally time to make a detailed blueprint for building the skeleton.

In this picture, *Jobaria's* tail bones (caudal vertebrae) have been laid out in their correct order so the team could study how the tail bones would look when they were strung together. The team was able to begin to develop a picture of the size and shape of Jobaria's muscles.

How did *Jobaria* move around? How much could *Jobaria* move it's neck and it's tail? Finding the answers to these questions requires careful study of *Jobaria's* bones as they come together to form *Jobaria's* skeleton.

#9: copy the fossils

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#11: share your discovery

A skeleton that is built for display is often built with exact copies of the real bones.

After Dr. Sereno and his team have a detailed blueprint for *Jobaria's* skeleton, it is almost time to build the skeleton. But *Jobaria's* bones are too heavy and fragile to mount for display as a skeleton. The thigh bone of the adult, for example, weighs almost 1400 pounds. It would be hard to mount it high in the air!

To recreate *Jobaria* , the original fossil bones were all copied. In order make exact replicas, a mold had to be made from each bone. Then, a replica (cast) was made for each. *Jobaria's* casts were made out of resin or fiberglass.

In this picture you can see the lightweight plastic replicas of *Jobaria's* bones about to be assembled as part of the skeleton.

#10: mount the copies

#1: find a dinosaur

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#8: figure out the skeleton

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#10: mount the copies

#11: share your discovery

In this picture, hollow plastic copies of the hind legs of *Jobaria* are being assembled into a skeleton.

The mounted skeleton of Jobaria began with an "armature" (metal framework) that was made of high-tensile steel. Casts of the bones were then attached to the framework. The bones end up hiding most of the steel framework from view.

As the casts of the bones were completed they were shipped to East Coolie, Canada, where the expert P.A.S.T. team mounted the skeleton.

#11: share your discovery

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The bone replicas (casts) are painted with acrylic paints to look like the color of the original fossil bone.

As you can see, the road to a mounted skeleton is long, and involves a lot of time, organization and energy!

Mark your calendar to visit Jobaria for FREE in te Crystal Gardens at Navy Pier.Two skeletons of *Jobaria* , along with the predator *Afrovenator* , will be on display from January 14-March 19, 2000.

Come and meet *Jobaria* for yourself!