



MEMO

PALEO NEWS

RANGER READER

DINO DOSSIER

RESOURCES

HELLO,

WELCOME TO THE FIELD STATION!

WE'RE EXCITED FOR YOU TO BE JOINING OUR TEAM. THIS IS ONE OF THE LOCATIONS SCATTERED AROUND THE ISLAND WHERE WE CONDUCT OUR RESEARCH. SORRY I'M NOT THERE TO GREET YOU IN PERSON, BUT I EXPECT YOU'LL SETTLE IN JUST FINE WITHOUT ME.

YOU'LL QUICKLY FIND OUT THAT THERE'S NEVER A DULL MOMENT! BUT IF YOU FIND YOURSELF NEEDING SOME LIGHT READING OR NEW THINGS TO TRY OUT, I TEND TO LEAVE SOME NOTES SCATTERED AROUND. ARTICLES I THINK YOU MIGHT BE INTERESTED IN, GAMES, AND OTHER THINGS I THINK MIGHT BE USEFUL FOR OUR TEAM!

IF YOU RUMMAGE AROUND, YOU'LL ALSO FIND SOME DATA FILES ON DIFFERENT ANIMALS AS WELL AS ANY IMPORTANT NOTES OR RECENT MEMOS.

BEST OF LUCK! RADIO IF YOU NEED ANY ASSISTANCE!!

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A NEW SPECIMEN OF ARCHAEOPTERYX WAS DESCRIBED FROM THE LOWER TITHONIAN MÖRNSHEIM FORMATION (LATE JURASSIC) IN THE FRANCONIAN ALB OF BAVARIA, GERMANY. WHILE THE OVERALL SPECIMEN IS CONSIDERABLY FRAGMENTARY, ENOUGH WAS PRESENT FOR THE RESEARCHERS TO CONCLUDE THAT THE FOSSIL IS A SPECIES OF ARCHAEOPTERYX INSTEAD OF ANOTHER AVIALAN.

[Read More](#)

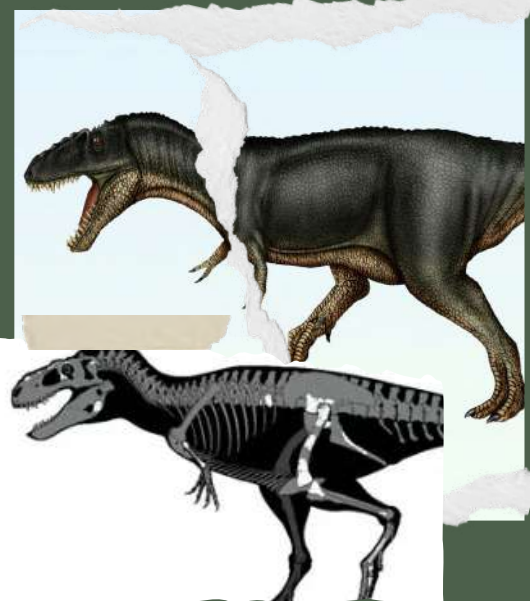
NEW EVIDENCE THAT PLANT COMMUNITIES EXPERIENCED "MAJOR RESTRUCTURING" AFTER THE K/PG EXTINCTION, LEADING TO A DISTINCT CHANGE IN THE COMPOSITION AND DIVERSITY IN THE HELL CREEK.

[Read More](#)

NEW SPECIES OF TYRANNOSAURID FROM MEXICO! NAMED LABOCANIA ANOMALA LIVED DURING THE CAMPANIAN AGE OF THE CRETACEOUS PERIOD, AROUND 72.5 MILLION YEARS AGO, IN THE CERRO DEL PUEBLO FORMATION. THE SPECIMEN APPEARS YOUNG, WITH THE FRAGMENTS SUGGESTING AN ANIMAL AROUND 6.3 M (21 FEET) IN SIZE. THE LABOCANIA CLADE SEEMED TO HAVE BEEN DOMINATING SOUTHERN LARAMIDIA, WHILE THE NORTH WAS BEING "RULED" BY OTHER TYRANNOSAURS?!

[Read More](#)

LABOCANIA ANOMALA
IMAGE CREDIT: KARKEMISH / CC BY-SA 3.0



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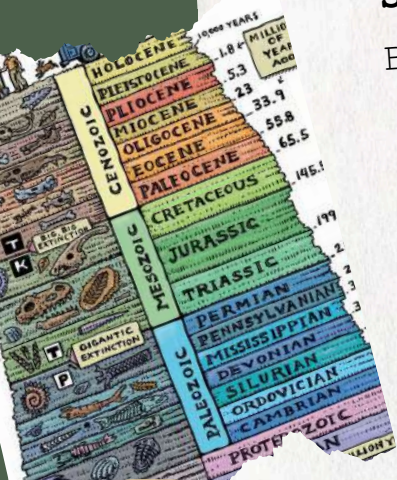
RESOURCES

RANGER READER

ANOTHER NEW YEAR!!!
WHERE DOES THE TIME GO?

IT NEVER CEASES TO AMAZE ME HOW **TIME JUST SEEMS TO PASS SO QUICKLY FOR US HUMANS.**
BUT FOR EARTH... IT'S NOTHING. A BLINK.

THINKING ABOUT HOW MUCH LIFE HAS COME AND GONE ON THIS PLANET IS STAGGERING! TIME HERE FOR THIS ROCK IS SO VAST AND CONTINUOUS, AND THINGS HAVE ALWAYS BEEN CHANGING AND ADAPTING IN A NEVER-ENDING CYCLE OF EVOLUTION, EXTINCTION, AND GROWTH.



[LINK TO TIMESCALE](#)

IT'S HARD FOR PEOPLE TO FULLY COMPREHEND JUST HOW LONG THIS HAS BEEN GOING ON. WE HAVE OUR TIME SCALES, AND ANALOGIES BUT... I MEAN, I JUST CUT UP MY LUNCH APPLE AND IT'S ALREADY TURNING BROWN IN A FEW MINUTES!



HOW CAN WE REALLY WRAP OUR HEADS AROUND 66 MILLION YEARS??? (ROUGHLY THE LENGTH OF TIME THE DINOSAURS HAVE BEEN EXTINCT (WELL... IF YOU DON'T EXTEND THEIR REIGN TO TODAY BY COUNTING MODERN BIRDS OR OUR LITTLE GENETICALLY MODIFIED ISLAND INHABITANTS.)

WELL... LET'S ATTEMPT TO PUT IT INTO SOME PERSPECTIVE.

CONTINUE



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RANGER READER

DINO DOSSIER

RESOURCES

IF WE TRY TO FIT ALL OF GEOLOGIC TIME INTO A TWENTY-FOUR HOUR PERIOD, THE FORMATION OF THE EARTH ABOUT 4.6 BILLION YEARS AGO WOULD BE SIGNALLED BY A MIDNIGHT CHIME IN OUR PROVERBIAL GEOLOGIC GRANDFATHER CLOCK. IT WOULDN'T BE UNTIL 4:00 AM BEFORE THE FIRST SINGLE-CELLED LIFE EVEN APPEARS, AND THEN TAKES A FURTHER HOUR AND A HALF BEFORE PHOTOSYNTHETIC PLANTS EVOLVE. THEN TIME JUST KIND OF TICKS BY FOR THE NEXT SEVEN AND A HALF HOURS (OR UNTIL ABOUT THE 2 BILLION YEARS MARK,) UNTIL THE FIRST EUKARYOTES EMERGE (ORGANISMS WITH A MEMBRANE-BOUND NUCLEUS IN THEIR CELLS,) AS SINGLE-CELLED ORGANISMS AROUND 1:00 PM.



ALL LAND USED TO BE CONNECTED INTO ONE SUPER- CONTINENT CALLED "PANGEA." OVER TIME, THE LAND DEVIDED AND BECAME THE CONTINENTS THAT WE HAVE NOW.

CONTINUE



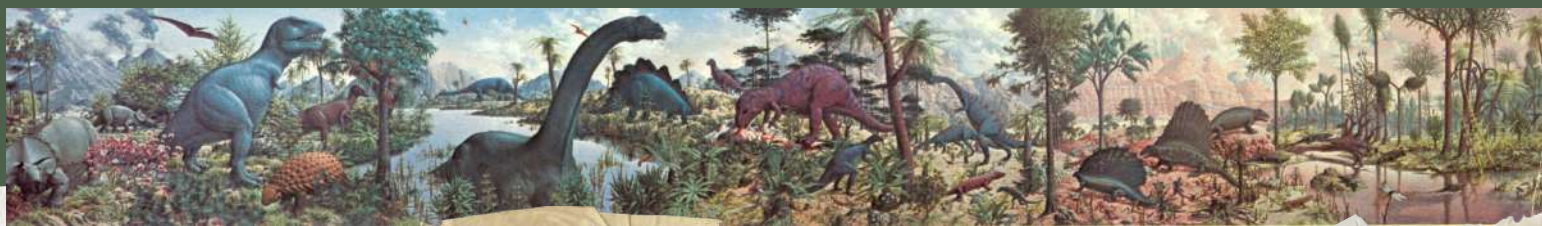
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RANGER READER

DINO DOSSIER

RESOURCES



THE FIRST MULTI-CELLED LIFEFORMS POP UP AROUND 5:00 PM, AND OUR FIRST COLLECTION OF AQUATIC LIFE FINALLY MAKE A SPLASH AROUND 8:00 PM. AT 9:00 PM (OR 530 MILLION YEARS) WE HAVE THE CAMBRIAN EXPLOSION BEGINNING. FIRST PLANTS APPEAR ON LAND AT 9:41 PM, LURING THOSE AMPHIBIANS OUT OF THE WATER AT AROUND 10:00 PM FOR THE FIRST TIME.

IT'S NOT UNTIL 10:40 PM (BETWEEN 245 AND 225 MILLION YEARS) THAT THE DINOSAURS FINALLY ARRIVE, BUT THEIR TIME IS SADLY SHORT-LIVED AS THAT K/PG EXTINCTION CUTS THEM OFF AT 11:40 PM SHARP (OR 66 MILLION YEARS AGO!)

MODERN MAMMAL FAMILIES START POPPING UP TWO MINUTES AFTER THAT, AND HOMINIDS APPEAR AT ROUGHLY 11:52 PM. CRASHING THE PARTY IS THE MAJOR ICE AGES AROUND 11:59 PM AND THEN (THE ULTIMATE BUZZKILL,) MODERN HUMANS, AT 12:00 AM ON THE DOT.

ONE OF THE MOST FAMOUS WORKS OF PALEOART, THE AGE OF REPTILES MURAL BY RUDOLPH F. ZALLINGER DEPICTS LIFE ACROSS MILLIONS OF YEARS. WHILE TYRANNOSAURUS REX AND DIMETRODON WOULDN'T HAVE EVER REALLY BEEN FIFTY METERS AWAY FROM ONE ANOTHER, IN TERMS OF GEOLOGIC TIME... THEY MIGHT AS WELL HAVE BEEN!

CONTINUE



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HUMAN LIVES... MOVE AT SUCH A **RAPID**
RATE AND GEOLOGIC **TIME IS SO VAST**
THAT IT'S HARD FOR US TO SEE THE
FULL PICTURE. BUT HOPEFULLY, THIS
COMPARISON HELPS MAKE IT A LITTLE
EASIER TO GRASP!

REFERENCE LINKS:GSA GEOLOGIC TIMESCALENORTHERN ARIZONA UNIVERSITY GEOLOGIC - HISTORY OF LIFE ON EARTHFLOWING DATA- HISTORY OF LIFE

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PARASAUROLOPHUS

<u>FAMILY</u>	HADROSAURIDAE	<u>GENUS</u>	LAMBIOSAURINE
<u>LENGTH</u>	9-11 M (30-36 FT)	<u>HEIGHT</u>	4-5 M (16 FT)
<u>WEIGHT</u>	2000 KG (2 TONS)	<u>DIET</u>	HERBIVORE
<u>LOCATION</u>	NORTH AMERICA, ASIA? (SEE BELOW)	<u>TIME PERIOD</u>	75-66 MYA (LATE CRETACEOUS- CAMPANIAN & MASSTRICHTIAN)

NOTES: ONE OF THE MOST ICONIC HADROSAURS (OR "DUCK-BILLED" DINOSAURS,) THE PARASAUROLOPHUS IS A SPECTACULAR ANIMAL. WITH A LARGE CREST THAT CURVES BACKWARD, IT DEFINITELY STANDS OUT IN A CROWD.

WHILE THE PARASAUROLOPHUS THAT HAVE BEEN BROUGHT BACK BY THE GENETICISTS ARE IMPRESSIVE, IT HAS TO BE ACKNOWLEDGED THAT (LIKE THE REST OF OUR ANIMALS) THE "DE-EXTINCTION" PROCESS IS NOT 100%, AND THERE HAS EVEN BEEN PURPOSEFUL ALTERATIONS AS WELL. THERE MAY BE DIFFERENCES IN STRUCTURE, APPEARANCE (EVEN AMONG OUR PARAS THERE IS QUITE A DIVERSITY,) AND BEHAVIOR WHEN COMPARED TO THE FOSSIL RECORD.

THERE ARE CURRENTLY THREE SPECIES OF PARASAUROLOPHUS. THE TYPE SPECIES, P. WALKERI, WAS DESCRIBED IN 1922 BY WILLIAM PARKS FROM A SPECIMEN EXCAVATED IN ALBERTA . THERE IS ALSO P. TUBICEN, AND THE SHORTER-CRESTED P. CYRTOCRISTATUS. CHARONOSAURUS JIAYINENSIS IS A VERY CLOSE RELATIVE TO PARASAUROLOPHUS THAT IS FOUND IN CHINA.

IMAGE KEY

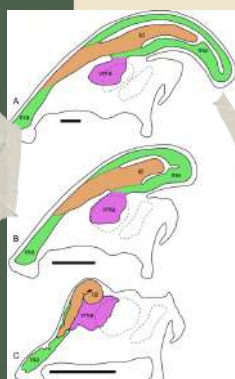
PARASAUROLOPHUS CONCEPT ART BY CRASH MCCREERY (CENTER)

JURASSIC PARK: THE GAME (UPPER LEFT)

JURASSIC PARK 30TH ANNIVERSARY CAPTIVZ ART BY JAROSLAV KOSMINA (LOWER LEFT)

SCENE FROM JURASSIC PARK (1993) (UPPER RIGHT)

PARASAUROLOPHUS MARQUETTE FROM THE LOST WORLD BY STAN WINSTON STUDIOS (LOWER RIGHT)



FARKE, ET AL (2013)

THE MAGNIFICENT CREST SPORTED BY PARASAUROLOPHUS IS THOUGHT TO NOT ONLY BE A VISUAL DISPLAY TO OTHER DINOSAURS BUT ABLE TO HELP THE ANIMAL PRODUCE SOME UNIQUE SOUNDS. THE CREST IS ACTUALLY A MULTI-CHAMBERED TUBE THAT CONNECTS TO THE NOSTRILS! USING CT SCANS AND COMPUTER PROGRAMMING, SCIENTISTS IN THE 90'S CREATED A 3D MODEL OF THE CREST, AND HAVE BEEN ABLE TO SIMULATE SOUNDS AND TONES BY BLOWING AIR THROUGH THE CREST MODEL.

ONTOGENETIC (GROWTH) STUDIES ON PARASAUROLOPHUS FOSSILS SHOW THAT JUVENILES HAD A CONSIDERABLY SMALLER CREST.



GOOSEBUMP INDUCING.

EVIDENCE ALSO SUGGESTS THAT THE CREST STRUCTURE GREW FAIRLY QUICKLY WITH THE ANIMAL, EVEN MORE SO THAN OTHER CRESTED HADROSAURIDS. THIS COULD BE DUE TO THE SIZE OF THE CREST AS WELL AS THE COMPLEX CONNECTION TO THE RESPIRATORY SYSTEM. (FARKE, ET AL (2013))

FURTHER STUDIES ON CRESTED HADROSAURIDS ALSO THEORIZE THAT YOUNGER INDIVIDUALS MAY BE CONSUMING DIFFERENT TYPES OF VEGETATION THAN ADULTS, LEADING TO NICHE SHIFTS THROUGHOUT THEIR LIFESPAN. (WYENBERG-HENZLER, ET AL (2022))

REFERENCES:

SCIENTISTS USE DIGITAL PALEONTOLOGY TO PRODUCE VOICE OF PARASAUROLOPHUS DINOSAUR

FARKE, A. A., CHOK, D. J., HERRERO, A., SCOLIERI, B., & WERNING, S. (2013). ONTOGENY IN THE TUBE-CRESTED DINOSAUR PARASAUROLOPHUS (HADROSAURIDAE) AND HETEROCHRONY IN HADROSAURIDS. PLoS ONE, 8(12), 1-12. <https://doi.org/10.1371/journal.pone.0182182>

WYENBERG-HENZLER, T., PATTERSON, R. T., & MALLON, J. C. (2022). ONTOGENETIC DIETARY SHIFTS IN NORTH AMERICAN HADROSAURIDS (DINOSAURIA: ORNITHOMIMIDAE). CRETACEOUS RESEARCH, 135, 105177.

IMAGE KEY

PARASAUROLOPHUS FROM MICHAEL CRICHTON'S THE LOST WORLD (UPPER LEFT)

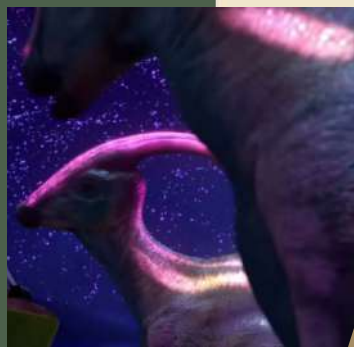
JURASSIC PARK RIVER ADVENTURE (MIDDLE LEFT)

JURASSIC WORLD: CAMP CRETACEOUS (BOTTOM LEFT)

JURASSIC PARK OPERATION GENESIS (CENTER)

JURASSIC PARK: THE EXHIBITION (UPPER RIGHT)

JURASSIC WORLD DOMINION (2022) (LOWER RIGHT)





JURASSIC FOUNDATION

FOUNDED IN 1998 BY UNIVERSAL STUDIOS AND AMBLIN ENTERTAINMENT, THE JURASSIC FOUNDATION IS A NON-PROFIT ORGANIZATION DEDICATED TO ADVANCING DINOSAURIAN RESEARCH AROUND THE GLOBE. TO DATE, THE FOUNDATION HAS DONATED NEARLY \$1 MILLION DOLLARS TO SCIENTISTS TO CONDUCT THEIR RESEARCH. RECENT PUBLICATIONS ON RESEARCH AIDED BY THE JURASSIC FOUNDATION CAN BE FOUND ON THEIR [INSTAGRAM](#)

YOU CAN FIND OUT MORE ABOUT THE FOUNDATION, APPLY FOR GRANTS, AND GET IN CONTACT WITH FOUNDATION MEMBERS BY VISITING THEIR WEBSITE: JURASSICFOUNDATION.ORG

MUSEUM MUSTS



MUSEUM OF THE ROCKIES

600 W KAGY BLVD, BOZEMAN, MT 59717
(406) 994-2252

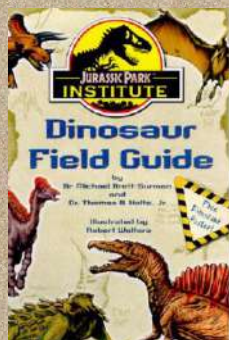
NESTLED NEXT TO MONTANA STATE UNIVERSITY, THIS WORLD-FAMOUS MUSEUM IS HOME TO A BREATHTAKING COLLECTION OF FOSSILS, INCLUDING “EGG MOUNTAIN” MIA SAURS AND NESTS, “BIG AL”, A DIVERSE ARRAY OF GROWTH SERIES DISPLAYS, STUNNING MODELS AND PALEOART, AND SO MUCH MORE.

MUSEUM OF THE ROCKIES ALSO HOSTS A YEARLY CONFERENCE, [DINOS AND MOR](#), WHERE RESEARCHERS GATHER AND PRESENT THE LATEST PALEONTOLOGICAL RESEARCH TO THE PUBLIC.

RECOMMENDED READS

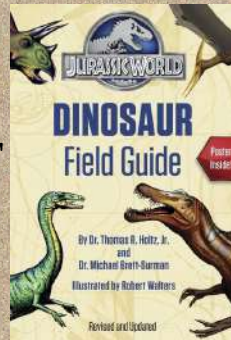
DINOSAUR FIELD GUIDE

BY DR. THOMAS R. HOLTZ JR., & DR. MICHAEL BRETT-SURMAN, ILLUSTRATED BY ROBERT WALTERS

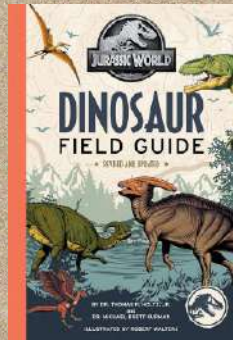


FIRST EDITION

SINCE ITS FIRST EDITION, RELEASED UNDER THE JURASSIC PARK INSTITUTE BRANDING, THE DINOSAUR FIELD GUIDE HAS BEEN A REQUIRED ADDITION TO DINOSAUR AND JURASSIC ENTHUSIASTS' LIBRARIES. THIS NONFICTION GUIDE HIGHLIGHTS OVER 100 PREHISTORIC SPECIES AND SOME OF THE NEWEST DISCOVERIES, DISCUSSES PREHISTORIC PLANT LIFE, HAS MAPS, PALEOART, HAS FUN TRIVIA, AND MORE.



SECOND EDITION



THIRD EDITION

HI EVERYBODY! I REALLY APPRECIATE YOU CHECKING THIS NEWSLETTER OUT AND AM HOPING YOU ENJOYED OUR FIRST ISSUE!



WHEN I WAS A KID, THE JURASSIC PARK INSTITUTE WAS A STAPLE OF MY EARLY INTERNET EXPLORATION, AS WELL AS PROMINENT ON MY PERSONAL BOOKSHELF. I CAN'T TELL YOU HOW MANY TIMES I READ THROUGH THE WEBSITE'S EDITORIALS AND THE LATEST DINO NEWS, OR SEARCHED FOR VIDEOS OF THE JPI TOUR ON YOUTUBE, AND YOU BETTER BELIEVE THE FIELD GUIDE RESTED NEXT TO MY BED EVERY NIGHT.

THE CREATION OF JURASSIC OUTPOST'S FIELD STATION HAS COME OUT OF A DESIRE TO FOLLOW IN THE JURASSIC PARK INSTITUTE'S GIANT DINO-SIZED FOOTSTEPS AND HELP MAKE THE SCIENCE OF PALEONTOLOGY ACCESSIBLE TO THE PUBLIC. DINOSAURS ARE OFTEN A GATEWAY FOR CHILDREN OR PEOPLE TO GET INTERESTED IN STEAM (SCIENCE, TECHNOLOGY, ENGINEERING, ARTS, AND MATHEMATICS,) AND THE JURASSIC FRANCHISE USES DINOSAURS AND STORYTELLING TO TAP INTO THAT SAME GATEWAY TO OPEN OUR IMAGINATIONS AND CURIOSITIES.

PLEASE NOTE, THIS NEWSLETTER IS STILL VERY MUCH IN ITS INFANCY, AND FORMAT AND STYLE CHOICES MAY CHANGE FROM TIME TO TIME. BUT AT ITS CORE, FIELD STATION IS ABOUT EDUCATION AND WILL STRIVE TO PROVIDE THE MOST UP-TO-DATE AND ACCURATE INFORMATION POSSIBLE. I HOPE THAT YOU STICK AROUND AND ENJOY THIS JOURNEY!

-J.

