



Presented by Global Creatures in association with BBC Worldwide Ltd

BBC EARTH

WALKING WITH DINOSAURS

THE ARENA SPECTACULAR

Education Resource Pack
EDUCATION PROGRAM



CONTENTS

Page 5	Introduction
Page 6	Welcome from the Creature Production Company
Page 8	No Bones About It – Walking With Dinosaurs Worldwide Tour!
Page 10	Dinosaur Fast Facts
Page 11	The Arena Spectacular – The Milestone Footprints

BEFORE SEEING THE SHOW - Age Range 5-13

Page 12	Lesson 1: Researching The Dinosaurs
---------	-------------------------------------

BEFORE SEEING THE SHOW – Age Range 14+

Page 13	Lesson 2: From Screen to Stage
---------	--------------------------------

AFTER SEEING THE SHOW

Page 14	Discussion Topics
---------	-------------------

Page 15	Fascinating Facts
---------	-------------------

AFTER SEEING THE SHOW – Age Range 5-13

Page 16	Lesson 3: The Science of Dinosaurs – Tracking Them Down
---------	---

Page 17	Lesson 4: Recreating History – The Dawn Of The Dinosaurs
---------	--

Page 18	Lesson 5: Reviewing Walking With Dinosaurs
---------	--

AFTER SEEING THE SHOW – Age Range 14+

Page 19	Lesson 6: Music of the Dinosaurs
---------	----------------------------------

Page 20	Lesson 7: Jurassic Staging
---------	----------------------------

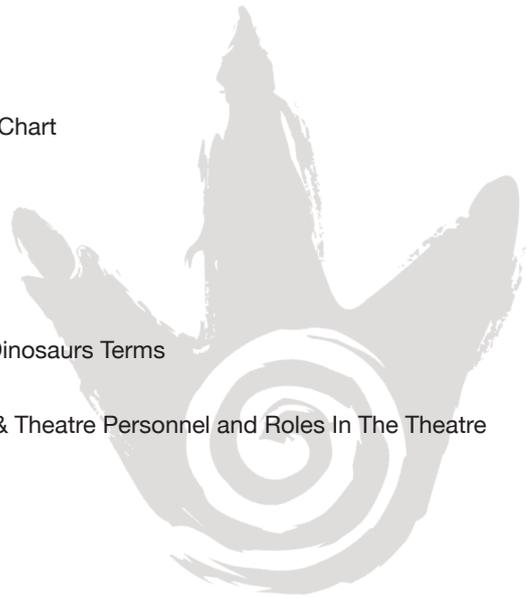
Page 21	Lesson 8: Reviewing the Spectacular
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APPENDICIES

Page 22	APPENDIX 1: Background Information – Millions of years in the making
Page 23	APPENDIX 2: Synopsis – The Life & Times of the Dinosaurs
Page 25	APPENDIX 3: Creative Team
Page 29	APPENDIX 4: Building The Dinosaurs And Their World
Page 31	APPENDIX 5: Meet The Dinosaurs
Page 36	APPENDIX 6: Dinosaur Timeline & Size Chart
Page 37	APPENDIX 7: Dinosaur Details
Page 39	APPENDIX 8: Music Of The Dinosaurs
Page 40	APPENDIX 9: The A to Z Dictionary of Dinosaurs Terms
Page 50	APPENDIX 10: Stagecraft Terminology & Theatre Personnel and Roles In The Theatre
Page 54	APPENDIX 11: Reviews
Page 57	APPENDIX 12: Curriculum Links
Page 58	APPENDIX 13: Additional Resources APPENDIX 14: References



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Dear Teacher,

Welcome to the Education Resource Pack for Walking With Dinosaurs – The Arena Spectacular.

This education program is designed for students aged 5 - 13 years, as well as those studying entertainment (performing arts, film and television) at secondary and tertiary levels. This resource includes discussion points, production facts, a total of eight lesson plans with a number of activities – two to be used before seeing the show with the remainder to take place afterwards. These later projects concentrate on various aspects of the dinosaur species, their traits, their history and environments as well as the live production, including music and staging which lead to students writing their own personal review of the show.

Each activity is based around science and history, including the dinosaurs, the world in which they lived, as well as the challenges faced taking an existing story from the screen to the stage and the recreation of the world through the eyes of these giant reptiles.

Combined with a visit to the show these lessons will give your students an insight into the life and times of the dinosaurs and their environments throughout the Triassic, Jurassic and Cretaceous Periods.

This resource pack has been created for use in the classroom and is designed to facilitate discussion and the gaining of knowledge surrounding the science of the dinosaurs and the complex elements which when combined result in this production.

We hope your students enjoy their journey Walking With Dinosaurs!

...now let's travel back to a time about 220 million years before computer games...

“This is an eye-popping excursion for young paleontologists ... attention was paid to the scientific accuracy of the educational, evolutionary narrative”

Chicago Tribune



A WELCOME FROM THE CREATURE PRODUCTION COMPANY

You are about to experience the magic and wonder of an award winning arena production, Walking With Dinosaurs - The Arena Spectacular.

Based on the critically acclaimed BBC documentary series Walking with Dinosaurs – which has been seen by over 700 million people worldwide – the production is one of the largest and most acclaimed shows to come out of Australia.

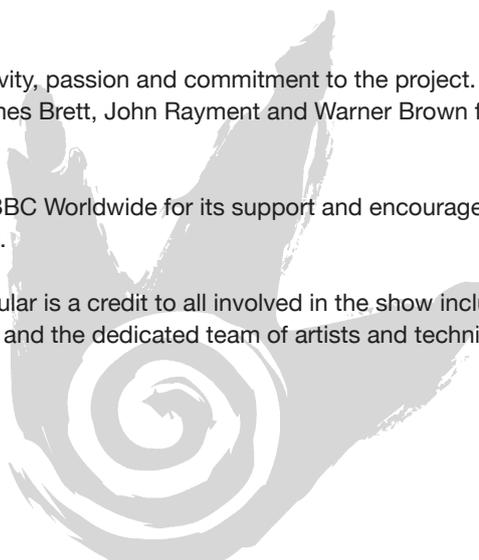
When William May, Malcolm Cooke, Jill Bryant and Bruce Mactaggart first introduced me to the show's concept and to the people behind it, I was immediately excited by its potential. However, it wasn't until Sonny Tilders and his team brought these magical and beautiful creatures to life that I realized we had created a new form of world-class entertainment.

Able led by the show's director, Scott Faris, our creative team – including artists, designers, engineers, choreographers and puppeteers – has developed and produced a show that we hope will both amaze and delight audiences around the globe.

I would like to thank each member of the team for their creativity, passion and commitment to the project. In addition, I would like to single out and thank Peter England, James Brett, John Rayment and Warner Brown for their outstanding contributions.

I would also like to thank and acknowledge Tim Haines and BBC Worldwide for its support and encouragement, and for having the faith to help us take this show to the world.

The success of Walking With Dinosaurs – The Arena Spectacular is a credit to all involved in the show including our hard working and talented puppeteers, our support crew, and the dedicated team of artists and technicians at the Creature Technology Company in Melbourne.



Gerry Ryan

GERRY RYAN
Chairman · The Creature Production Company





NO BONES ABOUT IT: MILLIONS OF YEARS IN THE MAKING – WALKING WITH DINOSAURS WORLDWIDE TOUR!

For 200 million years the Dinosaurs ruled the earth. Now, they're back roaming the arenas of the World in an extraordinary new theatrical production *Walking With Dinosaurs – The Arena Spectacular*, based on the award-winning BBC Television Series. Dinosaurs once again roam the earth in a spectacular theatrical arena show, *Walking With Dinosaurs – The Arena Spectacular*, based on the award-winning BBC Television Series.

Walking With Dinosaurs – The Arena Spectacular is now on tour in North America. Almost two million Americans have already seen the production since it opened in July 2007. The show originated in Australia, where after years of planning, *Walking With Dinosaurs* came to life at Sydney's Acer Arena in January 2007. The show proved itself such a sensation, that this North American tour was fast-tracked. It began a short three months after completing its sold out engagements in Australia.

Walking With Dinosaurs – The Arena Spectacular is brought to North America by The Creature Production Company, headed by CEO Carmen Pavlovic. Pavlovic said, "The BBC Series was a brilliant blend of special effects, escapism, excitement and information. Our show brings together all of that, plus something extra - it's live! In this production, fifteen roaring, snarling "live" dinosaurs mesmerize the audience – and are as awe-inspiring as when they first walked on earth." Pavlovic continued, "The dinosaurs are life-size, making the show so immense, it could only fit in arenas. It's a \$20 million arena spectacle of unprecedented size and quality, which captivates young and old alike. With *Walking With Dinosaurs*, we really believe we have created a new genre in entertainment and we hope to continue to bring new product to arenas for years to come"

Walking With Dinosaurs – The Arena Spectacular has sold out performances and broken records in arenas all over the America – generating \$90 million in ticket sales to date. It has been seen on *The Today Show*, *Good Morning America*, *Live with Regis and Kelly*, and has been written about in *Newsweek*, *The New York Times*, the *Christian Science Monitor* and *The Wall Street Journal*. It was the subject of a *Discovery Channel Really Big Things* episode and a video clue category on *Jeopardy*.

The production has won the 2007 THEA Award for Outstanding Achievement in Touring Event. The THEAs recognize excellence in the creation of compelling educational, historical, and entertainment projects. Artistic Director William May developed the creative vision of the show based on an original idea by entrepreneur Bruce Mactaggart to create an arena version of the *Walking With Dinosaurs* television series.

A talented and experienced team of creative artists came together to produce *Walking With Dinosaurs – The Arena Spectacular*. The show is directed by Scott Faris, a Broadway veteran who has worked side by side with Harold Prince, Trevor Nunn, Michael Blakemore, Gene Saks, John Caird, Tommy Tune and Jerry Zaks. The creatures are designed and built by Sonny Tilders; the set and projected image design are by Peter England; the show's lighting is by John Rayment, our score was composed by James Brett; and Warner Brown wrote the script. Tim Haines, creator and producer of the original BBC series, which was seen by a worldwide audience of 700 million, serves as Project Consultant to *Walking With Dinosaurs – The Arena Spectacular*. The series won six Emmy and three BAFTA Awards.

Ten species are represented from the entire 200 million year reign of the dinosaurs. The show includes the *Tyrannosaurus Rex*, the terror of the ancient terrain, as well as the *Plateosaurus* and *Liliensternus* from the Triassic period, the *Stegosaurus* and *Allosaurus* from the Jurassic period and the *Torosaurus* and the *Utahraptor* from the awesome Cretaceous. The largest of them, the *Brachiosaurus* is 36 feet tall, and 56 feet from nose to tail. It took a team of 50 – including engineers, fabricators, skin makers, artists and painters, and animatronic experts – a year to build the original production.

The show depicts the dinosaurs' evolution, complete with the climatic and tectonic changes that took place, which led to the demise of many species. With almost cinematic realism, Walking With Dinosaurs has scenes of the interactions between dinosaurs, and the audience sees how carnivorous dinosaurs evolved to walk on two legs, and how the herbivores fended off their more agile predators.

The history of the world is played out with the splitting of the earth's continents, and the transition from the arid desert of the Triassic period is given over to the lush green prairies and forces of the later Jurassic. Oceans form, volcanoes erupt, a forest catches fire - all leading to the impact of the massive comet, which struck the earth, and forced the extinction of the dinosaurs.

Variety said, "The dinosaurs are stunning, life-size and faultlessly nimble. In act one, the beasts parade into the arena gnashing and cavorting as a safari-suited palaeontologist describes their attributes ... in the second half, the action cranks up, culminating in a spectacular clash as a T-Rex mom defends her baby from predators. Sonny Tilders' triumphant creature design ensures Walking With Dinosaurs is a truly spectacular spectacular. It is everything a dino-phile could want."

The New York Times said that in this show dinosaurs make "a thundering comeback after 65 million years."

Gloria Goodale of the Christian Science Monitor said, "When the dinosaurs start pouring out onto the stage, if you don't have to stifle the natural flight response of any living breathing being, then it's your pulse that needs checking."

Newsweek called the show, "that rare entertainment beast that parents and kids can enjoy together."

It took artists and technicians one year to build the show. The 15 dinosaurs were originally "hatched" by Tilders, the head of creature design, in a Melbourne Docklands workshop big enough to park a 747. For the North American tour, the only building large enough to house rehearsals for the dinosaurs - some as large as 36 ft tall by 56 ft long, was the Greater Tacoma Convention and Trade Center! Artistic Director William May is known around the globe for co-producing shows with Malcolm Cooke for the past 30 years, including The Hobbit and The Lion, The Witch and the Wardrobe. He produced Marilyn An American Fable on Broadway and co-composed and wrote the musical Always for the West End. Director Scott Faris directed Michael Crawford in EFX at MGM Grand Hotel in Las Vegas, which at the time was the biggest stage production ever conceived, and was on the production team that created Siegfried & Roy at the Mirage Hotel. Faris has directed Chicago the Musical in 16 countries around the world in over a dozen languages. Most recently he directed Bette Midler in her new Las Vegas show, The Showgirl Must Go On at Caesars Palace.

Faris said, "We take the audience on a journey back in time and show them how the dinosaurs might have actually looked in their prime - huge, sometimes frightening, sometimes comical monsters - that fought for survival every day of their lives. Our dinosaurs move exactly like they are real—with all the roars, snorts and excitement that go with it. The realism is mind-blowing!" Sonny Tilders, who designed and built the creatures has been, for the past decade, one of the major creative forces of the high-tech world of animatronic puppetry for film and television. He was one of the lead animatronic engineers for Jim Henson's Creature workshop on the Farscape series, followed by work on Star Wars: Episode III - Revenge of the Sith, Peter Pan, Ghost Rider and The Chronicles of Narnia. Tilders said, "Many of the technologies we are using on Walking With Dinosaurs - The Arena Spectacular are borrowed from film. The computer software and hardware we have developed is based on the systems used to control animatronic creatures in feature films." "To make it appear that these creatures are flesh and blood weighing six, eight or even 20 tons, we use a system called 'muscle bags,' made from stretch mesh fabric and filled with polystyrene balls, stretched across moving points on the body. These contract and stretch in the same manner that muscle, fat, and skin does on real creatures." "The puppeteers use 'voodoo rigs' to make many of the dinosaurs move. They are miniature versions of the dinosaurs with the same joints and range of movement as their lifesized counterparts."

The puppeteer manipulates the voodoo rig and these actions are interpreted by computer and transmitted by radio waves to make the hydraulic cylinders in the actual dinosaur replicate the action, with a driver hidden below the animal, helping to maneuver it around the arena." Suited puppeteer specialists, who are inside the creatures, operate five of the smaller dinosaurs.

Warner Brown wrote the script of *Walking With Dinosaurs – The Arena Spectacular*. He is an accomplished writer whose works include the book of the musical *Flickers* on Broadway, the screenplay of *Nijinsky* for Regent Entertainment, the musical *The Black and White Ball*, which features music by Cole Porter and *The Truth About Light*, written with composer Jimmy Roberts. Other credits include a new version of *Half A Sixpence* for the West End in 2008, *Garbo – The Musical* with music by Jim Steinman and Michael Reed, playing in Europe, and the plays and musicals *Scandal*, *The Biograph Girl*, *Six for Gold*, *Cinderella*, *Talullah for a Day* and *Dance for Life*.

The score of *Walking With Dinosaurs – The Arena Spectacular* is by James Brett whose work can be heard on soundtracks including *10,000 BC*, *Alien vs Predator*, Miramax's *Ella Enchanted* and the forthcoming UK feature *Outpost*. He also helped create the groundbreaking collaboration between Metallica and the San Francisco Symphony. The album *S&M* has sold over 5 million copies worldwide.

The sets and projections are by the multi-award winning designer Peter England whose work has toured the world extensively. A frequent collaborator at Opera Australia, the Australian Ballet and Bangarra Dance Theatre, he also designed sections of the 2000 Sydney Olympic Games Opening and Closing Ceremonies, three City of Sydney New Year's Eve Celebrations and in 2002 was a finalist in the international design competition for the Pentagon Memorial in Washington DC.

Lighting Designer John Rayment lit the Opening and Closing Ceremonies of the 2000 Sydney Olympic Games; Hong Kong's original *A Symphony of Light*, a massive cityscape permanent lighting display involving over 18 buildings; Singapore's 2002 National Day Parade stadium event; and Singapore's Marina Bay annual New Year's Eve Countdown display. Rayment also works frequently at Opera Australia and has lit 30 productions for Sydney Dance Company.

Walking With Dinosaurs – The Arena Spectacular was originally produced in Australia by Gerry Ryan, Malcolm Cooke and Jill Bryant and is brought to the United Kingdom by The Creature Production Company.

Walking with Dinosaurs word mark & logo TM & © BBC 1998

<http://www.dinosaurlive.com/news/>

DINOSAUR FAST FACTS

The word dinosaur means 'terrible lizard' in Greek. A dinosaur is a reptile that developed an upright gait similar to that of mammals– that is, their legs were straight, perpendicular to the ground and supported the weight of the body so that they could walk or run more easily. Dinosaurs evolved around 230 million years ago and lived in the Mesozoic period known as the 'age of reptiles.' There were more than 700 different types of dinosaurs.

They are often classified as either meat-eaters (carnivores) like *Tyrannosaurus Rex*, or plant-eaters (herbivores) like *Triceratops*. Dinosaurs varied in size and shape. Some walked on two legs and others walked on four. Some were very fast like *Velociraptor* but some were slow and lumbering, like *Ankylosaurus*. Some had horns and spikes, or bumpy skin. But no one actually knows the colors or patterns of dinosaur skin.

Dinosaurs ruled Earth for about 160 million years, then suddenly died out around 65 million years ago. There are several theories about why this happened. The most accepted theory is that a giant asteroid crashed into earth around this time and caused catastrophic changes to the climate. It was probably freezing cold and the dinosaurs could not adapt to the new weather conditions. Scientists called palaeontologists study fossils and old bones to find out more about dinosaurs and how they lived. *Walking With Dinosaurs – The Arena Spectacular* is based on many of the findings of modern palaeontology, but it also includes many aspects that are controversial and speculative.

THE ARENA SPECTACULAR – The Milestone Footprints

North American Tour - Milestones 2007/2008

The North American Tour began July 11, 2007 in Tacoma, WA. The show has played 50 venues throughout the US and Canada (through end of Sept 2008). Almost 2 million audience members across the continent have experienced the dinosaurs live! Our Millionth audience member came to opening night in Rockford IL in March 2008.

Awards Received:

THEA Award for Outstanding Achievement in Touring Event - November 2007 (Given by the Themed Entertainment Association, The THEAs recognize excellence in the creation of compelling educational, historical, and entertainment projects.)

Venues Today Hall of Headlines Award for Bookings – December 2007

Unprecedented Media Coverage:

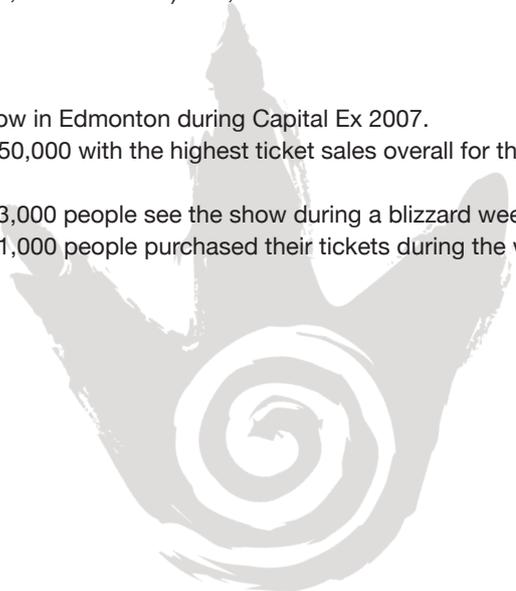
- The Today Show (June 2007) - unprecedented coverage featuring a live Baby T. Rex at Rockefeller Center and a live report from our rehearsals in Tacoma, WA.
- Live with Regis and Kelly (August 2007) - a surprise visit to the talk program that included Kelly and Regis roaming the streets of New York with Baby T.
- Good Morning America (April 2008) - Diane Sawyer kisses the Baby T. during its visit to the New York Studios with a segment from our Houston run.
- Newsweek (July 2007) - Two-page spread heralding the opening of the tour.
- Christian Science Monitor (July 2007) - Four page feature about the rehearsals of WWD-TAS in Tacoma WA.
- New York Times (October 2007) - Feature in Arts & Leisure about the return of the Dinosaurs.
- Discovery's Really Big Things (January 2008) - Two segments devoted to how really big the dinosaurs of WWD-TAS are! JEOPARDY! (May 2008) - The Dinosaurs star in a video clue category about the extinct creatures.

Most Successful Engagements By Attendance:

- New York (Madison Square Garden, July/August 2008) - 84,767
- Chicago (United Center, August 2008) - 69,989
- San Jose (HP Pavilion, December 2007) - 69,543
- Anaheim (Honda Center, August 2008) - 66,006
- East Rutherford (Continental Airlines Arena/IZOD Center, October 2007) - 65,082

Remarkable Canadian Response:

- Over 51,000 people flooded Rexall Place to see the show in Edmonton during Capital Ex 2007.
- Toronto's Air Canada Centre audience came to almost 50,000 with the highest ticket sales overall for the tour so far in Canada (by \$) last August 2007.
- In November 2007, Winnipeg's MTS Centre had over 53,000 people see the show during a blizzard week.
- In late January 2008 in Vancouver, at GM Place, over 21,000 people purchased their tickets during the week of show.



LESSON 1

BEFORE SEEING THE SHOW

Researching The Dinosaurs

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 5 – 13

This lesson allows students to explore begin discussing what they know about dinosaurs in preparation for them to attend Walking With Dinosaurs – The Arena Spectacular. It assists students to classify dinosaurs as reptiles, determining whether they still live today and whether they are related to other animals with which they are familiar.

LEARNING OBJECTIVES

- To understand what group of animals dinosaurs belong to.
- To discuss whether dinosaurs are still living today and if not, how long ago did they live.
- Determine what dinosaurs may have looked like and any features common to each of them.
- Ascertain whether dinosaurs are related to any animals which still live today.

PREPARATION

Photocopy Activity Sheet 1 for each student and provide pencils/ equipment for drawing.
Optional Resources Photocopy Appendix Five: Meet The Dinosaurs, Appendix Six: Dinosaur Timeline & Size Chart, Appendix Seven: Dinosaur Details and Appendix Nine: The A to Z of Dinosaur Terms, as needed depending upon the level of student knowledge.

LESSON OUTLINE

Dinosaurs are reptiles, which are the same type of animals as snakes, crocodiles and turtles. As a preliminary activity have your students response to the following questions:

- Can they draw and describe what these reptiles look like and then have them draw and describe what they think a dinosaur would look like?
- Can they determine whether there is anything which looks the same between these reptiles and their idea of a dinosaur?
- Ask them whether dinosaurs are still alive today and ask them how they know about dinosaurs?
- Have them share the names and any details of any dinosaurs which they know.

EXTENSION ACTIVITY

For those students who have reasonable knowledge of dinosaurs, have them undertake a dinosaur profile containing the following information:

- The name of the dinosaur
- A description of its size, colour, shape and any distinctive features
- How it moves?
- The diet of the dinosaur; and
- Whether the dinosaur has enemies and how it protects itself?

Please note – this activity is for those with advanced knowledge and following their attendance of Walking With Dinosaurs – The Arena Spectacular it is recommended that they undertake Activity 2G to further extend their knowledge.

LESSON 2

BEFORE SEEING THE SHOW

From Screen To Stage

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 14+

This lesson allows students to explore the challenges and processes of transferring a story from the screen to an arena containing live performance. It looks at the original structure and elements portrayed in the BBC television series and analyses how effectively they are translated in the development of a new Arena Spectacular.

LEARNING OBJECTIVES

- To research the history and making of the BBC Series, Walking With Dinosaurs.
- To determine what challenges would have been faced in translating the story from a television series to an arena spectacular.
- To gain greater understanding of the relationship between television production and the creation of a theatrical extravaganza based on the same subject matter.

PREPARATION

Photocopy Activity Sheet 2 for each student.

Additional Resource (not supplied): Walking With Dinosaurs – BBC Series 1999

LESSON OUTLINE

Students should be encouraged to note their existing knowledge about the dinosaurs, the time and periods in which they lived, what effected their existence and ultimately why they ceased to exist. Walking With Dinosaurs the BBC television series was made in the late 1990's using new technology to recreate these giant reptiles which used to roam the earth for the production of the series.

Students should then be given the opportunity to view the BBC television series, Walking With Dinosaurs (1999). While watching the film they should begin to identify what challenges would be faced concerning the series setting and environment when translating the concept and story to an arena production.

In addition, they should be asked to research any television series which began their lives as a stage or arena production and discuss those which have been made into an arena production, play, musical or theatre work in recent years.

EXTENSION ACTIVITY

Having now seen Walking With Dinosaurs –The Arena Spectacular, students should be encouraged to answer the following questions:

- What do they think the biggest differences are between the BBC television series and The Arena Spectacular?
- What challenges do you think were faced when adapting the story of Walking With Dinosaurs from a television series to an arena production? How successfully was this done?
- Do you think any element of the story was lost, or enhanced further during the transfer from television to a live spectacular? Explain why they think this was the case.
- In television, close-ups are used to create intimacy and wide-shots are used for landscape and space – how do they think the relationship between the action and the audience changes in a live experience?

AFTER SEEING THE SHOW**DISCUSSION TOPICS**

You may want to give your students an opportunity to discuss their experience of the performance and depending upon their level of study use the following questions to encourage discussion:

STUDENTS AGE RANGE 5-13

- Did you enjoy the show? What did you like the most?
- Was there any part of the production you didn't like? Why was this?
- How many years ago did the dinosaurs live?
- Who was your favorite dinosaur?
- Describe what your favourite dinosaur looks like?
- What did your favorite dinosaur eat?
- Based on what dinosaurs ate they are classified as Carnivores, Herbivores or Omnivores. Explain what type of food each of these terms mean?
- How did your favorite dinosaur protect itself? Who did it need to protect itself from?
- Can you remember the name of the biggest dinosaur?
- Could any of the dinosaurs fly?
- How do you think the dinosaurs walked and moved?
- What did you learn about the history of the Triassic, Jurassic and Cretaceous periods in which the dinosaurs lived?
- Why do you think the dinosaurs died out?
- Would you like to have lived in the time of the dinosaurs?
- Would you like to be a palaeontologist and study dinosaurs?
- Did you have a favorite part of the show? What was it and why was it your favorite?
- Would you like to see the show again?

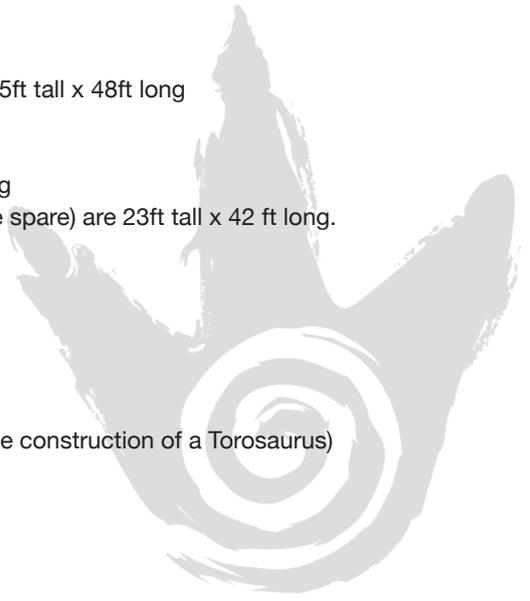
STUDENTS AGE RANGE 14+

- Describe how do you think the dinosaurs were operated?
- Do you think the dinosaurs were realistic? Why do you think this is the case?
- What did you learn about the how the continents in the world were formed from Pangaea?
- Were there any significant changes to the environment throughout time and if so what were they? How did they impact the dinosaurs, plants and other living organisms?
- Did you like the narrator? What was his role in the show?
- Did you have a favorite scene and why do you think it was important to the story?
- Did the musical choices propel forward or hold back the history of the dinosaurs and the times in which they lived?
- Did the music help create the drama that may have existed between the species?
- Do you think the music assisted to convey the behavior and characteristics of each of the dinosaurs? Explain why you think this was or was not the case.
- What was the most effective element of the set? Why do you think so?
- How effective was the lighting in creating the landscape of the different periods of time?
- How did the staging and lighting work together to achieve these different environments?
- How effective were the sound effects in depicting the sounds made by the dinosaurs? Do you think this is how a dinosaur would have sounded? Explain, why you think this would be the case?
- Were there elements of the production that you believe did not work to enhance the story? Why do you believe this and how would you have done this differently?
- How effective was the transfer of the story from the BBC television series to the Arena Spectacular?
- What do you think would have been the biggest challenge making a live arena show? Describe how these challenges were or were not overcome in the live performance.
- Would you like to see the show again? Explain why you would or would not.
- Would you recommend attending the show to your family and friends? What element/s would they most enjoy and why?

FACTS

FASCINATING FACTS

- Walking With Dinosaurs – The Arena Spectacular stars 15 Dinosaurs in all with ten separate dinosaurs species being represented.
- There are 10 large dinosaurs in the Arena Spectacular which include:
 - Plateosaurus which is 10ft tall x 31ft long
 - Stegosaurus which is 18.5ft tall x 36ft long
 - Allosaurus which is 14.5ft tall x 43ft long
 - Brachiosaurus as an adult is 36ft tall x 56ft long and as a baby is 29.5ft tall x 48ft long
 - Ornithocheirus has a wing span of 38ft
 - Ankylosaurus is 12ft tall x 34ft long
 - Torosaurus of which there are two in the show, are 13ft tall x 30ft long
 - Tyrannosaurus Rex of which there are two in the show (including one spare) are 23ft tall x 42 ft long.
- There are five suit dinosaurs in the show which include:
 - Three Utahraptors which are 8 ft tall x 14ft long
 - One Baby T-Rex (including one spare) which is 7 ft tall x 14 long
 - One Lilliensternus which is 7.5 ft tall x 16 ft long
- Each large dinosaur contains the following elements (based upon the construction of a Torosaurus)
 - 433 ft of hydraulic hose
 - 971 ft of fabric
 - 433 ft of foam
 - 53 gallons of paint
 - Seven kilowatts of power from 12 truck batteries
 - 1094 yards of cabling in each body
 - 24 microprocessors control movement along with 15 hydraulic rams; and
 - Six hydraulic motors each
- More than 16, 404 ft of fabric was used to produce the skins of the dinosaurs which is enough fabric to cross the Sydney Harbour Bridge 10 times over.
- Each large dinosaur weighs 1.6 tons a piece which is the same weight as a standard family car and runs on 6 roller blade wheels.
- To operate one dinosaur, it takes a team of three people including
 - One Driver; and
 - Two Voodoo Puppeteers. One operates the head and tail gross motion while the other is in charge of minor movements including the mouth, blinking and roars
- There is often more than one actor playing the narrator “Huxley” on each tour.
- The dinosaurs require 27 – 53 foot semi-trailers (73 ft long with cabin) to transport the entire physical production from city to city.
- Walking With Dinosaurs – The Arena Spectacular has a cast of 65 performers and voodoo operators.
- The 15 Cast include six suit performers, two actors and seven puppeteers.
- The 45 Crew include nine dinosaur drivers, three person skins/dressing staff, and multiple engineers, lighting and sound personnel, carpenters, riggers and workers in audio visual and automation.
- Walking With Dinosaurs – The Arena Spectacular was created in Australia where 300,000 people saw the show in Australia in early 2007
- The production began touring the world from July 2007
- Since then the production has been touring North America (Canada, Mexico and US) travelling to over 60 cities by the end of 2008
- Over 1,000,000 people saw the show in North America (spring 2008)



LESSON 2

AFTER SEEING THE SHOW

LESSON 2: The Science Of Dinosaurs – Tracking Them Down

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 5 - 13

This lesson acts as an introductory unit for students into the world of dinosaurs. It begins with basic interactive activities for younger students before identifying different species, their physical characteristics, diet, predators and how they protect themselves.

LEARNING OBJECTIVES

- To extend knowledge and interest about dinosaurs.
- To identify actual species, their characteristics, how they lived and protected themselves.
- To further understand the interaction of different species through group discussion.

PREPARATION

Photocopy Activity Sheet 2A, 2B, 2C, 2D, 2E or 2F/ 2F Extension Activity for each student.
Photocopy Appendix Five: Meet The Dinosaurs, Appendix Six: Dinosaur Timeline & Size Chart, Appendix Seven: Dinosaur Details and Appendix Nine: The A to Z of Dinosaur Terms, as needed.

LESSON OUTLINE

Activity 2A: Colour in Tyrannosaurus Rex

Activity 2B: Make Your Very Own Dinosaur Mask

Activity 2C: Dot-to-dot Dinosaur

Activity 2D: Drawn Your Own Dino!

Activity 2E: Name The Dinosaur – Your students are encourage to name some of the dinosaurs which they would have seen in Walking With Dinosaurs – The Arena Spectacular.

Activity 2F: Your students are encouraged to be a Palaeontologist and track down a dinosaur which is of interest to them. They should research the following as part of this activity:

- The name of the dinosaur
- A description of its size, colour, shape and any distinctive features
- How it moves
- The diet of the dinosaur; and
- Whether the dinosaur has enemies and how it protects itself.

EXTENSION ACTIVITY

Activity 2G Using the Walking With Dinosaur Timeline, students should identify which period of time (Triassic, Jurassic or Cretaceous) the dinosaur they studied as a Palaeontologist would have lived.

As a group activity, they should compare their dinosaur with those studied by other Palaeontologists in their class and group all the dinosaurs in each period - Triassic, Jurassic or Cretaceous. Once in groups, they should use the information from their dinosaur profile to determine the similarities and differences between them to discuss in groups as follows:

- Which dinosaur is the biggest in each period?
- Do they look similar or do they look different to each other?
- Do they move the same way?
- Do they eat the same types of food or do they have different diets?
- Does each dinosaur have an enemy from whom they need to protect themselves?
- If so, how do they protect themselves?

They should then be encouraged to present the results of their study to the other Palaeontologist in their class. who have been researching the dinosaurs in the other periods of time to see what they have discovered.

LESSON 3

LESSON 3: Recreating History – The Dawn Of The Dinosaurs

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 5 - 13

This lesson contains more advanced activities for students into the world of dinosaurs and the natural world. It explores how scientists know so much about dinosaurs and the environments in which they lived, while expanding your student's vocabulary around these concepts and extends learning through research activities surrounding geographical changes to the earth as well as the extinction of these giant reptiles.

LEARNING OBJECTIVES

- To recreate the process of how fossils and sedimentary rocks are formed.
- To expand a vocabulary, spelling and understanding of dinosaur terms and names.
- To trace the changes to the natural world and relationship to dinosaurs over time.
- Research the possible reasons behind why the dinosaurs died out.

PREPARATION

Photocopy Activity Sheet 3A, 3B, 3C, 3D, 3E, 3F, Extension Activities 3G or 3H for each student.

Photocopy Appendix Two – Synopsis: The Life and Times of the Dinosaurs, Appendix Five: Meet The Dinosaurs, Appendix Six: Dinosaur Timeline & Size Chart, Appendix Seven: Dinosaur Details and Appendix Nine: The A to Z of Dinosaur Terms, as needed.

LESSON OUTLINE

Activity 3A - Make Your Own Fossil - Fossils are parts of animals or plants that have been preserved in stone over time. Fossils are how Palaeontologists know so much about what dinosaurs looked like ate and how they moved. This activity allows your students to make their own fossil.

Activity 3B – Make Your Own Sedimentary Rock - Sedimentary rocks are formed in layers in different environments over hundreds of thousands to millions of years and often contain fossils. Make your own sedimentary rocks, like those which allow geologists to determine how the earth has changed over millions of years.

Activity 3C - Dinosaur Detective: Find A Word Intermediate - An expedition to find words which describe what the world where the dinosaurs lived.

Activity 3D - Dinosaur Detective: Find A Word Advanced - An expedition to find the names of all the dinosaurs, the periods in which they lived and some of their unique characteristics.

Activity 3E – Dinosaur World Dictionary - Create a dinosaur word dictionary by researching the meaning of terms found in Walking With Dinosaurs – The Arena Spectacular.

Activity 3F – What's In A Name: Dinosaur Prefixes and Suffixes - By looking at the prefixes and suffixes it is possible to determine more information about each dinosaur and its characteristics.

EXTENSION ACTIVITY

Activity 3G - History Of Pangaea - About 248 million years ago a supercontinent called Pangaea existed. Over time it began to drift apart. Your students should research and briefly trace the changes to the earth and lives of dinosaurs as depicted in the maps.

EXTENSION ACTIVITY

Activity 3H - Disappearing Dinosaurs - From what your students have learnt from Walking with Dinosaurs – the Arena Spectacular, they should undertake a research report that explains why the dinosaurs may have become extinct millions of years ago, including possible changes to the earth's temperature, sea level, volcanic eruptions, the development of a gaseous atmosphere and meteorite collisions.

LESSON 4

LESSON 4: Reviewing Walking With Dinosaurs

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 5 - 13

This lesson encourages students to think about the performance and all the aspects of the show they have seen. Students should then write their own review of the show which talks about the dinosaurs themselves, the science of the dinosaurs and their world, how they think they worked, as well as the staging, music, lighting and sound designs which helped create the dinosaur world.

LEARNING OBJECTIVES

- To understand the concept of how to experience and review live performances.
- To share their thoughts and opinions on the shared experience of attending the production.
- To clarify and express their own views in a written form
- To enable them to gain a simple understanding of the elements of a live performance.

PREPARATION

Photocopy Activity Sheet 4 and Extension Activity 4 for each student.

Optional Resource: Photocopy Appendix 8 - Reviews of production: Toscano, M. 'Roaming the Earth Once More', The Washington Post, September 14, 2007 and Cohan, P. 'Making a Thundering Comeback After 65 Million Years', The New York Times, October 3, 2007, as needed.

LESSON OUTLINE

Reviews of live performance are a means by which someone is able to express their views of their experience, as well as provide a reference and additional information about the show or spectacular. Students should be asked to prepare a review of the production which included their own thoughts and experience of the show as well as looking at the dinosaurs, the staging/ set design, music, lighting and sound as follows:

- They should initially be asked to write down phrases and words which describe what their experience of Walking With Dinosaurs – The Arena Spectacular.
- They should discuss the dinosaurs – what they looked like, did they think they were real, how do they think they walked and moved and did they think they looked and sounded real?
- What did the staging/ set design look like, how did it create the dinosaur's environments and different times and places? Did they like the special effects such as the flowers growing?
- Can they recall what the music for the show was like? Did the type of music change from the small dinosaurs to the large dinosaurs? If so, why would this be the case?
- Did they like the lighting for the show? Did it help create the dinosaur's world and if so how?
- Do they think the dinosaurs sounded like real dinosaurs would have?
- What was the role of the Narrator? (the man telling the story) Was it important to the show for him to be telling the story of the dinosaurs?

EXTENSION ACTIVITY

Reviewing the Review Walking With Dinosaurs – Group Activity

Following their personal review of the production, extracts from reviews which have appeared in newspapers should be read to the class to broaden their knowledge of how the show was performed and remind them of their own experiences. Discussion should be encouraged amongst the class before they respond to the following:

- Discuss what they think the reviewer meant by their comments and what thoughts they were trying to express about Walking With Dinosaurs – The Arena Spectacular?
- Explain whether they learnt anything new from what the reviewer has to say about the show?
- Explain whether they agreed or disagreed with the reviewer's comments about the show?

LESSON 5

AFTER SEEING THE SHOW

LESSON 5: Music of the Dinosaurs

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 14+

Central to Walking With Dinosaurs – The Arena Spectacular is the soundtrack of original music which not only pushes forward the history, but also provides insights into the character traits and behavior of the dinosaurs and their interaction with each other. In addition, the music serves to entertain the audience and provide opportunities to reflect a soundscape assisting us to imagine their life and times.

Students will explore the impact the music in contributing to the structure of this type of production.

LEARNING OBJECTIVES

- To understand the importance of music on the structure of an arena spectacular.
- To investigate the impact music has on the plot, characterisation of the dinosaurs and as a tool for integration of other elements such as staging.

PREPARATION

Photocopy Activity Sheet 5 and/or Extension Activity 5 for each student.

Photocopy Appendix Two – Synopsis: The Live & Times Of The Dinosaurs and Appendix Eight – Music of the Dinosaurs

Additional resource (not supplied): Walking With Dinosaurs – The Live Experience, compact disc (ABC Classics)

LESSON OUTLINE

Walking With Dinosaurs – The Arena Spectacular features an original score with music specifically composed to carry the plot forward, depict the action and mood of the dinosaurs within the music as well as an underscore the movements of the staging components depicting the changes in time. Students should assess the following:

- How important do they believe the music was to the structure Walking With Dinosaurs – The Arena Spectacular?
- Discuss how different pieces of music can range in type, change a mood and alter the speed of the story being told.
- Identify what other functions the music can play in an arena spectacular? Could the music be seen to create intimacy and expanse through the dynamics contained within it?

EXTENSION ACTIVITY

To further your student's ability to understand the imagery and range of emotions which can be conveyed through the music in live performance, students are encouraged to undertake the following exercise:

- Select two contrasting pieces of music from the production and discuss their placement in the arena spectacular.
- Undertake an auditory analysis of each piece of music focusing on the follow elements – tempo, rhythm, dynamics, major/ minor keys and instrumentation.
- Explain why they believe these choices were made to fulfill particular purposes within the production.

LESSON 6

LESSON 6: Jurassic Staging

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 14+

This lesson allows students to explore animatronics and physical production elements central to the staging of Walking With Dinosaurs – The Arena Spectacular which are responsible for creating both the dinosaurs and the worlds in which they lived, ensuring the realistic nature of the production.

LEARNING OBJECTIVES

- To understand how animatronics, staging, costumes, lighting, sound and special effects can create the illusion of different times and places, using the one space such as an arena.
- To show an understanding of how one production element was vital to this production and enhanced the story.
- To research the impact of technology on staging techniques and past practices leading to the development of computer generated staging, lighting, sound and collaborative performances with actors, technicians and puppeteers.

PREPARATION

Photocopy Activity Sheet 6 and/or Extension Activity 6 for each student.
Photocopy Appendix Four – Building The Dinosaurs And Their World

LESSON OUTLINE

Students should be asked to identify one dinosaur and one piece of staging used to create its environment or a period of time (within Triassic, Jurassic and Cretaceous) which was depicted in the creation of the physical world through time.

Once the staging has been selected the student should suggest how think it was achieved including all the elements which contribute to the creation of what they saw in the arena.

Attention should be paid to the way in which the dinosaur was operated and how the lighting and staging elements enhanced these moments as well as how a sound scape or sound effects contribute to the overall atmosphere.

EXTENSION ACTIVITY

As a research task students are to compile a report focusing on the art of stage and special effects. They should focus on how these effects have developed over the last 20 years with the incorporation of computer technology such as that used in the animatronics (in part the operational system behind the dinosaurs) automation (the system which allows Pangaea to evolve) moving lights and computer operated sound desks.

As part of this research, students should also explain how at least two special effects were achieved prior to the use of such technology.

LESSON 7

LESSON 7: Reviewing the Spectacular – Walking With Dinosaurs

ACTIVITY SUITABLE FOR STUDENTS AGE RANGE 14+

This lesson encourages students to discuss the performance they have experienced and to critically analyse this experience, while assessing each elements which contributes to the show. In addition, they are invited to critique a published review allowing for the broadening and refining of their analytical skills with regard to other points of view when looking at the same production.

LEARNING OBJECTIVES

- To critically analyse their experience of Walking With Dinosaurs – The Arena Spectacular.
- To share thoughts and opinions on the shared experience of attending the production.
- To clarify one's own view and be able to express persuasively and succinctly.
- Assess the production's elements and value of the production as entertainment
- To critique and respond to the views of another in a written assessment.

PREPARATION

Photocopy Activity Sheet 7 and/or Extension Activity 7 for each student.

Photocopy Appendix Eleven - Reviews of production: Toscano, M. 'Roaming the Earth Once More', The Washington Post, September 14, 2007 and Cohan, P. 'Making a Thundering Comeback After 65 Million Years', The New York Times, October 3, 2007.

LESSON OUTLINE

\Students should be asked to prepare their own review of the production incorporating all the creative elements such as structure, script, performers/ puppeteers, musical choices, production design, costuming, lighting and sound. They should be encouraged to assess the effectiveness of, but not limited to the following:

Role of the Narrator: What role did the narrator play in recreating the history of the times?

Setting: How effective was the setting in depicting the world of the dinosaurs and the environments of Pangaea, the Triassic, Jurassic and Cretaceous Periods? What technical elements contributed to this?

Staging: Did the staging appear to achieve its aims for so many diverse environments?

Music: How did the music enhance the narrative and further enhance the atmosphere of the work?

Choreography/ Puppeteering: What styles and techniques were used and how well did it support the music, characters and story? How did the puppeteers work to create the realism of the dinosaurs?

Themes: How effectively did all the elements of the production support and portray the story of the dinosaurs and the history of the natural world?

EXTENSION ACTIVITY

Reviewing the Review - Walking With Dinosaurs – The Arena Spectacular

Following their personal review of the production, they should be encouraged to review an existing published review as follows:

- Critically analyse a published review of the production.
- Identify those comments they agree with, as well as those they disagree with regarding the structure of the production, the script, performers/ puppeteers, production design, music choices, effectiveness of the dinosaurs, costumes, set design, sound and lighting choices.
- Explain why they agree or disagree with the reviewer's assessment of the arena spectacular?

1

APPENDIX ONE – BACKGROUND INFORMATION – Millions Of Years In The Making

'Walking With Dinosaurs took six years to create. The show requires 150 people to stage, including a spectrum manager to control radio frequencies used to operate the dinosaurs. Twenty-five tractor-trailers are needed to transport the 116,000 pounds of scenery, lights and sound equipment, and the 30 tons of dinosaurs'. The New York Times

The idea for Walking With Dinosaurs started in 1996. At the time it was a science TV producer at the BBC and knew they were looking for a big series about palaeontology. In particular they wanted it to appeal to the widest possible audience, to bring the subject alive. This was only a couple of years after Jurassic Park had come out which set a new bench mark in dinosaur imagery, so rather naively I suggested we use the same techniques to make a series of prehistoric natural history programmes. I had an image of a small raptor trying to catch dragonflies in the evening light of a Cretaceous summer - one of these extraordinary animals doing something quite normal and natural. Overall the aim was to create an immersive experience that was both spectacular and informative.

As I investigated further I realised how difficult it would be to achieve. The first quote I got for creating these computer dinosaurs was 10,000 US dollars a second which was way beyond a TV budget and Jurassic Park had only about nine minutes of dinosaurs in it, we needed three hours. So my initial ideas concentrated heavily on the insects, plants and landscapes of the Mesozoic with the occasional dinosaur thrown in. Fortunately my search of UK graphics companies brought me to Framestore where I met Mike Milne. He understood exactly what I was trying to achieve and showed a flexibility and imagination that allowed us to bring down the cost of animation. Suddenly, thanks to Mike and his team, I could have a programme full of dinosaurs.

We shot a six minute pilot among some old Mediterranean pines in Cyprus and this was enough to persuade the BBC, Discovery and BBC Worldwide to fund the series. It was essential that this vision of the past was as accurate as possible even though it could only ever be based on scientific conjecture. For six months we did nothing but research - carefully choosing the moments in the Mesozoic that scientists knew the most about.

To create a complete picture of the past we needed all the information we could get. Then between the summer of 1997 and winter 1998 producer Jasper James and myself took a small production crew to some of the last places on Earth where ancient plants and trees still survive so we could capture the right backgrounds for our dinosaurs. These small patches of untouched wilderness are some of the most beautiful places on the planet and we were truly privileged to spend weeks in them filming. These included the araucaria forests in New Caledonia and southern Chile, the redwood forests in California, the beech gap on South Island New Zealand and the Labyrinth in Tasmania.

While the film crews sat in southern Pacific forests shooting lots of pretty shots of landscape with nothing in it, Mike Milne and his team of animators started work on the dinosaurs. With a lot of advice from Palaeontologists we built accurate models of almost 20 dinosaurs (and several other weird and wonderful creatures from the same time) and then scanned them into the computer. The team then faced a huge task. They were attempting something that had never been tried before even in Hollywood - hours of high quality photoreal animation. The first show took a year to animate but once Mike's team have overcome their teething problems, the last five only took six months.

Once our creatures were up and running they looked magnificent and suddenly the era came alive - walking, running, feeding and fighting, a whole menagerie of creatures many of which have never been seen outside the pages of scientific journals. When I first saw the images of our polar Allosaurus wandering among the Podocarps of New Zealand I knew we had created something quite special. The six half hour programmes were finished and first broadcast in October 1999 on the BBC1.

TIM HAINES

Creator and BBC Series Producer Walking With Dinosaurs

2

APPENDIX TWO – SYNOPSIS: THE LIFE AND TIMES OF THE DINOSAURS

TRIASSIC PERIOD

245 to 208 million years ago



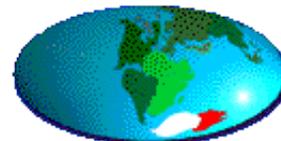
220 million years ago

Roughly 248 million years ago (mya), the Permo-Triassic extinction occurred. This is the largest extinction known. About 95% of all species and about 60% of the genera died out, including many marine animals (like the trilobite). The cause of the Permian extinction might have been global cooling, volcanic eruptions, or a decrease in the continental shelf area during the formation of the giant continent, Pangaea. This catastrophic extinction and continental rearrangement opened the way for the rise of the dinosaurs and mammals. There were no dinosaurs at the beginning of the Triassic, but there were many amphibians and some reptiles and dicynodonts (like *Lystrosaurus*). During the early Triassic, corals appeared and ammonites recovered. The Triassic meadows and prairies would have been covered in ferns, low cycads, club mosses and horsetails as these plants dominated the land; in the Northern hemisphere, conifers flourished. There was no grass and no flowers. The first half of the Triassic was dry and highly seasonal, with particularly large annual temperature variations in the vast continental interior of Pangaea. Low sea levels probably exaggerated these temperature extremes. The environment was harsh, with deserts and dry wilderness. 230 million years ago a unique breed of reptile appears, the dinosaur. Most Triassic dinosaurs were small bipeds, but at the end of the Triassic the first large sauropods appear.

Walking with Dinosaurs · The Arena Spectacular features the Plateosaurus and Liliiensternus from the Triassic period.



152 million years ago



149 million years ago

JURASSIC PERIOD

208 to 144 million years ago

At the beginning of the Jurassic the Earth's continents were still jammed together, making much of the inland area dry and desert-like, but they were beginning to drift apart and there was no polar ice. There had been a minor extinction at the end of the Triassic period, which gave rise to an abundance of dinosaurs in the Jurassic. In the Middle Jurassic, the supercontinent Pangaea started to drift apart. A north-south rift formed in mid-Jurassic, and by the late Jurassic, the separation of the continents of Laurasia and Gondwana was almost complete. During the Jurassic period sea levels began to rise, probably due to an increase in sea-floor spreading. This caused flooding of large areas of the continents. As a result, the deserts began to retreat, and continental temperatures stabilized. Pangaea also began to break up into smaller units, which brought more land area in contact with the ocean. The presence of nearby oceans also increased humidity, so that climates worldwide became wetter as well as warmer. This effect created an environment that was warm and tropical. The deserts were replaced by lush forests of conifer trees and vast open fern prairies. The herbivorous sauropod had become the largest creatures to ever walk the earth. Allosaurs emerged as the alpha predators. Some of the smaller carnivores developed feathers and took to the air, including *Archaeopteryx* (Ancient Wing). There was a minor mass extinction toward the end of the Jurassic period. During this extinction, most of the stegosaurid and enormous sauropod dinosaurs died out. The cause of the extinction is unknown.

Walking with Dinosaurs · The Arena Spectacular features the Stegosaurus, Allosaurus and Brachiosaurus from the Jurassic period.

2

APPENDIX TWO – SYNOPSIS: THE LIFE AND TIMES OF THE DINOSAURS

CRETACEOUS PERIOD

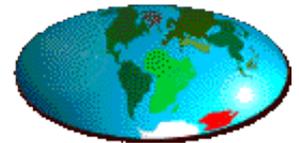
144 to 65 million years ago



127 million years ago



106 million years ago



65 million years ago

During the Cretaceous, the supercontinent of Pangaea completed its breakup into present day continents, although their positions were substantially different. Though Gondwana was still intact in the beginning of the Cretaceous, Gondwana itself broke up as South America, Antarctica and Australia rifted away from Africa. The Indian Ocean was newly formed. Such active rifting lifted great undersea mountain chains along the welts, raising sea levels worldwide. Laurasia started to rotate clockwise and moved northward with North America to the north, and Eurasia to the south. The environment was warm and sub tropical and there was no ice at the poles. The sea levels were high. Broad leaf trees replaced the conifers and flowering plants appeared for the first time and became the dominant flora. The landscape looked very similar to the landscape today, but there were still no grasses. On land, mammals were a small and still relatively minor component of the fauna. In the skies, Pterosaurs were common in the early and middle Cretaceous, but as the Cretaceous proceeded faced growing competition from the adaptive radiation of birds. Dinosaurs continued to diversify and dominate the landscape. The herbivorous Hadrosaurs, Ankylosaurs and Ceratopsians emerged. New carnivore groups developed including the Tyrannosaurs, Spinosaurus and Dromaeosaurs. One of the most widely accepted explanations for the mass extinction of animal and marine life at the end of the late Cretaceous is the collision of a meteor into the earth. Many changing environmental elements contributed to the demise of the dinosaurs; however, it seems the impact of an extraterrestrial body was the decisive factor.

Walking with Dinosaurs - The Arena Spectacular features the Ornithomimus (pterosaur), Torosaurus, Ankylosaurus, Utahraptor and Tyrannosaurus Rex from the Cretaceous period.

PRESENT DAY



present day



3

APPENDIX THREE– CREATIVE TEAM



WILLIAM MAY – Artistic Director

Imagine being asked to bring dinosaurs back to life after 65 million years to appear in a live arena spectacular! Well William May did just that with the ground-breaking show *Walking with Dinosaurs · The Arena Spectacular*. William was born in Brooklyn, New York. He is dyslexic. His motto is “If you can dream it, you can achieve it”. William is a world renowned Artistic Director and his driving passion is to give children and families the experience of “wonderment”, igniting their imagination to dream. He discovered and managed Australian artist Samantha Sang and with the Bee Gees Barry Gibb, produced her number one hit record *Emotion*. For 30 years he and his partner Malcolm Cooke have produced original, acclaimed stage shows including *The Hobbit* and *The Lion, The Witch And The Wardrobe*. His Broadway debut musical was *Marilyn - An American Fable*, the life story of Marilyn Monroe. He co-composed and co-wrote the West End Musical *Always – the love story of King Edward VIII and Mrs Simpson*. William offers gratitude to creative consultant, Kim Poster of Stanhope Productions who helped assemble the international creative team. William is represented by Irving Azoff and Harry Sandler of Front Line Management Group, one of the largest management and touring companies. Irving says “Bill’s imagination will take audiences to places they could never have dreamed of.”



SCOTT FARIS – Director

Scott Faris originally from California, attended USIU in San Diego and started his career performing in commercials, industrials & musicals, among them *A Chorus Line*. He stole most of his directing skills while working as a production stage manager and supervisor for some of the best directors on Broadway on productions like *City of Angels*, *Les Miserables*, *Cabaret*, *Cats*, *Grease*, *Busker Alley*, *Ain’t Misbehavin’*, *Children of a Lesser God*, and *Whistle Down The Wind*. He has directed over a dozen productions of the hit musical *Chicago* on five continents. In Las Vegas, he directed EFX at the MGM Grand Hotel, and *Bette Midler - The Show Must Go On* at Caesars Palace; and was part of the production team that created *Siegfried & Roy* at the Mirage Hotel. He conceived and directed *George Lucas Live Adventure*, a multi-media arena spectacular that played Japan’s largest arenas. A personal highlight was helping Bette Midler return to the stage in her tour, *Experience the Divine*. Scott lives in New York City with his daughter, Emily, who attends the High School of the Performing Arts, the school made famous by the movie *Fame*.



WARNER BROWN – Script Writer

In America, Warner Brown’s musical *Flickers* was first seen at Broadway’s Circle-in-the Square Theater. He wrote the screenplay *Nijinsky* for Regent Entertainment in L.A. and the ‘new Cole Porter musical’ *The Black and White Ball*. In Europe, Warner’s credits include *Musical of the Year*, starring Denis Quilley, Al Jarreau and Sir Peter Ustinov, and book and lyrics for *Garbo – the Musical*, with music by rock legend Jim Steinman and Michael Reed. In the U.K., Warner’s work includes the plays *Laughing Dove*, *Scandal* and *The Prospero Suite*, directed by John Doyle; the all-star production of *Cinderella* at the London Palladium and the musicals *Six For Gold*, *The House on the Corner* and *The Biograph Girl*, with composer David Heneker. Heneker and Brown were the subjects of the BBC documentary *The Making of a Musical*. For Gillian Lynne, at the request of Diana, Princess of Wales, Warner wrote *Dance For Life* at London’s Her Majesty’s Theatre. His new version of the classic show *Half A Sixpence* is currently on a national tour. Among his numerous credits for the BBC, Warner was Script Associate of the *Classic Musicals* series, directing such artists as Tyne Daly, Barbara Cook, Anthony Newley and Julia Migenes.

3

APPENDIX THREE– CREATIVE TEAM

**JAMES BRETT – Composer**

James Brett studied at The Royal Academy of Music in London. Alongside the composer Michael Kamen, James worked on films such as *The Event Horizon*, *The Iron Giant*, *Frequency*, *X-Men The Movie* and *Band Of Brothers*. In 1999, as assistant Musical Director, James helped mastermind the groundbreaking collaboration between Metallica and the San Francisco Symphony. In 2002, James served as assistant Musical Director for the BBC Party at the Palace, part of the Queen's Golden Jubilee Celebrations. James is currently sought after as a composer and arranger by some of the more prestigious film companies both in the US and Europe. Recently James has composed music on projects such as *Outpost*, *10,000bc*, *Alien VS. Predator*, *Ella Enchanted*, *The Life & Death Of Peter Sellers* and two seasons of the cult TV show *HEX* for Sky. James scored the music for *Walking with Dinosaurs - The Arena Spectacular* in Sydney. His involvement in an arena show of this nature was one of the highlights of his career.

**SONNY TILDERS – Creature Designer**

Sonny Tilders has spent the last 20 years making critters and weird contraptions for both the film and theatrical industries. His formal training is in graphic design having graduated from Swinburne University in 1988. Sonny worked the next 10 years at Australia's foremost models and effects company, Mothers Art Productions, in Melbourne. He left in 1998 as their senior project manager for film and television to pursue his interests in the specialized field of "animatronics" (the world of high-tech puppet making). Sonny's work can be seen in US feature films such as *Peter Pan*, *Ghost Rider*, *The Chronicles Of Narnia* and *Star Wars*, *The Revenge Of The Sith* as key animatronics engineer. His television credits include being lead animatronics engineer for the US science fiction series *Farscape*. Working there with the resources of the Jim Henson's Creature Shop was a great opportunity to develop his animatronic skills further. Although focusing on film and television Sonny has also made puppets for Australian theatrical touring productions of *The Hobbit* and *The Lion, The Witch And The Wardrobe*. To meet the technical and creative demands presented by *Walking With Dinosaurs – The Arena Spectacular*, Sonny is proud to have assembled an extraordinary team of talented artists and technicians from throughout Australia without whom none of what you see in this show would be possible.

**PETER ENGLAND – Set Design & Projected Images**

Bachelor of Performing Arts in Design, National Institute of Dramatic Art, 1994. Bachelor of Landscape Architecture (Hons.), University of New South Wales, 1986. Helpmann Award for Best Set Design in 2001, 2002 and 2004. Green Room Award for Best Opera Design in 1998 and 2002. Green Room Award for best Dance Design, 2005. Mike Walsh Fellowship, 1997. Finalist in the Pentagon Memorial Design Competition (with Room 4.1.3), 2002. Peter has designed over 50 event and theatrical productions including: For Bangarra Dance Theatre: *Boomerang* (Green Room Award 2005), *Unaipon* (Helpmann Award 2004), *Bush*, *Walkabout*, *Skin* and *Fish*. For Opera Australia: *Sweeney Todd* (Helpmann Award 2002, Green Room Award 2003), *Simon Boccanegra*, *La Bohème* and *Madama Butterfly* (Green Room Award 1998). For The Australian Ballet: *Amalgamate*, *Aesthetic Arrest* and *The Rite of Spring*. For the Shakespeare Theatre (Washington DC): *Titus Andronicus*, *Richard III* and *Hamlet*. For Sydney Theatre Company: *Victory*, *The Virgin Mim*, *The School for Scandal* and *Betrayal*. For the Atlanta 1996 Olympic Closing Ceremony: *Sydney Handover*. For the 2004 Adelaide Festival of Arts: *Universal Playground*. For the Sydney 2000 Olympic Opening Ceremony: *Awakening* (Helpmann Award 2001). And for the City of Sydney: *Millennium NYE Celebrations* on and around Sydney Harbour.

3

APPENDIX THREE– CREATIVE TEAM



JOHN RAYMENT – Lighting Designer

Lighting Design credits include Sydney 2000 Olympic Games – Opening and Closing Ceremonies; Hong Kong’s original permanent cityscape display, A Symphony of Light and Singapore’s Marina Bay New Year’s Eve Countdown displays (on-going). Architectural commissions include, in 2004, Norman Foster’s iconic HSBC headquarters in Hong Kong (HSBC / LVM) and Outrigger O-CE-N, a 110-apartment resort, which opened in Bali in late 2007. Theatre productions include Lulu, Orpheus In The Underworld, The Trojans I & II, Aida, Die Walkure for Opera Australia; Red Earth, Cinderella, Sleeping Beauty, among others, for The Australian Ballet; Mulan – a 2005 Sydney Dance Company / Shanghai City Dance co-production 2005 to open the Shanghai International Arts Festival; The Nutcracker, Romeo & Juliet, Wedding, The Protecting Veil for Royal New Zealand Ballet; musicals such as West Side Story, Return to the Forbidden Planet, The Rocky Horror Show, Kiss Me Kate; for Sydney Dance Company, 40 productions including Salome, Free Radicals, Synergy with Synergy, Fornicon, Beauty and the Beast, Viridian; for Sydney Theatre Company, 30 productions including the legendary Life and Adventures of Nicholas Nickleby; for Paul Dainty, Happy Days – the Arena Mega-Musical; for Warner Village Theme Parks, in 2006, their new permanent attraction, Australian Outback Spectacular.



PETER HYLENSKI – US Sound Designer

Began his career in audio design in his home state of Connecticut. He continued in theatrical design while studying at Carnegie Mellon University. He then went on to become the associate designer of Broadway and Las Vegas shows such as Cirque du Soleil’s Zumanity, Fosse, Taboo, Seussical, The Music Man, Follies and Parade. Now based in New York City with his wife Suzanne, he spends much of his time designing Broadway productions such as Cry Baby, The Times They Are A-Changin’, The Wedding Singer, Sweet Charity, Martin Short: Fame Becomes Me, Little Women, Brooklyn, and Laughing Room Only. Recently, he completed the new sound design for Le Reve at the Wynn, Las Vegas. Other credits include, Ragtime (London’s West End, Olivier Award nomination Best Sound Design), Mame (Kennedy Center), Opening Doors (Carnegie Hall), Annie, Children’s Letters to God, Go Diego, Go!, Dora the Explorer, Chef’s Theater, Ovations!, Spoleto Festival (1999-2002), and Blues Clues. When not designing for live theater, he also mixes for film and television on projects such as the Victoria’s Secret Fashion Show, Search for Life (American Museum of Natural History), SonicVision (AMNH, MTV2), and Cosmic Collisions.



CAMERON WENN – Resident Director

Cameron Wenn has extensive experience in all mediums of the performing arts as a director, writer, singer and actor. Beginning his career on the stage, he received awards for performances in 84 Charing Cross Road, A Flea In Her Ear and Falsettos. Cameron earned his directing stripes under the mentorship of acclaimed producer/director Garry Ginivan for whom he staged My Grandma Lives in Gooligulch, Pinocchio and the puppetry-based, hit children’s musical Possum Magic. He has resident directed the Villa Lobos opera Magdalena and the New Zealand tour of The Hobbit. Other notable directing credits include Romance Romance, Lost in Yonkers and Play it Again Sam. In 2005 he received a Best Director Green Room Award Nomination for Joe Starts Again, which he also directed in New York. Cameron has guest-directed at the Victorian College of the Arts and Young Opera Workshop Lismore. Cabaret highlights include jazz chanteuse Nichaud Fitzgibbon’s Peggy Lee Tribute at The Famous Spiegeltent for the Melbourne International Festival. In 2005 he was privileged to tour Australia and New Zealand with Stephen Berkoff’s Shakespeare’s Villains. Cameron’s involvement with Walking With Dinosaurs · The Arena Spectacular began in early 2006 at script development stage and he is delighted to be – still, walking with dinosaurs.

THE CREATURE TECHNOLOGY COMPANY

A NEW COMPANY EVOLVES IN THE FOOTSTEPS OF DINOSAURS

Where on earth would a Producer go when shopping for a cast of life sized animatronic dinosaurs? There are typically only two options; hand over the job to an existing company or start from scratch and build the show from the ground up. Faced with this choice, the producers of Walking With Dinosaurs - the Arena Spectacular took the bold move of opting for the latter, transforming an empty warehouse in Melbourne, Australia, into a sophisticated workshop facility. Under the supervision of Sonny Tilders, a team of local designers, technicians, electrical and mechanical engineers, sculptors, painters and support crew built fifteen frenetic months.

Two hundred and seventy shows, one million audience members (and counting) later, a new company has been born. The Creature Technology Company represents the cutting edge of large scale animatronics, housed in a new 18,000 square foot facility. The company is not only making more sophisticated dinosaurs for upcoming productions but is also opening its doors to new clients around the world.

The Creature Technology Company would like to take the opportunity to thank all those involved in our conception and our ongoing success. Firstly to the show's Artistic Director, William May, and its producers, Malcolm Cooke and Jill Bryant – thanks for taking the gamble and entrusting a fledgling team with such a mammoth task. To the production's creative ensemble, led by director Scott Faris – thank you for creating a truly spectacular show. To the USA tour promoter Bruce Mactaggart – thank you for introducing our show to a new and appreciative audience in America. To the puppeteers, suit performers, dinosaur drivers and the tireless maintenance crew on tour – thanks for looking after our babies! And, most importantly, to all those who have worked and continue to work at CTC – thank you all for your energy, passion, commitment and skill in bringing these creatures back to life.

Finally, heartfelt thanks to Gerry Ryan for supporting this remarkable show and someone to whom all of us at the Creature Technology Company are grateful for having taken such a brave and bold new step.

www.creaturetechnology.com



4

APPENDIX FOUR – BUILDING THE DINOSAURS AND THEIR WORLD





BLAST FROM THE PAST

EVERYTHING YOU NEED TO KNOW ABOUT DINOSAURS

Tyrannosaurus rex
(TIE-RAN-oh-SAW-rus) **REX**
Weighted: More than six tons
Up to 40 feet long and 10.5 feet tall, sharp-tipped
He was one of the largest terrestrial carnivores of all time, with 6-inch long, sharp, serrated teeth and the ability to eat 154 pounds of meat in one mouthful. Research suggests he could run at more than 25 miles per hour.

Triceratops
(TR-oh-SAW-rus)
Weighted: More than seven tons
Up to 32.5 feet long, ornithischian, skull including crest up to 8.5 feet tall
He leaned little. Despite his bulk and fierce look, he was a sociable creature. But put two males together and they would fight for herd leadership.

Ankylosaurus
(An-KILE-oh-SAW-rus)
Weighted: More than seven tons
Up to 32.8 feet long and 8.6 feet tall, ornithischian
He was the most heavily armored creature of all time. Even his eyelids were armor plated. His head had robust triangular horns in each corner and his skull was nearly 2.2 feet long, very broad but very thick, leaving little room for a brain.

Utahraptor
(YOO-tah-RA-P-4or)
Weighted: Up to one ton
Up to 21.2 feet long and 6.6 feet tall, sharp-tipped
He was the largest of a group of lightly built carni-vorans called the dromaeosaurs (swift lizards). He had large eyes, long grasping hands and powerful clawed feet.

Ornithomimus
(Or-NITH-oh-MEE-rus)
Weighted: Up to 220 pounds
Up to 11.5 feet long, ornithomimid, wing span up to 28.4 feet long
His wings were made of skin. Using rising air currents, he may have been able to fly hundreds of miles without flapping his wings.

Allosaurus
(All-oh-SAW-rus)
Weighted: Up to three tons
Up to 23.4 feet long and 10.4 feet tall, sharp-tipped
He was a running hunter and, although swift, probably preferred ambush attacks rather than chasing his food. He could take on larger opponents.

Stegosaurus
(STEG-oh-SAW-rus)
Weighted: More than seven tons
Up to 42.6 feet long and 12 feet tall, ornithischian
He had a double row of plates on his armored back – probably a warning device. His back legs were considerably longer and straighter than his front ones.

Piatosaurus
(PLAT-oh-SAW-rus)
Weighted: About four tons
Up to 28.2 feet long and 10 feet tall, ornithomimid
He had a long tail, long hind limbs and a small head at the end of a fairly long neck. His teeth were leaf-shaped and his jaw was beak-like.

Lilliensternus
(LIL-ien-STERN-us)
Weighted: 230 - 400 pounds
Up to 6.2 feet tall, sharp-tipped
He was a fast predator and dined on the eggs of the larger dinosaurs. Unearthed in Germany in 1924, he was named after scientist Count Von Lillienstern.

Brachiosaurus
(BRACK-ee-oh-SAW-rus)
Weighted: More than 70 tons
Up to 75 feet long and 42.6 feet tall, ornithomimid
He was one of the largest land animals of all time. Unlike other dinosaurs, he had front legs longer than his hind ones.

How many million years ago they lived

APPENDIX FIVE – MEET THE DINOSAURS



Allosaurus

Pronounced

AL-oh-SAW-us

Size 12m (39 feet)

Allosaurus (meaning “Other reptile”) was one of the largest carnivores of the Jurassic period. Running on two muscular, bird-like legs, Allosaurus preyed upon the large herbivores of the period, including large sauropods and smaller plant eaters. It may have been a pack hunter, possibly lying in wait to ambush prey. The forelimbs were short but muscular, each of the three fingers tipped with a sharp curved claw up to 25cm (10 inches) long for holding prey. The powerful jaws were lined with over seventy sharp 8cm (3 inch) long teeth. Movable joints and elastic ligaments in Allosaurus’s jaw and skull flexed to help the teeth tear and slice through the prey. The flexible jaws stretched widely to allow the creature to swallow large mouthfuls of flesh.



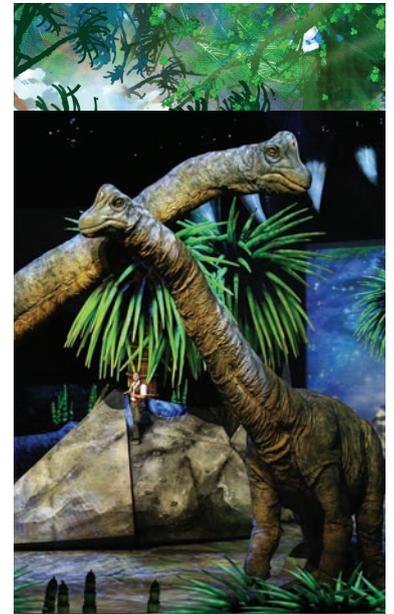
Ankylosaurus

Pronounced

An-KIH-loh-SAW-us

Size 11m (36 feet)

Ankylosaurus - the last and largest of the tank-like armoured dinosaurs, Ankylosaurus (meaning “Fused reptile”) was well protected from big meat eaters allowing it to eat low to medium lying plants. Large bony plates, which probably had additional horn-like coverings, protected its flanks. The skull was thick with two pairs of sharp horns at the back of the head. Parts of the tail vertebrae were fused like the handle of a club, while the base of the tail remained flexible. The end of the tail was a large bony club which would have been a devastating defensive weapon wielded against attacking predators. Analysis of Ankylosaurus’s brain cavity indicates the most highly developed part of its brain was devoted to its sense of smell.



Brachiosaurus

Pronounced

BRACK-ee-oh-SAW-us

Size 22m (72 feet)

Named for the large bones of its fore-leg, Brachiosaurus was an enormous sauropod, one of the largest dinosaurs known from a complete skeleton. Brachiosaurus stood over ten metres high, was twenty-two metres long and weighed around eighty tonnes. Brachiosaurus was adapted to live on land, with similarities to a giraffe, browsing in treetops. Named for the large bones of its fore-leg, Brachiosaurus was an enormous sauropod, one of the largest dinosaurs known from a complete skeleton. Brachiosaurus stood over ten metres high, was twenty-two metres long and weighed around eighty tonnes. Brachiosaurus was adapted to live on land, with similarities to a giraffe, browsing in treetops.

APPENDIX FIVE – MEET THE DINOSAURS



Liliesternus

Pronounced

LIL-ee-en-STUR-nus

Size 5m (16.5 feet)

Liliesternus was an active hunter, agile and fast, running on two powerful hind-legs, balanced by a long, graceful tail. It was a lightly built carnivore and was the largest meat eater of its time. Skull details suggest that Liliesternus is related to the Jurassic carnivore Dilophosaurus. The jaws were lined with sharp, blade-like teeth. The skull shows evidence of distinctive fin like crests along the snout. These may have been for species recognition or as a display to attract a mate. Like many early theropods, Liliesternus has a five fingered hand, with a smaller fourth and fifth digit. Later theropods have three fingered hands. Liliesternus is known from two incomplete specimens found in the Kueper Formation, Saschen-Anhalt in Germany. Named for German Palaeontologist Hugo Ruele von Liliestern.



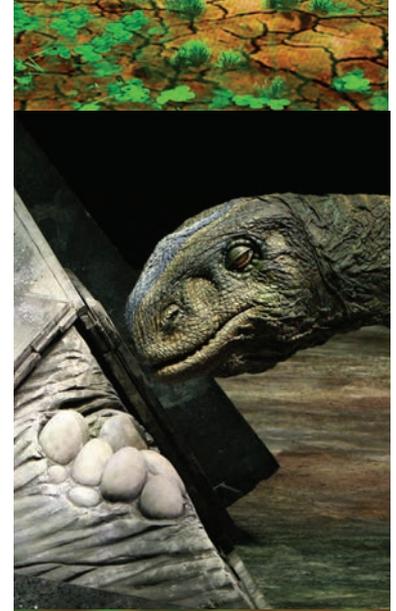
Ornithocheirus

Pronounced

OR-nith-oh-KEER-us

Wingspan up to 12m (40 feet)

One of the largest flying creatures ever, Ornithocheirus is known from a variety of bone fragments on different continents. Like many larger pterosaurs, Ornithocheirus had an enormous head relative to its body length. The jaw supported numerous long, slender, pointed teeth, useful for catching a slippery diet of fish and squid. The crest of the Ornithocheirus may have offered some aerodynamic advantage in flight or it may have been an indicator of gender or for species recognition. Some of the best Pterosaur fossils have come from the Araripe Plateau in north-west Brazil.



Plateosaurus

Pronunciation

PLAT-ee-o-SAW-us

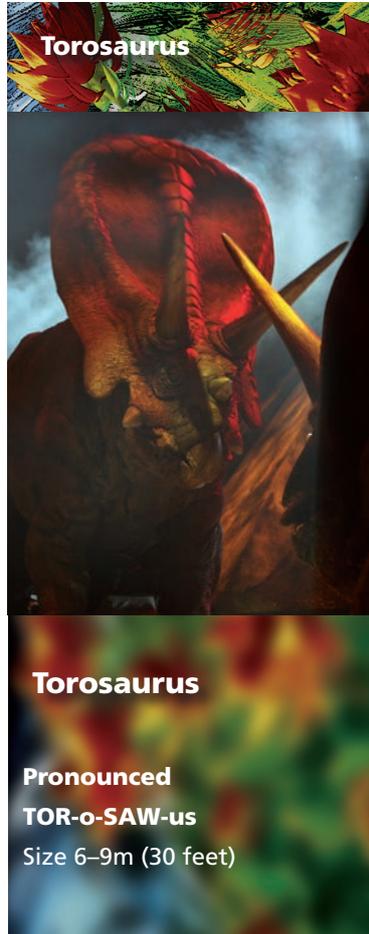
Size 8-9m (26-29 feet)

Plateosaurus (meaning “broad reptile” or “flat reptile”) was the first and best known of the early giant herbivores. Probably travelling in herds, Plateosaurus was able to move on all fours and could also rear up into a bipedal posture. Balanced on its long hind legs and reaching up with its long neck, Plateosaurus was able to feed on higher branches of conifers and ferns. It had distinctive hands with small fingers and a large clawed thumb. The hands had effective grasping ability and the claw was possibly used for ripping up roots or tearing at branches. Rearing up, Plateosaurus was also able to use its long thumb claws for defense against predators such as Postosuchus. This Triassic dinosaur was first described in 1837 by H. von Meyer. Plateosaurus is known from over one hundred partial to complete skeletons, including ten skulls. Plateosaurus is the most common and well known European Triassic vertebrate fossil from the late Triassic and was the largest land animal of the period.

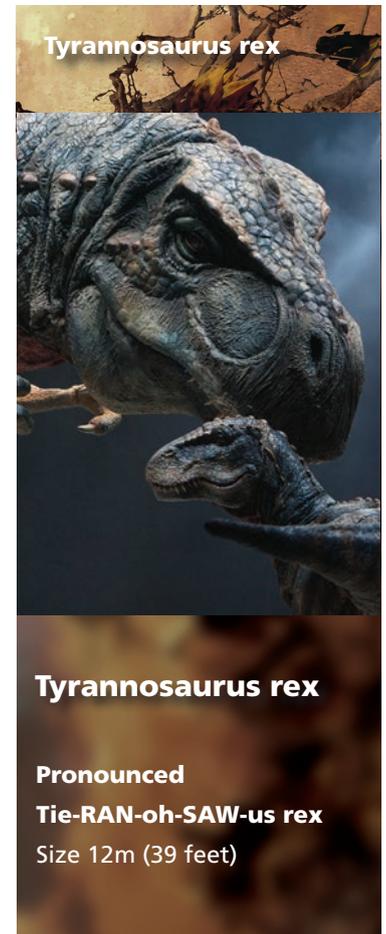
APPENDIX FIVE – MEET THE DINOSAURS



Stegosaurus (meaning “roof lizard”), is one of the most easily-identifiable dinosaurs, due to the distinctive double row of kite-shaped plates rising vertically along its arched back and the two pairs of long spikes extending horizontally near the end of its tail. “Stegosaurus tails were without question one of the most dangerous weapons ever evolved by a plant-eating animal”. (Bakker) Such a weapon appears necessary considering Stegosaurus coexisted with large predatory theropod dinosaurs, such as the fearsome Albasaurus. The function of the plates has been much debated. Initially thought of as some form of armour, researchers have also proposed that they may have helped to control body temperature. Wind tunnel tests have suggested that the plates are well shaped to gather and dissipate heat. Stegosaurus is also known for its remarkably tiny brain, at only 80 grams, apparently sufficient for its needs.



With its formidable horns and powerful, muscular body, Torosaurus (meaning “Bull reptile”) was like a dinosaur version of a rhinoceros. Featuring an enormous neck frill, Torosaurus had the largest skull of any terrestrial animal. The bony frill had large fenestrae, or holes, to reduce weight and may have been brightly coloured and used for display. Apart from the large frill, Torosaurus was similar in appearance to its close relative, Triceratops. Both ceratopsians had two long horns sprouting above the eyes with a smaller horn on the snout. Torosaurus used its sharp beak and rows of shearing teeth to munch tough vegetation. Fossilized footprints identified as ceratopsian trackways indicate that the forelegs were slightly splayed, with the hind legs straight under the body, similar to a rhinoceros.



Tyrannosaurus (meaning “Tyrant Lizard”), was one of the largest terrestrial carnivores of all time being roughly six tonnes in weight. Tyrannosaurus’s massive skull was balanced by a long, heavy tail. The heavily reinforced skull of T.rex suggests that it was a devastating predator, with bone-crushing bite strength. The jaws were armed with 150mm long, sharp, serrated teeth. Relative to the large and powerful hind limbs, Tyrannosaurus forelimbs were small and retained only two digits. Recent specimens have shown the tiny arms to have been well-muscled, presumably to enable the animal to anchor itself to the ground as it attempted to straighten its hind legs and stand up from a prone position. It was among the last dinosaurs to exist prior to the Cretaceous-Tertiary extinction event. More than 30 specimens of T.rex have now been identified, some nearly complete, which has allowed significant research into many aspects of its biology, including its life history and biomechanics.

APPENDIX FIVE – MEET THE DINOSAURS



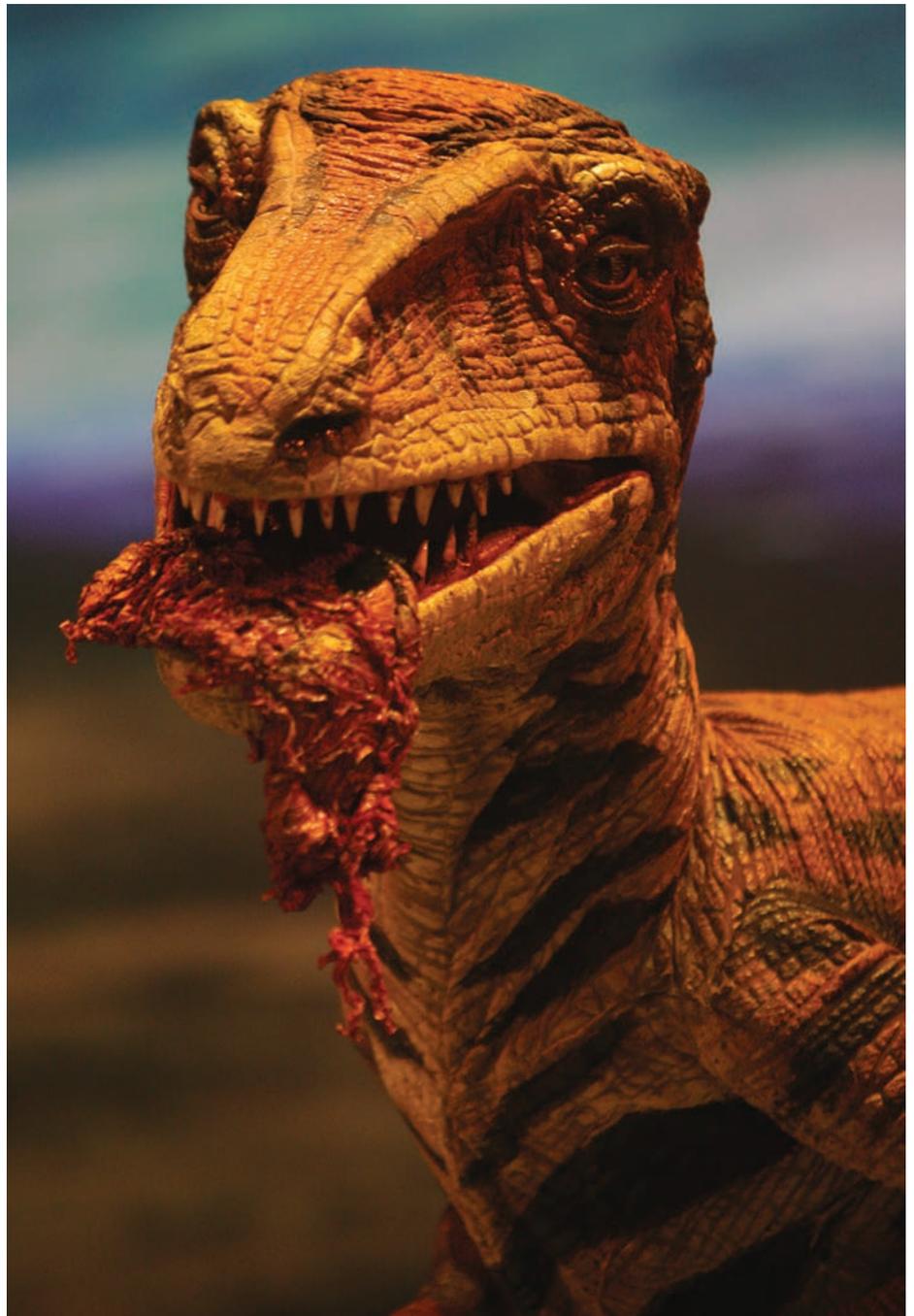
Utahraptor

Pronounced

YOO-tah-RAP-tore

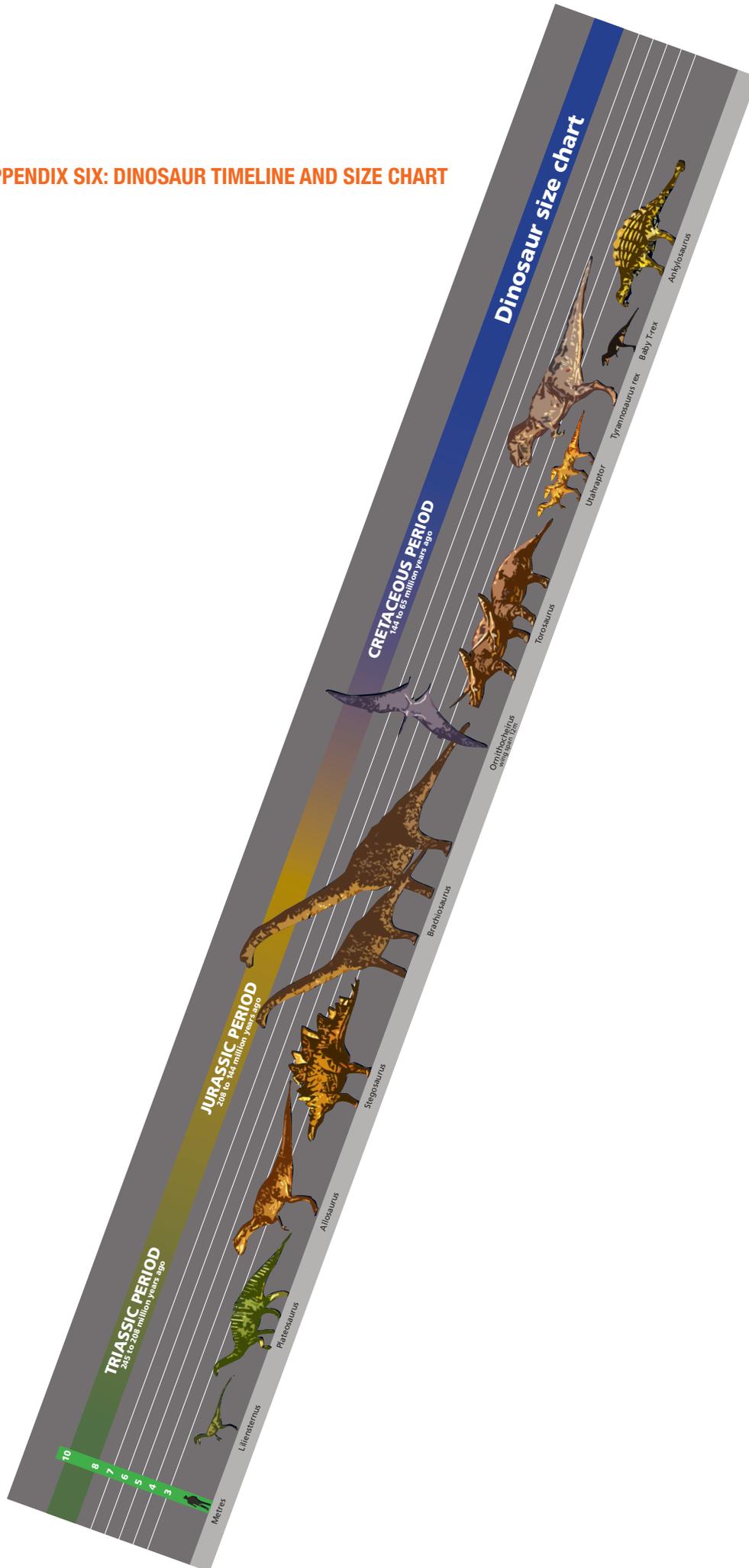
Size 6m (19.5 feet)

Utahraptor (meaning “Utah thief”) is the largest known member of the theropod dinosaur family Dromaeosauridae. Utahraptor is known from a well-preserved skeleton found in 1991 in Utah, USA and fragmentary remains from South America. It was the largest of a group of lightly-built carnivores, called the dromaeosaurs (‘swift lizards’). Utahraptor had large eyes, long grasping hands with large, sharp ripping claws. Its toe joints were specially enlarged so that its massive claw could be raised upward and backward to avoid damage while running. But when used in attack, its claw flexed forward as the animal kicked out. Swinging in a wide arc its huge 20 cm slashing claw would produce terrible wounds enabling a Utahraptor to cripple and kill animals much larger than itself. The unique wrist-joints of the dromaeosaurs allowed the hands to pivot sideways, an action similar to the folding of a bird’s wing.



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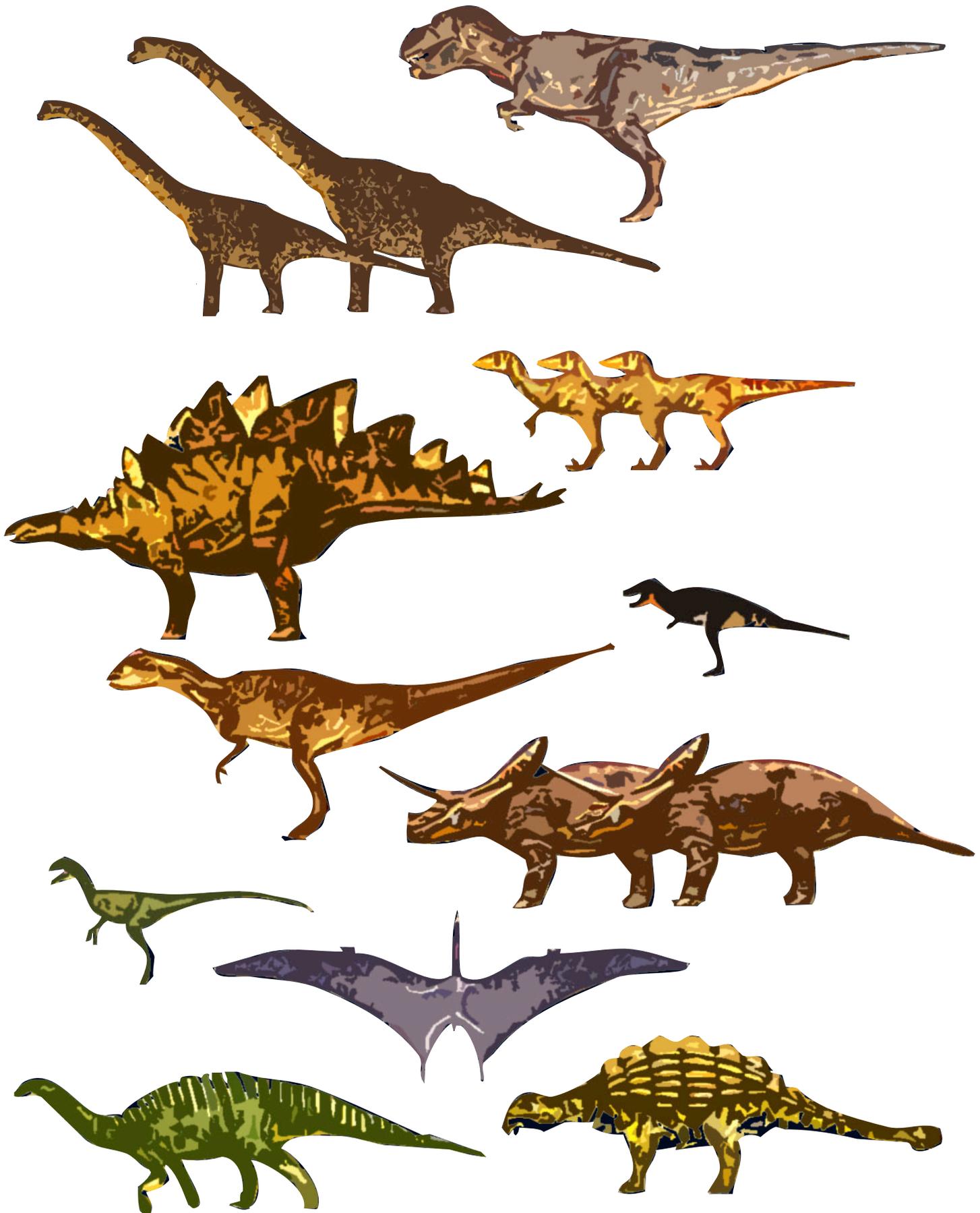
APPENDIX SIX: DINOSAUR TIMELINE AND SIZE CHART



7

APPENDIX SEVEN: DINOSAURS DETAILS

period	name	pronunciation	meaning	animal type	dietary type	size /height	weight	major fossil finds
222 to 215 million years ago Late Triassic period	Plateosaurus	PLAT-ee-oh-SAW-rus	Flat lizard	Dinosaur (Prosauropod)	Herbivore	9 metres long	4 tonnes	Germany
150 to 145 million years ago Late Jurassic period	Allosaurus	all-oh-SA-rus	Different lizard - it had strange vertebrae	Dinosaur (theropod)	Carnivore - hunted big game	Up to 12 Metres long	Up to 3 tonnes	Wyoming USA, New Mexico USA, Utah, Tanzania
150 to 145 million years ago Late Jurassic period	Stegosaurus	STEG-oh-SAW-rus	Covered lizard	Dinosaur (stegosaur)	Herbivore - low level ferns	Up to 12 metres long	Up to 7 tonnes	Colorado, Utah, Wyoming, western Europe, China and southern Africa
150 to 145 million years ago Late Jurassic period	Brachiosaurus	BRAK-ee-oh-SAW-rus	Arm lizard	Dinosaur (sauropod)	Herbivore	25 metres long 13 metres high	70 tonnes	Colorado, USA and Tanzania
132 to 100 million years ago Early Cretaceous period	Ornithocheirus	Or - NITH - oh - KEE - rus	Bird-hand	Pterosaur	Carnivore - fish	Wingspan - up to 12 metres Body - up to 3.5 metres, Head - up to 1.5 metres	Up to 100 Kg	Europe, Brazil
67 to 65 million years ago Late Cretaceous period	Torosaurus	TOR-oh-SAW-rus	Bull lizard	Dinosaur (ceratopian)	Herbivore	Up to 8 metres long	Up to 7 tonnes	South Dakota, Montana, Wyoming, Texas, Utah, New Mexico, Saskatchewan
132 to 100 million years ago Early Cretaceous period	Utahraptor	YOO-tah-RAP-tor	Robber from Utah	Dinosaur (dromaeosaur)	Carnivore	Up to 6.5 metres long Up to 2 metres high	Up to almost a tonne	Eastern Utah
67 to 65 million years ago Late Cretaceous period	Tyrannosaurus	tie-RAN-oh-SAW-rus	Tyrant Lizard	Dinosaur (theropod)	Carnivore	Up to 14 metres long Up to 5 metres tall	Up to 5 tonnes	USA (in Montana, Texas, Utah, and Wyoming), Canada (Alberta and Saskatchewan), and East Asia (Mongolia).
67 to 65 million years ago Late Cretaceous period	Ankylosaurus	an-KILE-oh-SAW-rus	Fused or stiff lizard	Dinosaur (ankylosaur)	Herbivore	Up to 10 metres long	Up to 7 tonnes	Western USA (Montana) and Canada (Alberta)



8

APPENDIX EIGHT: MUSIC OF THE DINOSAURS

Conductor: James Brett

1. Main Theme
2. The Eggs Come Alive
3. Liliiensternus Scavenges
4. Plateosaurus Enters
5. Triassic Encounter
6. The Jurassic Age
7. Stegosaurus
8. Allosaurus Attacks
9. Forest Fire and Rebirth
10. The Brachiosaurus
11. Brachiosaur Battle
12. Moonlit Jurassic
13. Ornithicheirus Flies
14. Raptor Hunt
15. Pangaea Shifts
16. Duelling Torosaurs
17. Sulphurous World
18. Ankylosaurus
19. Tyrannosaurus Rex
20. Last Night on Earth
21. Closing Titles



9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Algae - Simple plants made of basic cells either alone or in long chains. In large quantities it appears as a water plant with no stem or leaves. The most familiar larger algae are seaweeds.

Allosaurus - This fierce two legged carnivore lived in the Late Jurassic period. It inhabited the plains, and normally hunted alone. It would hunt in groups to tackle the largest prey. It was approximately 12 metres long, five metres high and weighed up to three tonnes. The name Allosaurus means “different lizard”

Ammonite - Spiral-shelled molluscs, related to the modern day octopus and squid. The soft body occupies the last chamber of the shell, the others are filled with air to make it buoyant.

Amphibian - The first air-breathing land vertebrates. Fossil evidence suggests that they appeared around 360 million years ago in the late Devonian period. Directly descended from fish, these creatures represent a transitional stage between water dwellers and land dwellers. In the early stage of their life amphibians have gills. These develop into lungs as they become adults. The word “amphibian” comes from the Greek “amphi” meaning both and “bios” meaning life. This is because the animal can live both in and out of the water.

Anatotitan - A herbivorous dinosaur, of the Late Cretaceous period, Anatotitan was one of the last duckbilled dinosaurs. Its name literally means “giant duck”. It had a long wide beak, with hundreds of cheek teeth behind it. It could be up to 13 metres long, and weigh up to 5 tonnes.

Angiosperm - Angiosperms or flowering plants are the most recent major group of plants to evolve. They first appeared early in the Cretaceous period and dominated the world’s flora by the end of it. Angiosperms have seeds inside a nutritious fruit which gives them a better start in life. Fertilisation can occur by the wind, or very often by flying insects and other animals, enabling flowering plants to spread rapidly.

Ankylosaurus - Literally “fused” or “stiff lizard”. A medium sized, herbivorous dinosaur of the Late Cretaceous period. It had a heavily plated back and a club tail. All its bones had fused together so thickly that there was very little room for a brain. It was up to 10 metres long and weighed up to 7 tonnes.

Antarctic - The South Pole.

Anurognathus - This small flying omnivore lived in the Late Jurassic period. It is possible it could have spent its life onboard the back of sauropods such as Diplodocus or Brachiosaurus that wandered the plains. It fed on the insects disturbed by the feeding of the massive herbivores. It had a wingspan of up to 50 cm and weighed about three to seven grams.

Apatosaurus - A large four-footed herbivorous sauropod dinosaur up to 21m long and weighing more than 20 tonnes, which lived during the Upper Jurassic period. Apatosaurus used to be known by the name Brontosaurus.

Araucaria - This is the name for a group of ancient trees that survive to this day. They are tall, evergreen coniferous trees which have cones and needle-like leaves. One of the modern representatives of this group is the Monkey Puzzle tree.

Archaeopteryx - The oldest known which lived in the Late Jurassic period. It is known from only six skeletons and a few other disputed remains, all recovered from the Solnhofen Limestone of Germany. Archaeopteryx was about the size of a crow with well developed feathers on its forelimbs. However it retained several reptilian features, including a long bony tail, teeth in its jaws and clawed fingers on the wings. It is believed to have evolved from the dinosaurs from the dromaeosaur group.

Archelon - A carnivorous sea turtle of the Cretaceous period which grew to be about the size of a car.

Archipelago - A group of many islands.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Archosaur - Literally “ancient reptiles”. These include the thecodonts or socket-toothed reptiles, which in turn gave rise to the pterosaurs, crocodiles, dinosaurs and birds.

Arthropod - Invertebrate animals with jointed legs and an external skeleton that has to be periodically shed as growth proceeds. The three principal groups are the centipedes, millipedes and insects; the spiders and scorpions; and the crustaceans. The ancestors of all these three main groups were well developed by the end of the Cambrian period.

Cambrian Baryonyx - A large 9 metre long theropod from the early Cretaceous period. With a long crocodile-like head and relatively long arms with huge curved claws on the thumbs, Baryonyx may have been primarily a fish-eater. It is known from a relatively well-preserved skeleton found in a quarry in Surrey, England by an amateur fossil hunter in 1983.

Belemnite - A soft bodied, squid-like carnivore that lived in the sea. It caught small fish and marine organisms with its tentacles and ate them with its beak-like mouth. It had hooks on its tentacles instead of suckers. Common in the waters of the Jurassic period, it is now extinct.

Bennettite - The name for a group of ancient plants with a bare central trunk topped by a crown of leaves. Similar in appearance to the cycad, these plants thrived on the plains in the Triassic and Jurassic periods and became extinct at the end of the Cretaceous period.

Biped - An habitually two-footed creature.

Bird - Birds are feathered, egg-laying animals with a high metabolism which enables most species to fly. The first birds appear in the Jurassic period. The group of reptiles that the birds evolved from is still a matter for debate among palaeontologists.

Bird-hipped - Bird-hipped dinosaurs, or Ornithischia are one of the two main sub divisions of the dinosaurs. They were all herbivores. They evolved in Triassic period and the group died out with the mass extinction at the end of the Cretaceous period. The name derives from the distinctive arrangement of the pelvis.

Brachiosaurus - A tall herbivorous dinosaur of the Late Jurassic period, its name means “arm-lizard”.

Butterfly - A type of insect. Butterflies, along with moths and skippers are insects classified as Lepidoptera. Today there are several thousand species distributed world-wide. They evolved in the Cretaceous period alongside the flowering plants which they fed on, and pollinated in return. They were the most recent major group of insects to have evolved.

Cambrian Period - The Cambrian is a period of geological time between 540 and 505 million years ago at the beginning of the Palaeozoic era. It is separated into three epochs - the Early Cambrian (570 to 540 mya), the Middle Cambrian (540 to 523 mya) and the Late Cambrian (523 to 505 mya).

Cannibal - An animal that eats other animals of its own kind.

Cantabria - The only island where Ornithocheirus would breed each year. This enormous flying reptile would often migrate thousands of kilometres to reach the island. It was one of the few areas in western Europe not to have flooded in the Mesozoic. It now forms bedrock of parts of Spain and Portugal

Carboniferous - The Carboniferous is a period of geological time between 360 and 286 million years ago towards the end of the Paleozoic era. It is separated into two epochs - the Early Carboniferous (360 to 320 mya) and the Late Carboniferous (320 to 286 mya).

Carnivore - An animal that eats other animals.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Cartilage - A dense plastic like material which is strong but more flexible than bone.. It forms the majority of the skeleton of many primitive animals including the sharks. In humans, the nose and ears contain cartilage to stiffen them.

Cenozoic - The last of the four eras into which the Earth's geological history has been divided. It dates from 65 million years ago to the present day.

Centipede - Long flattened segmented predators each segment of which bears a pair of legs. They evolved during the Silurian Period and there are about the 2800 species alive today. Together with the millipedes, they are known collectively as the myriapods

Ceratopsian - Ceratopian or "horn-faced" dinosaurs, were an order of the bird-hipped, herbivorous dinosaurs that became highly successful in the Late Cretaceous period. Distinctive features include facial horns, a hooked beak and a large bony frill at the back of the head.

Chitin - Horny substance found in the outer skeletons of insects, crabs and other arthropods, and the internal structures of some other invertebrates.

Cockroach - Cockroaches evolved at the end of the Devonian Period, together with other insects. They are scavengers that operate at night and favour living in a burrow. They are capable of withstanding extremely hot and dry conditions and their modern descendants are extremely widespread.

Coelacanth - This medium sized carnivorous fish evolved more than 360 million years ago. They were prevalent in the Triassic period in both fresh water and marine environments. Surprisingly this ancient fish still survives today in the depths of the Indian ocean. It is approximately one and a half metres long and weighs 50 kg.

Coelophysis - This small two legged carnivore lived in the Late Triassic period. It inhabited river valleys and scrubland around the plains, hunting alone or in small groups. At the end of the dry season Coelophysis formed large packs to hunt. It was two to three metres long and weighed 35 to 40 kg.

Coelurus- This two legged carnivore lived during the Middle Jurassic period. It inhabited the forest eating lizards and small mammals. It was two metres long with grasping hands and a long snout.

Column Pine - A type of conifer that was tall and thin, offering little shade. It belonged to the araucaria group.

Conifer- The name for a group of ancient plants that survive to this day. Typically they are evergreen trees with cones and needle-like leaves which thrive in temperate climates. They are pollinated by wind. This is a diverse group of plants with the earliest fossils dated at 300 million years old.

Coprolite- Fossilised dung. The droppings of prehistoric animals.

Crinoid - Crinoids are echinoderms, a group of animals that also includes the sea-urchins and starfish. Most fossil crinoids have a head bearing a crown of arms (usually five) and lived attached to the sea floor by a stalk. Their superficial flower-like appearance led to their popular name "sea lilies". In the Palaeozoic era crinoids were abundant but they started to decline during the Mesozoic era. Today there are only a few, mostly free-swimming, forms.

Crocodile - The only surviving archosaurs, crocodiles are cold-blooded, egg-laying reptiles. They have changed very little in their history, nearly all being aquatic or semi-aquatic hunters and scavengers.

Crustacean - A class of arthropods that includes crabs, lobsters, wood-lice, barnacles and waterfleas. They evolved in the Cambrian period, or maybe even earlier, and became diverse and numerous in the Mesozoic era.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Crustacean - A class of arthropods that includes crabs, lobsters, wood-lice, barnacles and waterfleas. They evolved in the Cambrian period, or maybe even earlier, and became diverse and numerous in the Mesozoic era.

Cryolophosaurus - Cryolophosaurus, meaning “frozen crested reptile”, was a bipedal, meat-eating dinosaur, about 6 metres long. It had a horn-like, upward pointing crest above its eyes. It lived in what is now Antarctica during the early Jurassic period, roughly 190 million years ago. It is the only theropod known from the Antarctic, and the first Antarctic dinosaur ever described.

Cretaceous Period - The Early Cretaceous period lasted from 144 million years ago to 97 million years ago. The Late Cretaceous period lasted from 97 to 65 million years ago.

Cryptoclidus- This large, four flippers plesiosaur was a carnivore living in the Late Jurassic period. It glided through the open seas in search of fish or squid. It is thought that Cryptoclidus swallowed stones, called gastroliths, to weigh itself down while hunting for prey on the sea bed. It was up to 8 metres long and could weigh up to 8 tonnes.

Cycad trees - An ancient group of plants that survive to this day in tropical and subtropical environments. They have a central trunk with thick bark that is topped by a crown of spiny leaves. They look similar to tree ferns and palms.

Cynodont - These small, four legged omnivores lived in the Late Triassic period. They inhabited river valleys and scrubland around the plains and made burrows. An ancestor of the mammals, they had hair-like scales and hunted at night. Typical cynodonts would grow up to about one and a half metres long and weigh up to 20 kg.

Cypress - A group of coniferous plants that evolved in the Carboniferous period and are still alive today. Cypress are seed-bearing plants or gymnosperms.

Deinosuchus - This huge, four legged carnivore was a type of giant terrestrial crocodile which lived in the Late Cretaceous period. It was approximately 15 metres long and weighed two tonnes.

Devonian - The Devonian period runs between 406 and 360 million years ago in the middle of the Paleozoic era. It is separated into three epochs - the Early Devonian period (406 to 387 mya), the Middle Devonian period (387 to 374 mya) and the Late Devonian period(374 to 360 mya).

Didelphodon - This small, four legged omnivore lived in the Late Cretaceous period. It inhabited forests and river valleys, hunted at night and lived in a burrow. It was an early marsupial, or pouched mammal, and looked like a modern opossum.

Dinilysia - An Early Cretaceous snake. Snakes only evolved towards the end of the age of the dinosaurs but they survived the extinction in the Late Cretaceous and are still with us today.

Dinosaur - The word literally means “terrible lizard”. The term was coined by British anatomist Sir Richard Owen (1804-1892) to describe fossil remains which did not correspond to any living creatures.

Dinosaur Cove - An important fossil site in the south east of Australia. The fossils date from the Early Cretaceous period and were laid down in a polar forest environment. The fossils are of many dinosaurs including Leaellynasaura.

Diplodocus - This massive four legged herbivore lived in the Late Jurassic period. It is thought that it inhabited the plains, grazing in large herds grazing on a variety of plants. It could grow up to 30 metres long and could weigh up to 20 tonnes.

Dorsal Fin - The fin or fins on the back of fish.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Dragonfly - A type of colourful insect characterised by four large wings. They appeared in the Devonian Period. In the Carboniferous period there were species with wing spans of over 70 cm. They are still around today, and commonly fly in tandem when mating. The eggs are laid in water and the young have gill-like structures to assist breathing.

Dromaeosaur - The word means “swift lizard”. The dromaeosaurs were a group of small carnivorous dinosaurs or theropods. They evolved in the Early Cretaceous period and became extinct along with the rest of the dinosaurs at the end of the Cretaceous period. One of the distinguishing features of this group was a huge sickle-like claw on the second toe of its foot.

Duckbills - Huge herbivorous dinosaurs that lived during the late Cretaceous period.

Dung Beetle - Insects with a scooper-like head which are used to form dung into balls. They lay their eggs in the balls and bury them – provide their young with a ready food supply when they hatch.

Dwarf allosaur - A medium sized two legged carnivore which lived in the Early Cretaceous period. Smaller than Allosaurus, but still a vicious predator, it roamed the forests and marshes of Australia in search of prey.

Edmontosaurus - This huge herbivore lived from the middle to the end of the Cretaceous period. It had four legs but frequently reared up on its back legs for feeding, and looked like a smaller version of Anatotitan to which it was closely related. It had a duck-like bill and was able to chew food using its numerous back teeth. It could grow up to approximately 13 metres long and could weigh up to three and a half tonnes.

Epicontinental Sea - A shallow sea that has a continental plate under it. This can form when land is flooded by high global sea levels. A modern day example is Hudson Bay.

Eustreptospondylus - This medium-sized carnivore lived in the Late Jurassic period. Eustreptospondylus may have been a scavenger that could swim from island to island when attracted by the smell of meat, using its tail as a balance. It could grow up to 5 metres long, and weigh up to half a tonne.

Fossil - The remains of an animal or plant preserved in rock. Usually the soft parts, such as muscles or skin, decay completely before they can be preserved. This leaves only the more resistant parts, such as bone or shell. These were then replaced by minerals that seeped in from the surrounding sediment. Many fossils were also crushed flat by the weight of overlying rock.

Fern - This is the name for a group of low growing woody plants that appeared during the Devonian period, approximately 400 million years ago. Requiring water as part of their reproductive cycle they have diversified greatly since then and are a successful plant group today.

Frog - Primitive frogs evolved during the Early Triassic period. The first modern frogs with jumping motion appeared during the Jurassic period. Feeding on insects and other invertebrates they are restricted to aquatic habitats.

Fungi - This group includes yeast, mould, mushrooms and mildews. They lack chlorophyll and the organised plant structure of stems roots and leaves. Evidence for their existence dates to approximately 420 million years ago, but palaeontologists argue that they may have been around earlier.

Gastroliths - These are stones that are contained in the stomach of large herbivores such as the sauropods. They function in the mechanical breakdown of seeds and other tough plant material.

Ghost Ranch - This fossil location was discovered by Edwin Colbert in 1947 and is the site of a mass death during the Late Triassic period. It contained hundreds of skeletons of Coelophysis and other animals of the time including fish, clams, phytosaurs and crayfish.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Ginkgo - Ginkgos, or maiden hair trees, were deciduous trees that evolved in the Carboniferous period. They have a tree-like shape with a narrow trunk and soft foliage that is low in resin but has a high content of toxins. Only a single species remains today, in China.

Gymnosperm - The gymnosperms are a large group of plants that include the seed ferns, cycads, conifers and ginkgos. They evolved in the Devonian period and possessed “naked seeds”. This made them less reliant on water for their reproductive cycle than the pteridophytes and gave them an advantage in drier conditions.

Hadrosaur - The hadrosaurs, also known as the duck-billed dinosaurs, were a family of bird-hipped herbivorous dinosaurs that appeared in the Late Cretaceous period. They had long powerful hind limbs with three-toed feet and smaller more delicate front legs. Many species were characterised by elaborate head crests.

Herbivore - An animal that feeds only on plants, and is specially adapted to be able to extract nutrition from tough foliage.

Horseshoe Crab - Horseshoe crabs are not actually crabs they are primitive arthropods. They have a broad plate-like body and a thin spine-like tail. Their ancestry can be traced back to the Cambrian period, but it wasn't until the Jurassic period that the true horse-shoe shape developed. By the Late Cretaceous period, they were less common although five species of horseshoe crab still exist today.

Horsetails - A group of plants that originated in the Devonian period and were particularly successful in the Carboniferous period when some species grew up to 30 metres tall. Horsetails are regular symmetrical plants with jointed stems and circles of leaves. Some species still exist today but none grows taller than a couple of metres.

Hybodus - A carnivorous shark, it lived in the Late Jurassic period. It inhabited both deep and freshwater sea, searching for fish, baby Ophthalmosaurus and small Cryptoclidus. It could grow up to 2.5 metres long. Although sharks evolved in the Silurian period the Hybodus was one of the first of the modern sharks.

Ichthyosaur - A group of marine fish-shaped carnivorous reptiles. They had flippers that were derived from a reptilian forelimb, and whale-like flukes on its tail. Ophthalmosaurus was an ichthyosaur.

Iberomesornis - Thought to have been one of the earliest of its kind, this small carnivorous bird lived in the Early Cretaceous period. Although it had feathers and a breast bone like modern birds it still had the teeth and claws of its reptilian ancestors.

Iguanodon - This large four legged herbivore lived in the Early Cretaceous period and formed large migratory herds. Iguanodon was a successful species which seems to have evolved teeth for chewing, and a vicious thumb spike with which to catch predators unawares.

Invertebrate - An animal that lacks a vertebral column or backbone. This group accounts for more than 90 per cent of living animals including, molluscs, arthropods, and insects.

Jurassic Period - The Jurassic Period lasted from about 205 million years ago to 144 million years ago.

Koolasuchus - This salamander-like reptile was a carnivore that lived in the Antarctic during the Early Cretaceous period. It survived well in the polar forests, living off river life such as fish and crayfish. It had a huge flat head with lidless eyes for all-round viewing. It was up to 5 metres long and 30 cm high. Special sensory grooves that criss-crossed its head allowed it to sense movement in the surrounding water.

Leaellynasaura - This small two legged herbivore lived in the Early Cretaceous period. It could have been a social and lived in the forests of polar Australia. It is likely that it developed huge eyes to cope with the six month Antarctic darkness. It grew up to about 2 metres long, and weighed up to 10 kg.

Leedsichthys - Leedsichthys was a huge Jurassic fish up to 20 metres long, which used its large mouth to sift plankton from the water. It is named after Alfred Leeds, an amateur fossil collector who found its remains in clay quarries around Peterborough, England.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Labyrinthodont - These are a group of primitive amphibians that range from the Devonian period until the Cretaceous period, although their remains after the Triassic period are very rare. Many were large predators over 5 metres long with massively built skulls. The name of the group refers to the structure of the teeth which in cross-section have a distinctive wavy, maze-like appearance.

Lacewing - Small flying insects between 1.5 and 50 mm long with veined wings that give them a lacy appearance. There are about 4000 living species world-wide.

Leptolepis - Herring-like in size and appearance, this fish lived in the Late Jurassic period, although fragmentary remains indicate earlier origins than this.

Liopleurodon - The largest of carnivores, this gigantic, marine reptile lived in the Late Jurassic period. It inhabited the wide open sea, and had four paddle like limbs to propel it. It had a keen sense of smell and a ferocious dental array. It grew up to approximately 25 metres long and weighed up to 150 tonnes.

Lizard-hipped - Lizard-hipped dinosaurs, or Saurischia, are one of the two main sub-divisions of the dinosaurs. The lizard-hipped dinosaurs were split into the carnivorous theropods and the herbivorous sauropodomorphs (sauropods and prosauropods). Evolved in the Triassic period, the group died out with the mass extinction at the end of the Cretaceous period. The name derives from the distinctive arrangement of the pelvis.

Lungfish - This group evolved in the Devonian period and has relatives that still exist today. They use their swim-bladder as a lung to survive when rivers dry up during droughts by burrowing into the substrate and wrapping themselves in a waterproof cocoon.

Mammal - A mammal is a vertebrate which can regulate its body temperature, has hair on its body, and mostly bears live young. It provides these with milk from mammary glands.

Marsupials - A group of mammals characterised by premature birth and continued development while suckling in a pouch. The group takes its name from the marsupium or pouch - a fold of skin covering the nipples. Living examples include kangaroos, opossums and koalas.

Mesozoic Era - This era began around 250 million years ago and ended 65 million years ago. The major periods in this era were Triassic, Jurassic and Cretaceous periods. It was a time of great tectonic activity.

Metoposaurus - This medium sized, four-legged carnivorous amphibian lived in the Late Triassic period. It was green with a slab-shaped head and looked similar to a salamander. It was approximately 2.75 metres long.

Metriorhynchus - Metriorhynchus was one of the most specialised of the crocodiles being thoroughly adapted to a marine existence with paddle-like forelimbs, a blade-like tail and no body armour. Up to 3 metres long, it lived in the Late Jurassic period.

Millipede - Millipedes are long flattened segmented scavengers, each segment of which bears two pairs of legs. They evolved during the Silurian Period and there are about the 10,000 species alive today. Millipedes and centipedes they are known collectively as the myriapods.

Morrison Formation - This consists of thin band of sediments that stretches across the western USA from Montana southwards to New Mexico. This Upper Jurassic deposit is named after the town of Morrison in Colorado. Throughout its length the formation has yielded vast quantities of dinosaur fossils including Ornitholestes, Allosaurus, Diplodocus and Brachiosaurus. The Morrison beds near Vernal, Utah are the site of the Dinosaur National Monument, where today visitors can see a section of quarry face in which numerous dinosaur bones are embedded.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Muttaburrasaurus - This large four legged herbivore lived in the Early Cretaceous period. It may have migrated towards the Antarctic every year feeding on podocarp and cycads.

Myriapod - The group of arthropods composed of the centipedes and millipedes. They evolved in the Devonian Period and early forms were aquatic or semi-aquatic.

Nanantius - A primitive, carnivorous bird that lived in the Early Cretaceous period. Nanantius was a scavenger and about the size of a present day black bird but had a pelvic structure very different from that of modern birds.

Nautilus - Cephalopod molluscs that possess a smooth, coiled shell consisting of about 36 chambers. The animals live in the last chamber. They adjust their buoyancy by flooding and expelling water from the chambers and propelled themselves by squirting water like a squid. They are active predators catching small fish with their tentacles. The Nautiloids were most abundant during the Palaeozoic Era - only a single genus survives today, in deep water in the Pacific.

Omnivore - Animals that eat both plants and animals.

Ophthalmosaurus - This ichthyosaur was a medium-sized marine carnivore which lived in the Late Jurassic period. It inhabited the wide oceans and may only have approached the shore to give live birth to its young. It was probably a powerful swimmer that chased squid and fish with its long toothless snout. It grew up to approximately 5 metres long.

Ornithischia - The ornithischia, or bird-hipped dinosaurs are one of the two main sub divisions of the dinosaurs. They were all herbivores. They evolved in Triassic period and the group died out with the mass extinction at the end of the Cretaceous period. The name derives from the distinctive arrangement of the pelvis and hip structure.

Ornithocheirus - This great flying carnivorous pterosaur lived in the Early Cretaceous period. Its huge wingspan meant it could migrate great distances. It had a wingspan of 12 metres, its body length was 3 1/2 metres and its weight was about 100 kg.

Ornitholestes - This small, two legged carnivore lived in the Late Jurassic period. It had small conical teeth and a small head with long balancing tail. It grew up to two metres long and weighed up to 12 kg. It probably lived off lizards and small mammals.

Otway Range - A region near Melbourne, Australia which has produced numerous vertebrate remains from the Early Cretaceous period. The area is particularly important because at this time it was located much closer to South Pole and any animals it contains would have had to cope with long periods of darkness and cold during the winter months.

Oysters - These evolved in Jurassic times. They formed reefs around islands on the seabed and rocks of warm southerly oceans.

Palaeontology - The study of ancient life, through examining the remains of plants and animals in the form of fossils.

Palaeobotanist - A scientist who studies plant life from the geological past by looking at fossils and their living descendants.

Paleozoic Era - This was from 540 to 250 million years ago. It is the group name for the following periods - Cambrian, Ordovician, Silurian, Devonian, Carboniferous, and Permian periods.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Peteinosaurus - This small omnivorous flying reptile lived in the Late Triassic period. It inhabited river valleys and swamps and fed on insects, particularly dragon flies. It was one of the earliest pterosaurs that actually flapped and had a wing span of up to 60 cm. It weighed up to 100 grams.

Phytosaurs - These were four-legged carnivores that resembled a crocodile and lived in the Triassic period. They inhabited water courses and fed mostly on fish and small reptiles. Some grew to very large sizes.

Placerias - This large, four legged herbivore lived in the Late Triassic period. It lived on the plains where it grazed in large herds, eating low-lying plants like ferns. It grew up to 3 metres long and weighed up to 1 tonne.

Plains - Huge expanses of flat land inhabited by a mixture of low growing vegetation. This would have been covered in ferns not grasses in the Mesozoic era.

Plateosaurus - This huge, four-legged herbivore lived in the Triassic period. It was one of the first of the giant dinosaurs and was approximately nine metres long and weighed four tonnes. Name Plateosaurus means “flat lizard”.

Plesiosaurs - Plesiosaurs were one of a number of different groups of marine reptiles, including marine crocodiles and ichthyosaurs. They descended from land-living creatures that had returned to the sea. These medium-sized reptiles lived from the Triassic period to the end of the Cretaceous period. They inhabited freshwater and marine environments feeding mainly on fish. Fossil evidence shows they were much more common in marine environments and ate ammonites as well as fish. Palaeontologists are divided on how closely plesiosaurs are related to these other marine groups. However, it is clear that they were only very distantly related to the dinosaurs.

Podocarp trees - There is evidence of these huge trees from the Late Triassic to the Cretaceous period. They were usually the tallest in the forest, spreading their branches above the tree canopy to catch the most light.

Polacanthus - This four legged herbivore lived in the Early Cretaceous period. It was mainly a solitary dinosaur, though some fossils have been found amongst Iguanodon herds. Polacanthus was heavily armoured with a thick plate of bone over its rump and evenly spaced rows of spikes lining its back.

Postosuchus - This large, four-legged carnivore lived in the Late Triassic period. It inhabited river valleys and scrubland around the plains and hunted big game. It grew up to was approximately six metres long, and could rear up on its long back legs to a height of two metres.

Predator - An animal that preys on other animals.

Protoanthus - It is a made up name to describe the earliest flowers which evolved in the Early Cretaceous period.

Pterodactyls - A type of pterosaur.

Pterosaur - Literally “flying reptile”. These creatures were distinct from dinosaurs, none of which ever flew.

Quetzalcoatlus - A pterosaur named after the Mexican deity Quetzalcoatl, who was an Aztec god taking the form of a feathered snake.

Reptiles - A group of air breathing, scaly-bodied animals with back bones that evolved from the amphibians. They fertilise their eggs internally and are not reliant on water to lay their eggs in. Modern turtles, crocodiles, lizards and snakes are all reptiles.

Rhamphorhynchus - This medium sized, carnivorous pterosaur lived in the Late Jurassic period. It lived in large marine colonies and fed almost entirely on fish by skimming the water with its beak. It had a wing span of up to approximately 1.75 metres.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Sauropod- A family of enormous herbivores that co-existed in herds on the plains. Included in this group are Diplodocus, Brachiosaurus, Apatosaurus and Camarasaurus.

Scrubland - A landscape that is dominated by scattered drought-tolerant shrubs. A shrub is a woody plant less than five metres high.

Seaweed - Large algae that grows in the sea or in the tidal reaches of the sea.

Shield bug - This small insect gets its name because the female sits over, or shields, her hatching eggs and young.

Shrimp - Shrimps are crustaceans, related to crabs and lobsters. They have semi-transparent bodies which are flat and flexible in the middle with a fan-like tail.

Sphecid Wasp - This antisocial insect lives alone and uses its sting to paralyse its prey. It digs a nest for its young and brings back food to feed its larvae.

Stegosaurus - This huge, four-legged herbivore lived in the Late Jurassic period. It is thought to have inhabited the plains and grazed in large herds alongside other herbivores like Diplodocus. It had a row of massive bony plates down its back, and a dangerous tail with four spikes to fend off attack from predators. It grew up to approximately 12 metres long and seven metres tall. It could weigh up to seven tonnes. The name Stegosaurus means “covered lizard”.

Steropodon - A small spiny mammal, from the late Cretaceous period in Australia.

Swamp Cypress - It is a type of cypress, a group of ancient plants that survive to this day.

Tapejara - This medium sized pterosaur was a carnivore who lived in the Early Cretaceous period. It lived on the edges of lakes and inland seas. It had a huge crest which was probably some sort of display structure to attract mates. Its wingspan was five metres, and its body length was one metre.

Theropod - A group of lizard-hipped dinosaurs. All theropods were bipedal carnivores and ranged from the lightly built forms such as Coelophysis to the massive Tyrannosaurus.

Torosaurus - This medium sized herbivore lived in the Late Cretaceous period. It lived on coastal plains, and probably was able to tackle the tough vegetation there with a powerful beak. It is thought that Torosaurus also had an enormous, vibrantly coloured head crest, which was used in mating rituals or hierarchy fights. It was eight metres long, and weighed eight tonnes and had the largest skull of all land animals. The name Torosaurus means “bull lizard”.

Triassic Period - Lasted from about 245 million years ago to 208 million years ago.

Triceratops - A three horned dinosaur with a bony crest that lived during the Late Cretaceous period. It is the best known of the horned dinosaurs. It was unusual because its head crest was solid bone and did not have holes in it.

Tuatara - The tuatara, Sphenodon, from New Zealand, is the most famous “living fossil”. It evolved in the Triassic around the same time as the dinosaurs.

9

APPENDIX NINE – THE A - Z DICTIONARY OF DINOSAUR TERMS

Tyrannosaurus - This huge two legged carnivore lived in the Late Cretaceous period. It roamed around the forests and marshes searching for prey. Its long, serrated teeth and enormous jaw made it a fearsome predator. It was 12.4 metres long, and weighed five to seven tonnes. The name Tyrannosaurus means “tyrant lizard”.

Utahraptor - This medium sized two-legged carnivore lived in the Early Cretaceous period. It was a very large member of the dromaeosaur family distinguished by their large foot claws. It may have hunted in packs on open plains. It was one of the most intelligent and dangerous of the dinosaurs. The name Utahraptor means “robber from Utah”.

Velvet Worms - These worm-like animals evolved over 300 million years ago and are characterised by paired fleshy legs. Modern descendants exist today in Africa, Asia, the Caribbean and South America but are found exclusively on land.

Whip Scorpions - These small predators evolved over 300 million years ago and are still around today. They live in burrows and eat spiders, insects and other scorpions. They have powerful pincers and a whip-like tail with which they can spray acid.

Source: http://www.abc.net.au/dinosaurs/fact_files/glossary_i_l.htm



10

APPENDIX TEN – STAGECRAFT TERMINOLOGY & THEATRE PERSONNEL

THEATRE TERMINOLOGY

Acting – the activity of those who perform in musicals, plays, movies and television show, involving learning a script and songs and taking on the role of a character.

Ad Lib – a departure from the script to cover an unexpected occurrence or forgotten lines, which results in improvised in speech, song music.

Animatronics - the technology connected with the use of electronics to animate puppets or other figures, as for motion pictures.

Apron - Section of the stage floor which projects towards or into the auditorium. In proscenium theatres, the part of the stage in front of the house tabs, or in front of the proscenium arch.

Arena - Form of stage where the audience are seated on at least two (normally three, or all four) sides of the whole acting area.

Black Box – A kind of flexible studio theatre where the audience and actors are in the same room, surrounded by black tabs (curtains).

Blocking – The process of arranging moves to be made by the actors during the play, recorded by stage management in the prompt script. Positions at the start of scenes are noted, as are all movements around the stage.

Beginners – A call given by Stage Management to bring those actors who appear in the first part of a play to the stage. e.g. 'Act One Beginners to the stage, please'. The actors/actresses are then called by name. A similar call is given after the interval.

Calling The Show - The process of giving verbal cues to the lighting, sound, fly operators and stage crew during the performance. Usually done from the prompt corner by the DSM or Stage Manager from the prompt copy.

Character – a part or role, played by an actor in a musical, play, movie or television show.

Choreography – Describes the dance compositions and plans for movement in a musical, play, movie or television show.

Costumes – Specially designed clothes for the characters worn by the actors onstage.

Cue – anything said or done, on or off stage, that is followed by a specific line or to action, or direct to come in, in a specific place in a musical or dramatic performance.

Curtain – The drapes which hide the stage from the audience usually in a proscenium arch theatre.

Curtain Call - At the end of a performance, the acknowledgement of applause by actors - the bows.

Cyclorama (Cyc) – The Cyclorama is a curved plain cloth at rear of the stage. Often used as a 'sky' backing to a traditional set, or as the main backing for a dance piece which has light project onto it.

Dialogue – The spoken text of a play or musical - conversations between characters is dialogue.

Downstage - The part of the stage nearest to the audience.

Flats – A piece of scenery consisting of a wooden frame, usually rectangular, covered with lightweight board or fabric.

APPENDIX TEN – STAGECRAFT TERMINOLOGY & THEATRE PERSONNEL

Fourth Wall - Is the imaginary wall at the front of the stage in a proscenium theatre, between the actors and the audience, through which the audience sees the action in the world of the live performance such as a musical. (imagine it as being in the same position as the screen of your television) As a result, the Fourth Wall often means the audience is invisible to characters for many musical theatre productions, although some productions choose to break the Fourth Wall by deliberately removing it by directly addressing the audience. Audience participation in the performance including actors moving into the auditorium, or audience members moving onto the stage achieves this. The Fourth Wall is another theatrical convention, forming part of The Suspension of Disbelief.

Green Room - A green room is a room in a theatre for the accommodation of performers/ puppeteers, musicians and crew when they are not required on the stage.

Libretto - The script of a musical, text of an opera, or other long musical vocal composition.

Lyricist - The author of the text of a musical or the words of a song.

Monologue - A speech within a musical or play delivered by a single actor alone on stage.

Music - An art of sound in time that expresses ideas and emotions in significant forms through the elements of rhythm, melody, harmony and colour.

Musical Theatre - A living artwork/ form in which the story line is interspersed with or developed by songs and dances and dialogue (not accompanied by music) is optional.

Stage - The part of the theatre on which performances happen, adjacent to the auditorium.

Stage Door - The backstage entrance to the theatre. Performers and technicians enter here. Large theatres normally have a stage door keeper, who takes messages for performers and acts as a security guard for the entrance.

Script - The text of a musical or play. Also contains stage directions and other notes.

Sets - The complete stage setting for a scene or act.

Song Cycle - Is a series of largely unconnected songs with no plot or characters that continue from song to song, but the songs and the production are theatrical and character-driven.

Strike - To disassemble a stage set or to remove props from the stage.

Suspension of Disbelief - is the name given to the convention (in theatre and other forms of entertainment and literature), which surround the willingness of audience members to temporarily and willingly suspend one's critical faculties and believe the unbelievable; sacrifice of realism and logic for the sake of enjoyment. The audience will usually passively accept the presence of the fourth wall without giving it any direct thought, allowing them to enjoy the fiction as if they were observing real events. The Suspension of Disbelief is the invisible barrier between realities and is critical to the successful acceptance of the action which takes place onstage and is related to the convention of the Fourth Wall.

Theme - A unifying or dominant idea or thought through a musical, play or arena spectacular.

Theatrical Conventions - A set of unwritten, often theoretical rules which are embedded in, and influence how we understand and accept the happenings, action and behavior on a theatre stage. The most common theatre conventions are the Suspension of the Fourth Wall and the Fourth Wall.

Opposite Prompt (OP) - Opposite Prompt side of the stage. Stage Right. (ie Actors right when facing audience)

Orchestra Pit - the space reserved for the musicians, usually the front part of the main floor in front of the stage.

Play - a dramatic composition or piece performed on stage and made up of the spoken word.

10

APPENDIX TEN – STAGECRAFT TERMINOLOGY & THEATRE PERSONNEL

Plot – The basic story thread running through a performance, musical or play which gives the reason for the character's actions.

Project – To use one's voice forcefully enough to be perceived at a distance, as by all members of the audience in a theatre. To speak loudly towards the back of the theatre.

Projections - The process of projecting a filmed image onto a screen or other viewing surface.

Prompt Side (PS) – Usually stage left side of the stage, containing the prompt corner.

Prompt Corner - Area, traditionally on the stage left side of the stage, from which the Stage Manager (or DSM) controls ('prompts') the performance, from the prompt desk.

Prompt Copy - Master copy of the script or score, containing all the actor moves and technical cues, used by stage management to control the performance. Sometimes also known as the 'book' or Prompt Script.

Props (Properties) - Furnishings, set dressings, and all items large and small which cannot be classified as scenery, electrics or wardrobe. Props handled by actors are known as handprops.

Proscenium Arch – The opening in the wall which stands between stage and auditorium in some theatres; the picture frame through which the audience sees the play. Supports the convention of The 'Fourth wall'.

Puppeteer - a person who manipulates puppets to make puppets perform.

Upstage – The part of the stage furthest from the audience.

Wings – The out of view areas to the sides of the acting area.

ROLES IN THE THEATRE

Actors – A theatrical performer whose job it is to learn lines and songs, take on roles where they play characters and perform as a member of a cast in a musical, play, movie or television show. As part of an Actor's job, they pretend to be characters in the story.

Assistant Stage Manager (ASM) - The Assistant Stage Manager is the most junior member of the Stage Management team, and is often in charge of sourcing and running Properties during the run of a show.

Choreographer - a person who creates dance compositions and plans, as well as arranging dance movements and patterns for dances, movement and musical staging.

Composer – a person whose role it is to compose or write the music.

Costume Designer - Member of the artistic team for a show who works with the director to create the 'look' of the costumes (specially designed clothes) for the characters. He/she sometimes also designs the set.

Dancer - Member of the company whose role is choreographed, and who has no spoken words.

Deputy Stage Manager - Usually shortened to DSM, this is the member of the Stage Management team who attends all rehearsals and then calls the cues / runs the prompt copy for the show.

Director – The person responsible for the overall artistic vision of a production and who supervises the integration of all the elements such as acting, staging, and lighting, required to realise the Writer's conception.

APPENDIX TEN – STAGECRAFT TERMINOLOGY & THEATRE PERSONNEL

Dramaturge - Works as an advisor/assistant to the director on the background and historical relevance of the musical or play being produced. Also can act as a liaison between Director and Playwright, and can work on the text of the play (editing and revising scripts and librettos).

Ensemble – An acting group. Normally used to describe a group of actors who work well together, with no-one outshining the others.

Lighting Designer (LD) – Member of the production team for a show who is responsible for the overall look of the lighting. The Lighting Designer is responsible for liaising with the director about style and with the set and costume designers about colour and decides on the position, type, focus direction and colour of every lighting instrument in the rig. He/she draws a lighting plan to communicate this to other members of his team (and to the theatre staff who are rigging the lighting).

Musical Director (MD) – The conductor/leader of a musical, or the person responsible for the musical content of a production.

Musicians – The person or people who perform the music for a musical, play, film or television show. When more than one musician works on a musical they are known as a band or orchestra.

Production Manager – Responsible for technical preparations, including budgeting and scheduling of productions. The Production Manager works closely with the Technical Director and in some cases depending on the size of the company the Production Manager/ Technical Director may be the same person.

Production Stage Manager (PSM) – On larger musical theatre productions often a more senior staff member is added to the stage management team to supervise the production and serve as a further liaison with the Director, Technical Director and production team.

Producer – That person or body responsible for the financial and contractual side of a production. This can include the raising of money to stage the production, hiring the facilities, employing the technical crew, front of house and publicity staff, director and cast. The Producer usually works closely with the director before embarking on a production.

Puppeteers - One who entertains with and operates puppets, marionettes and/or animatronics.

Set Designer – Member of the artistic team for a show who works with the director to create the scenic 'look' for the stage throughout the show and any accompanying props. He/she sometimes also designs the costumes. The Set Designer works with the Technical Director/ Production Manager to ensure the design stays within the budget. Many theatres have a stock of scenery which means that items can be reused by recovering or repainting in a different production

Sound Designer – Member of the production team who has the responsibility for planning and executing the layout of all sound playback and reinforcement equipment for the show. This role also includes the sourcing of music and sound effects for the production.

Stage Manager (SM) – The Head of the Stage Management team comprising the Deputy Stage Manager (DSM) and Assistant Stage Manager (ASM). The DSM is normally 'on the book' calling the cues from the prompt corner. The ASM supervises props.

Technical Director (TD) - The exact role of the Technical Director changes according to the size of the theatre company. Generally the TD co-ordinates all technical aspects of the production, from organising crew calls to ensuring equipment is ordered, to liaising with the designers and sometimes adapting a design to fit the venue.

Sources: www.dictionary.com and www.theatrecrafts.com

Toscano, M. 'Roaming the Earth Once More', The Washington Post, September 14, 2007.

The Washington Post

Friday, September 14, 2007

With THE Kids

Roaming the Earth Once More

By MICHAEL J. TOSCANO
Special to The Washington Post

Maybe it's the arena-shaking sound, the ominous thuds that signal the approach of something fearsome. Maybe it's the sheer size of the thing when it lumbers into view, some 36 feet high and 49 feet long. Or the cold glint in the reptilian eye as the monster slowly turns to look . . . directly . . . at . . . you. It can be mesmerizing, even paralyzing, says Harley Durst, one of 150 artists and technicians who re-create a prehistoric *light for survival*. You see, Tyrannosaurus rex is trying to protect Baby-T, her 15-foot-long toddler.

This vignette is from "Walking With Dinosaurs — The Live Experience," the \$20 million show coming to Verizon Center for seven performances Wednesday through Saturday. Based on the award-winning BBC television series of the same name, shown here on Discovery Channel, "Walking With Dinosaurs" may be that rare event that children and parents can enjoy equally.

Harnessing technology developed for the movies, the showmanship of noted music director Scott Paris, an original score, and elaborate scenic and lighting design, the show features 15 vividly realistic dinosaurs and one mammal (a human "paleontologist" guide). Developed by an Australian company called Immersion Edutainment to thrill and teach, the show had a successful run down under before beginning a North American tour this summer.

"You can hear the laughter when Baby-T comes out," says Durst, 26, a movie stuntman who works inside that model. "Sometimes you hear gasps and cries when Mama T. rex roars at the crowd. But other times, there's just dead, shocked silence."

The content of the show is appropriate for all ages, but some intense dramatic scenes may upset very small children.

The show moves through 165 million years of the dinosaurs' reign on Earth in 95 minutes, as animals and planet evolve. Carnivorous creatures begin walking on two legs, continents split and the Triassic desert greens over into the lush forests of the Jurassic period. The dinosaurs are masters of their paradise, until death comes from the sky in the form of a massive comet.

The animatronic, computer-driven puppetry, complete with rippling muscles and flesh, offers a new kind of heightened realism, Durst says. But he says he thinks the interaction between audience and "animal" is what makes the show effective. "People look directly into the creatures' eyes," he says. "As a performer, you can feel that contact when they look at the face, you can feel the intimacy and the fear that this thing might actually bite them."

Immersion Edutainment chief Bruce MacTaggart says the extinct creatures may save live entertainment from going the way of the, you know, dinosaur. "There's concern that kids, with their Xboxes and computers and all their electronics, would let live entertainment



Tyrannosaurus rex is protective of her toddler, Baby T, in "Walking with Dinosaurs — The Live Experience," roaring into Verizon Center on Wednesday with 15 realistic dinosaurs.

die," he says from Melbourne. "It seemed to us that no one was doing anything new, something that would stimulate both parents and children. Out of that came the notion that if we could synthesize education and entertainment on a grand scale, then we might have something quite powerful."

WALKING WITH DINOSAURS — THE LIVE EXPERIENCE Wednesday at 7, Thursday at 10:30 and 7, Sept. 21 at 7, and Sept. 22 at 11, 3 and 7, Verizon Center, 601 F St. NW (Metro: Gallery Place-Chinatown), \$30.50-\$82.50. Tickets required for age 3 and older; available at box office, www.ticketmaster.com or by calling 202-397-7328. For more information, visit www.dinosaurlive.com.

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THE Arts

The New York Times

Making a Thundering Comeback After 65 Million Years



By PATRICIA COHEN

There is really no such thing as “fun for the whole family.” This was an epiphany that Bruce MacTaggart had while watching a children’s show with his kids, but that he refused to accept.

So Mr. MacTaggart, an Australian entrepreneur with Spielberg-size ambitions, decided to create a theatrical experience that had “something for all ages, kids and adults, so they wouldn’t be bored.” One result is “Walking With Dinosaurs: The Live Experience,” a show with life-size animatronic din-

osaurs that walk and talk (well, roar), not simply on screen, but also in three dimensions.

Based on the popular BBC Television series, this \$20 million extravaganza is arriving at Continental Airlines Arena in East Rutherford, N.J., tonight through Sunday as part of a two-year American tour. Tickets range from \$27 to \$87.

Having managed three arenas in Australia and New Zealand, Mr. MacTaggart, now the executive director of Im-merision Edutainment, which created the dinosaur show, said he realized how

undervalued stadiums are. During the show’s run at the Wachovia Spectrum in Philadelphia, he noted that arenas had such “height and width and depth, but most shows don’t use all the space.”

His does. The ornithomirrus, strung from the ceiling, has a 38-foot wingspan. The brachiosaurus is 36 feet tall. But scale alone does not account for their impact. They are also remarkably life-like. Stretchy beanbags filled with polystyrene balls and pulled across moving points in the dinosaurs’ bodies give the

Continued on Page 5

APPENDIX ELEVEN – REVIEWS

A Comeback For the Fons: The Roar Of the Latex

From First Arts Page

appearance of muscles and fat moving under skin. Hand-painted mesh (six miles of it) and latex stencils give the skin a pebbled texture. Most important, the technology that allows the giant lizards to cock their heads, roll their eyes and react to the audience endows them with emotion.

Two lumbering, torosaurus-like resemble sumo wrestlers more interested in eating than fighting. A serene vegetarian, the ankylosaurus has the eyes and expression of a dimwitted ram.

The parade of 15 animals lasts about 90 minutes. And though there is a human host (effective as a measuring stick), his commentary is like the onstage questions at a beauty contest: all anyone is really waiting for is the next contestant to appear.

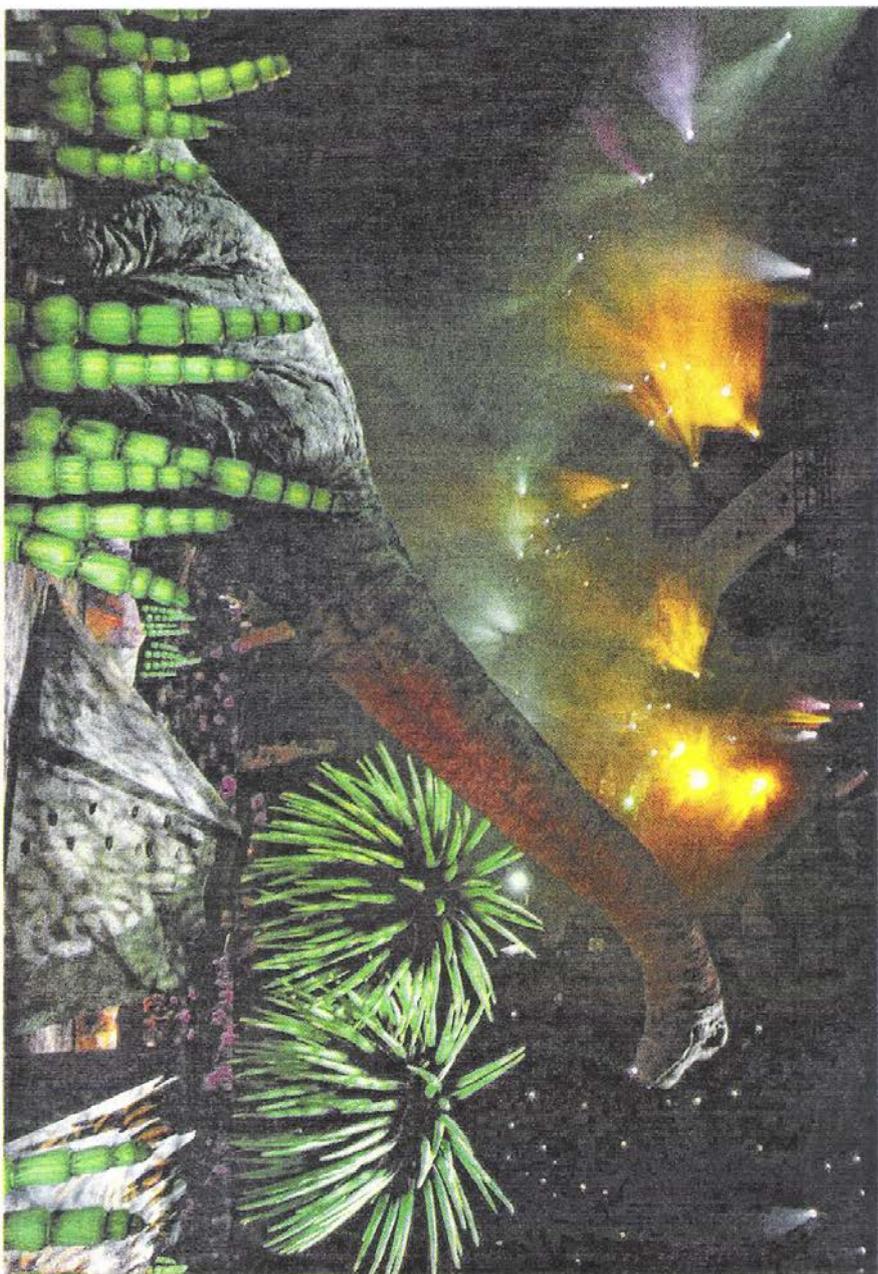
"Some dinosaurs wouldn't get off the stage," my 7-year-old complained. "They're wasting time."

The hulking Tyrannosaurus rex didn't wait to be injected out. At 23 feet high and 42 feet long, with 6-inch teeth and a thundering snarl, she was fearsome enough to reduce some toddlers to tears. Mama charged out to save her yelping baby T, who then gave her a playful nip. A look around the arena revealed what seemed to be whole families having fun.

Although the dinosaurs make it all around the stage — about the size of a hockey rink — spectators sitting on the sides may have difficulty in some arenas seeing the video backdrop and the opening egg-hatching sequence.

The large dinosaurs glide

"Walking With Dinosaurs: The Live Experience" runs through Sunday at the Continental Airlines Arena in East Rutherford, N.J. (212) 307-7171, dinosaurthe.com.



Back from extinction: A life-size brachiosaurus, 36 feet tall, is one of 15 realistic dinosaur creations to stomp through the show. "Walking With Dinosaurs."

along, attached to low-slung go-carts run by jockey-size drivers. A second operator in a control booth uses a "wooden rig" — a device that fits along the operator's arm — to move a dinosaur's body, head and tail, while a third person manipulates the eyes, jaws and sounds.

The Utahraptors and baby T rexes, 7 and 8 feet high and 14 feet long, are actually 50-pound puppets. Though they are the smallest characters, they are in some ways the most compelling. There is a performer inside, and that beating heart comes through.

Harley Durst, 26 and trained as

a stunt acrobat, is one of the men inside the belly of the beast. He has been with the show for five years, he said, and has closely watched the BBC series, visited zoos and worked with the designer, Sonya Tidler, to understand "how an animal reacts to whether he sees something or smells something."

"I watched bears fight," he said, "posturing, then seconds of madness."

"We had big mirrors made up," he added, so the puppeteers could observe themselves and practice "ways you can stand still and keep it alive."

Hopping up from a chair to demonstrate, Mr. Durst said he practiced moving like a quadruped. He took large strides with one knee forward, leading with his chest while extending the other leg back. And while you might think that a flash of spinning human legs would ruin the illusion, it is actually less distracting than the camouflaged go-carts between the mammoth robots' feet.

Although Mr. Durst is onstage for only 15 minutes, it is exhausting work, given the weight and strenuous movements. "My brain is turning 100 miles an hour with

all the music and movement cues," he said.

"Walking With Dinosaurs" took six years to create. There is an original score. Onstage with the dinos are inflatable vines, trees, flowers and insects that rise from the stage floor in seconds. A smoking volcano later turns the vines into a pile of scorched wet noodles. Elaborate lighting creates patterns of leaves and footprints across the floor. And the fog that rolls in at intermission could keep "The Phantom of the Opera" going for a month.

The show requires 150 people

to stage, including a spectrum manager to control radio frequencies used to operate the dinos. Twenty-five tractor-trailers are needed to transport the 116,000 pounds of scenery, lights and sound equipment, and the 30 tons of dinosaurs.

"This really is a remarkable collaborative effort by people who brought a dream," Mr. MacIntyre said.

He said his company was creating a second unit to tour in Europe and Asia, possibly by the end of next year — a kind of Cirque du Dinosaur. Barney, eat your heart out.

12

APPENDIX TWELVE - CURRICULM LINKS

Country/Region	Year	Subject links	Page Title	Page
England and Wales N.I. Scotland	y.1/2 P2/3 P2	Science/ The World Around Us Art	Researching the Dinosaurs	12
England and Wales N.I. Scotland	y.1/2 P2/3 P2	Science/ The World Around Us Expressive Arts	Discussion Topics	14
England and Wales N.I. Scotland	y.1/2 P2/3 P2	Science /The World Around Us Art and Design	The Science of Dinosaurs -Tracking Them Down	16
England and Wales N.I. Scotland	y.3-y.7 P4-y.8 P3-S1	Science/ The World Around Us	The Science of Dinosaurs -Tracking Them Down	16 (extension activity)
England and Wales N.I. Scotland	y.3-y.7 P4-y.8 P3-S1	Science/The World Around Us	Researching the Dinosaurs	12 (extension activity)
England and Wales N.I. Scotland	y.4/5 P5/6 P5	Science/ The World Around Us English/Welsh Language- writing	Recreating History- The Dawn of the Dinosaurs	17
England and Wales N.I. Scotland	y.4/5 P5/6 P5	English/Welsh Language-writing Drama/Expressive Arts	Reviewing Walking With Dinosaurs	18
England and Wales N.I. Scotland	y.7-y.9 y.8-y.9 S1-S2	English/Welsh Language-writing Drama/Expressive Arts	Reviewing Walking With Dinosaurs	18 (extension activity)
England and Wales N.I. Scotland	y.7-y.9 y.8-y.9 S1-S2	Music	Music of the Dinosaurs	19
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6	Vocational Performing Arts/ Performing Arts Business	No Bones About It	8
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6 FE and HE	Drama/ Performing Arts/ Media/Film	From Stage to Screen	13
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6 FE and HE	Vocational Performing Arts/ Technical Theatre Art and Design Puppetry	Fascinating Facts	15
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6 FE and HE	Music/ Audio technology/ multi- media/ sound production	Music of the Dinosaurs	19 (extension activity)
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6 FE and HE	Vocational Performing Arts – Technical Theatre	Jurassic Staging	20
England and Wales N.I. Scotland	y.10 –y.13 y.11-y.14 S4-S6 FE and HE	Drama/Expressive Arts/Vocational Performing Arts	Reviewing the Spectacular -Walking With Dinosaurs	21

13

APPENDIX THIRTEEN - ADDITIONAL RESOURCES

Walking With Dinosaurs – The Arena Spectacular	www.dinosaurlive.com
Global Creatures	www.global-creatures.com/
ABC Online – Walking With Dinosaurs	www.abc.net.au/dinosaurs/
Walking With Dinosaurs – BBC Series	www.bbc.co.uk/sn/prehistoric_life/tv_radio/wwdinosaurs/
Wikipedia – Walking With Dinosaurs	http://en.wikipedia.org/wiki/Walking_with_Dinosaurs
Walking With Dinosaurs – The Live Experience, compact disc (2007 WWT-Rex Pty Ltd ABC Classics)	http://www.wwdshop.com/

14

APPENDIX FOURTEEN - REFERENCES

Theatrecrefts.com	www.theatrecrefts.com
Dictionary.com	www.dictionary.com

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