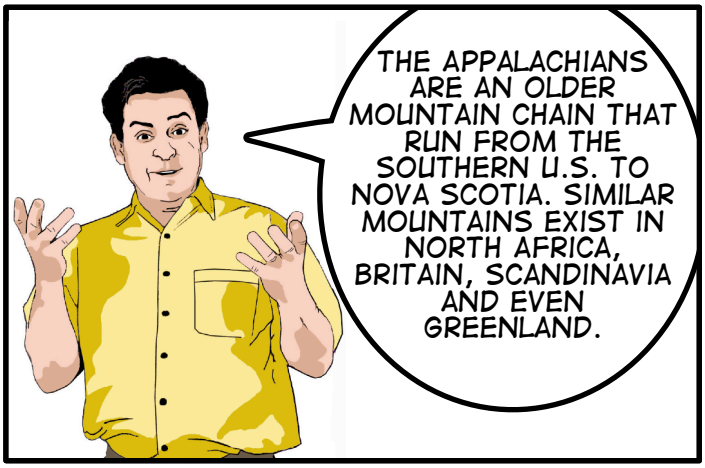
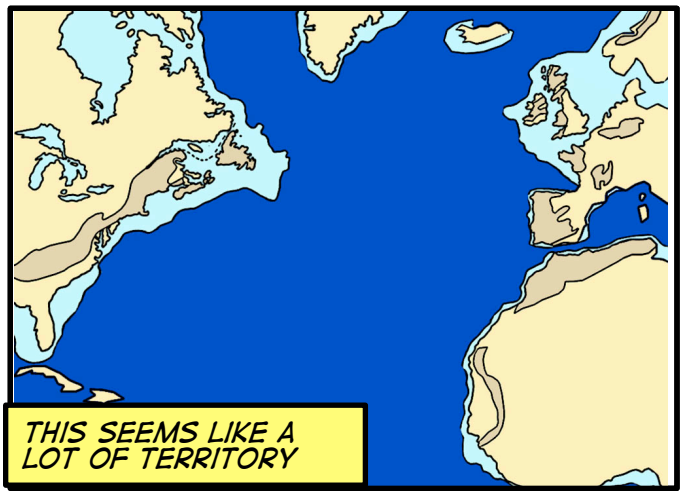
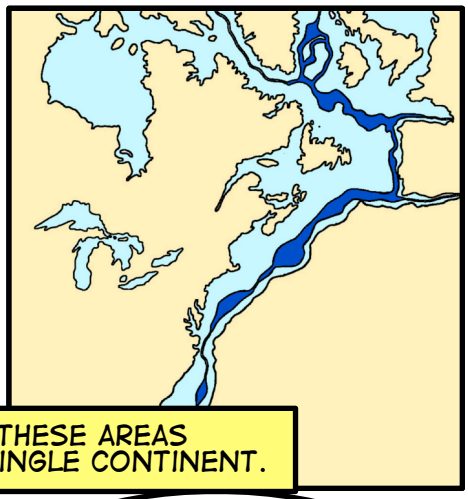
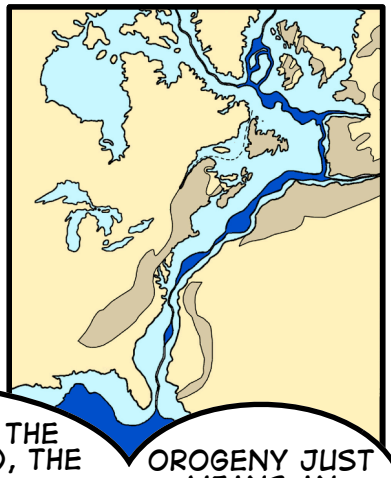




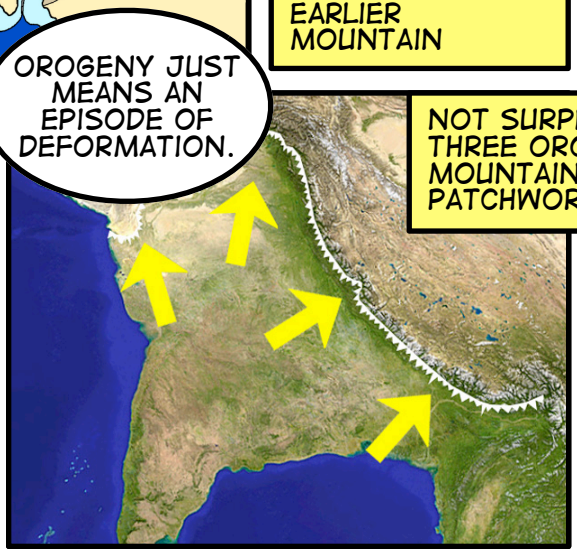
UNTIL YOU REALIZE THAT THESE LOCATIONS WERE ONCE CONTIGUOUS, WHEN PANGEA EXISTED, PRIOR TO ABOUT 220 MILLION YEARS AGO.



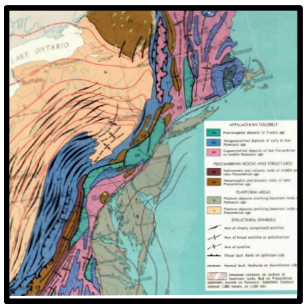
AND THE APPALACHIAN MOUNTAINS ARE THE REMNANT OF A CONTINENTAL COLLISION THAT BUILT PANGEA FROM EARLIER CONTINENTS - THAT COLLIDED.



LIKE MOST MOUNTAIN CHAINS THE APPALACHIANS ARE COMPLEX AND CONTAIN SOME ROCKS THAT BEAR TRACES OF EARLIER DEFORMATION, RESULTING FROM THEIR FORMATION IN EARLIER MOUNTAIN



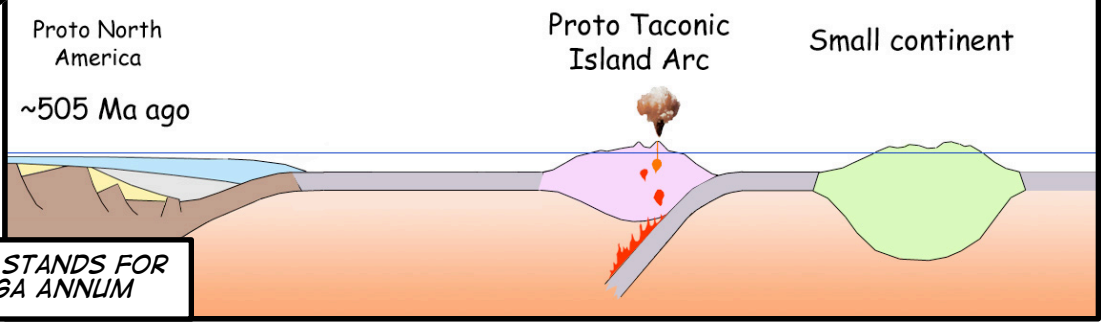
NOT SURPRISINGLY, WITH AT LEAST THREE OROGENIES, THESE MOUNTAINS, LIKE THE ALPS, ARE A PATCHWORK OF DIFFERENT TERRAINS.

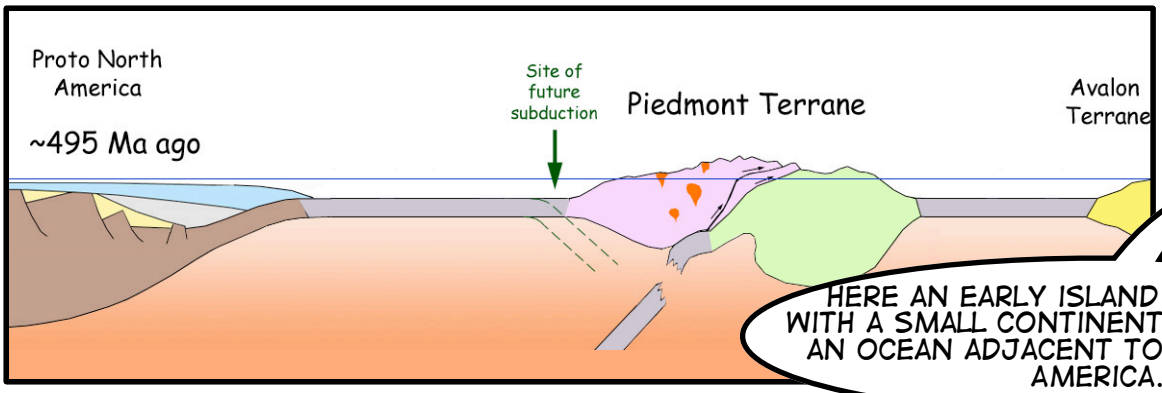


LETS TRACE THE COLLISIONS THROUGH HISTORY. FOR THIS YOU NEED TO KNOW THAT MA MEANS MILLIONS OF YEARS!

MA STANDS FOR MEGA ANNUM

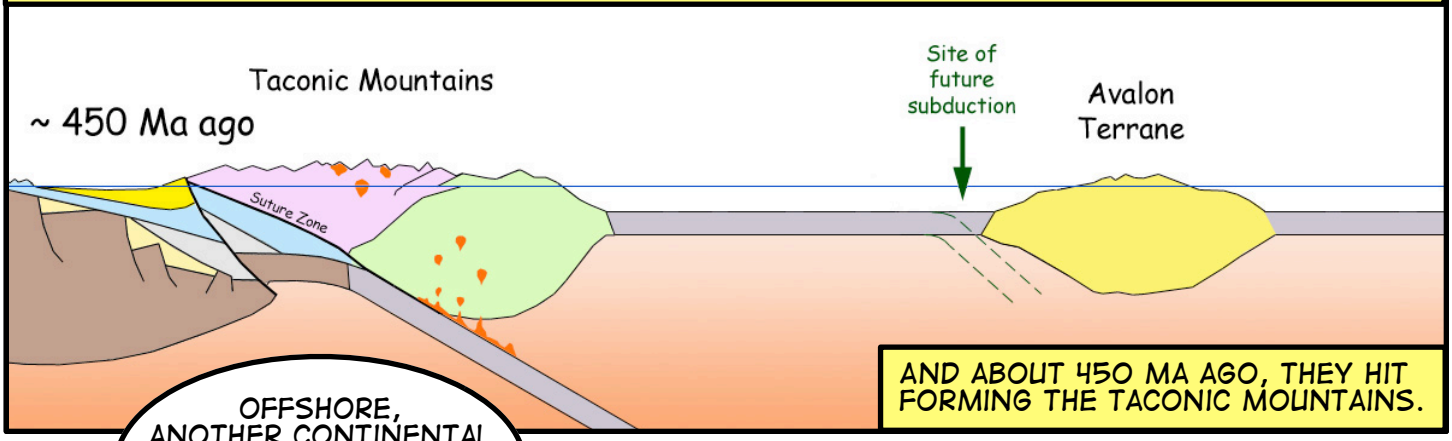
THE EARLIEST COLLISION ACTUALLY HAPPENS BEFORE OUR FIRST OROGENY, ABOUT 505 MA AGO





HERE AN EARLY ISLAND ARC COLLIDED WITH A SMALL CONTINENT, SOMEWHERE IN AN OCEAN ADJACENT TO PROTO-NORTH AMERICA.

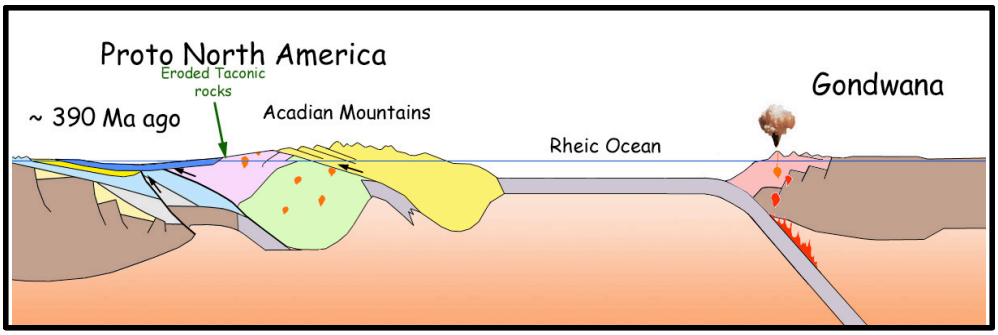
THESE FRAGMENTS APPROACH PROTO NORTH AMERICA AS THE INTERVENING OCEAN SUBDUCTS.



AND ABOUT 450 MA AGO, THEY HIT FORMING THE TACONIC MOUNTAINS.

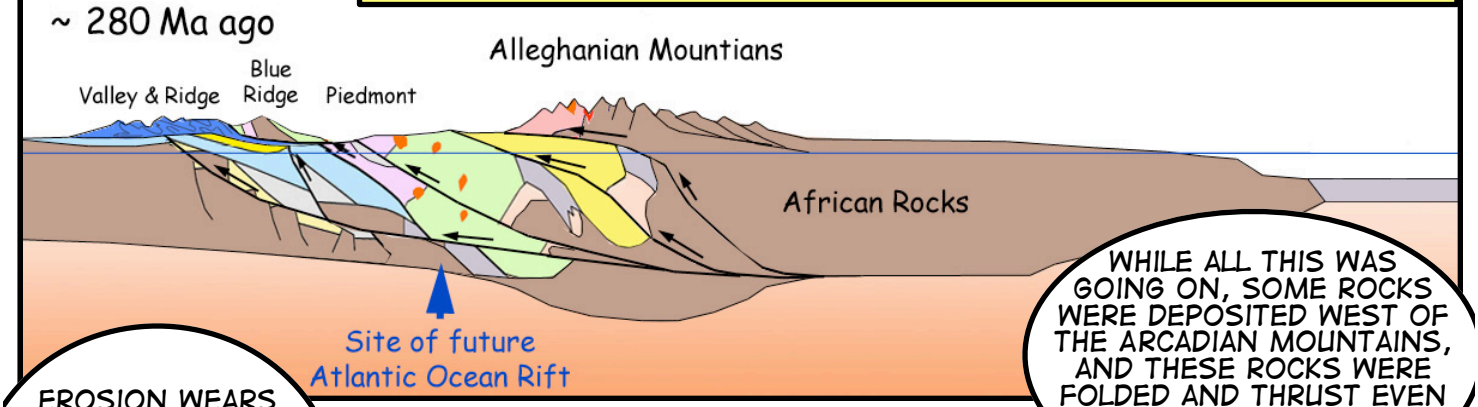
OFFSHORE, ANOTHER CONTINENTAL FRAGMENT - THE AVALON TERRANE - IS APPROACHING.

THIS FRAGMENT HITS "NORTH AMERICA" ABOUT 375 MA AGO FORMING THE ACADIAN MOUNTAINS

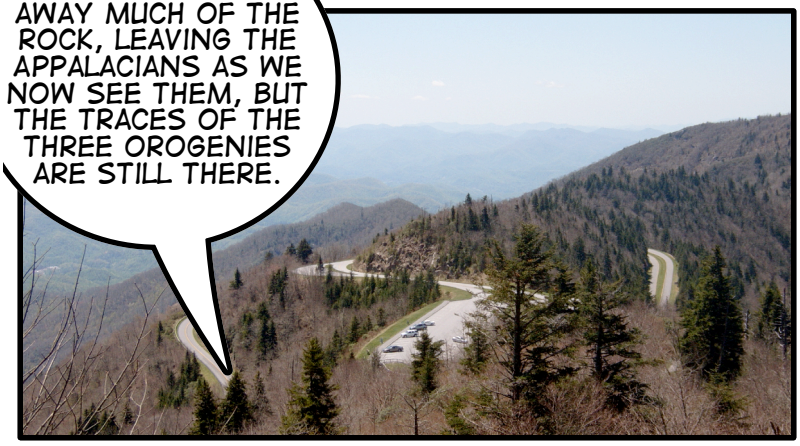


THE OCEAN BETWEEN AFRICA AND NORTH AMERICA IS NOW BEING CONSUMED BY SUBDUCTION.

AND ULTIMATELY THESE TWO CONTINENTS COLLIDE ABOUT 280 MA AGO, MAKING THE ALLEGANIAN MOUNTAINS.



EROSION WEARS AWAY MUCH OF THE ROCK, LEAVING THE APPALACIANS AS WE NOW SEE THEM, BUT THE TRACES OF THE THREE OROGENIES ARE STILL THERE.

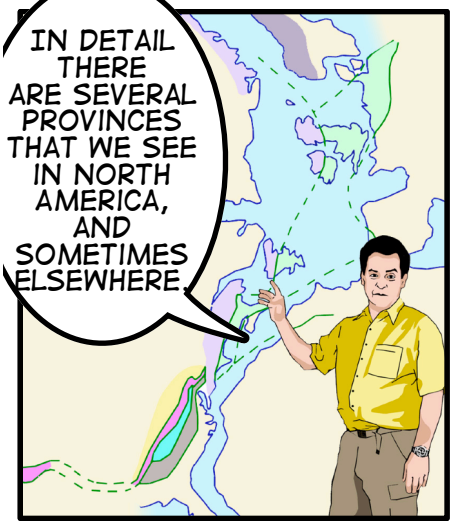


WHILE ALL THIS WAS GOING ON, SOME ROCKS WERE DEPOSITED WEST OF THE ARCADIAN MOUNTAINS, AND THESE ROCKS WERE FOLDED AND THRUST EVEN FURTHER WEST BY THE COLLISION.

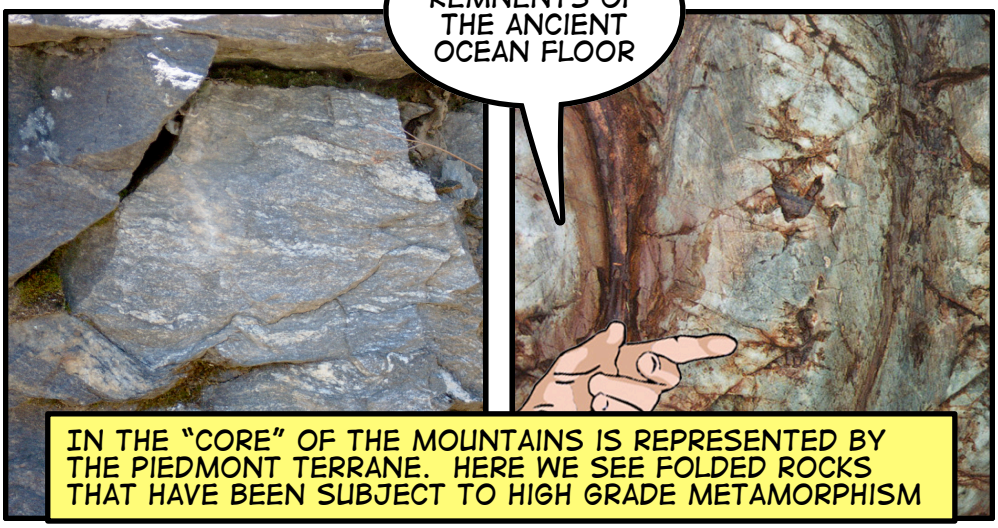
THESE ROCKS PRESERVE THEIR FOLDS AND ARE NOW PART OF WHAT IS NOW CALLED THE VALLEY & RIDGE PROVINCE.

THE ROCKS MAY ALSO BEAR TRACES OF LATER DEFORMATION, RESULTING FROM THE LATER EVENTS.

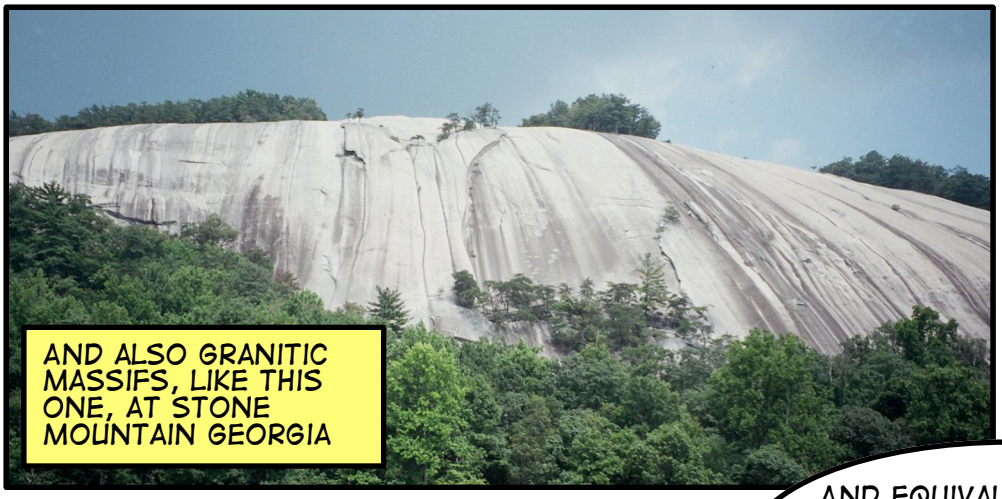
IN DETAIL THERE ARE SEVERAL PROVINCES THAT WE SEE IN NORTH AMERICA, AND SOMETIMES ELSEWHERE.



AND EVEN REMNENTS OF THE ANCIENT OCEAN FLOOR



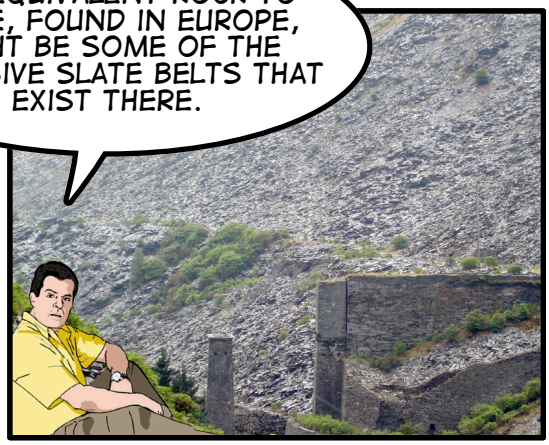
IN THE "CORE" OF THE MOUNTAINS IS REPRESENTED BY THE PIEDMONT TERRANE. HERE WE SEE FOLDED ROCKS THAT HAVE BEEN SUBJECT TO HIGH GRADE METAMORPHISM



AND ALSO GRANITIC MASSIFS, LIKE THIS ONE, AT STONE MOUNTAIN GEORGIA

TO THE WEST OF THE PIEDMONT IS THE BLUE RIDGE, BASICALLY A LARGE ANTICLINE CORED BY VERY OLD ROCKS THAT EXISTED BEFORE THE PROT-TACONIC ISLAND ARC FORMED. THESE OLDER ROCKS HAVE JUST BEEN CAUGHT UP IN THE ENTIRE COLLISION, AND ALTHOUGH THEY FORMED DEEP IN THE CRUST, HAVE NOW BEEN REVEALED BY THRUSTING AND EROSION.

SOME BLUE RIDGE ROCKS WERE FORMED IN THE DEEP OCEAN BASINS THAT SEPARATED PROTO NORTH AMERICA AND OUR TACONIC ISLAND ARC.

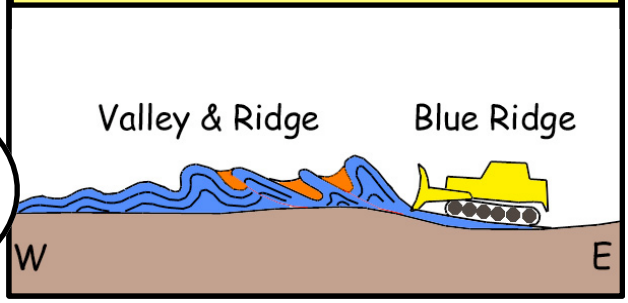


AND EQUIVALENT ROCK TO THESE, FOUND IN EUROPE, MIGHT BE SOME OF THE EXTENSIVE SLATE BELTS THAT EXIST THERE.

FINALLY THE VALLEY & RIDGE PROVINCE IS A VERY NOTICEABLE PART OF THE APPALACHIANS, DISPLAYING DRAMATIC FOLDS

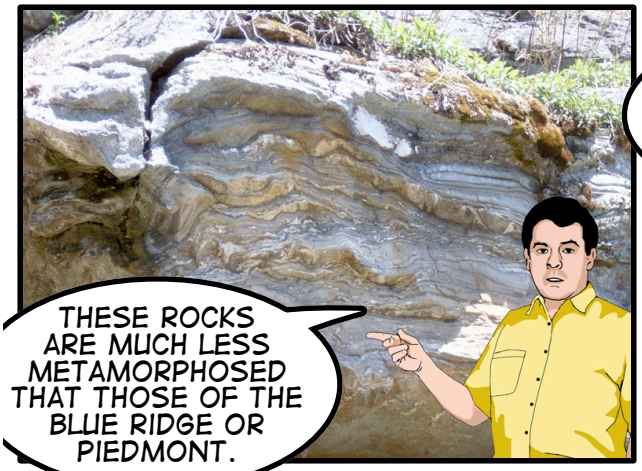
WHICH ARE OFTEN INCLINED, TILTING NORTH-WESTWARD

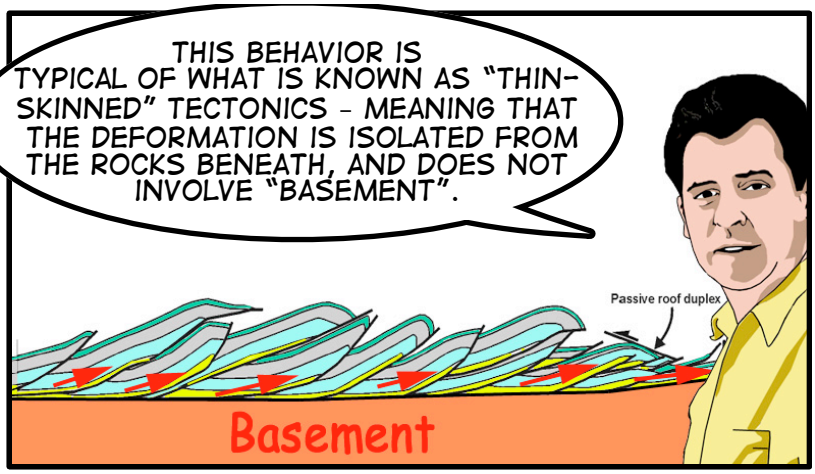
THEY FORMED AS ROCK LAYERS BECAME CRUMPLED BY THE BULLDOZING EFFECT OF THE TERRAINS TO THE EAST, GETTING THRUST WEST.

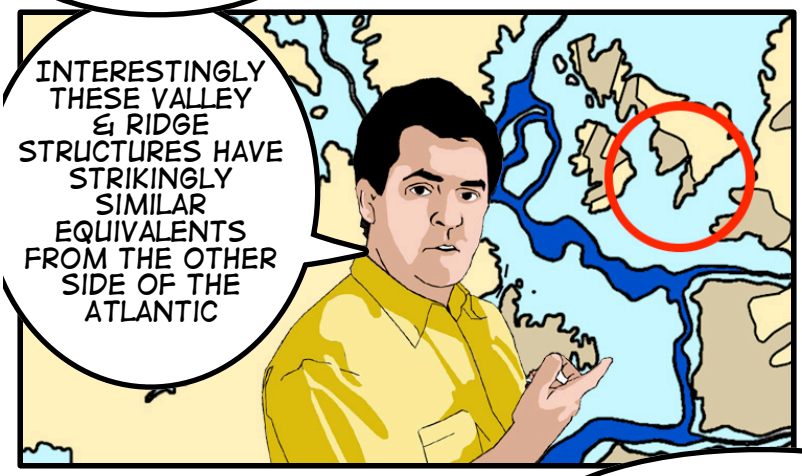


THEY MAY ALSO HAVE SLID WESTWARD DUE, IN PART, TO SLIDING OFF THE RISING ALLEGHANIAN MOUNTAINS ALONG THRUST FAULTS OR "DETACHMENT" ZONES

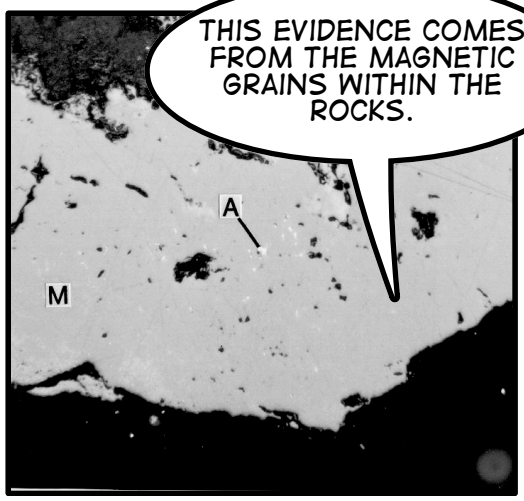
LIKE THIS ONE IN TENNESSEE



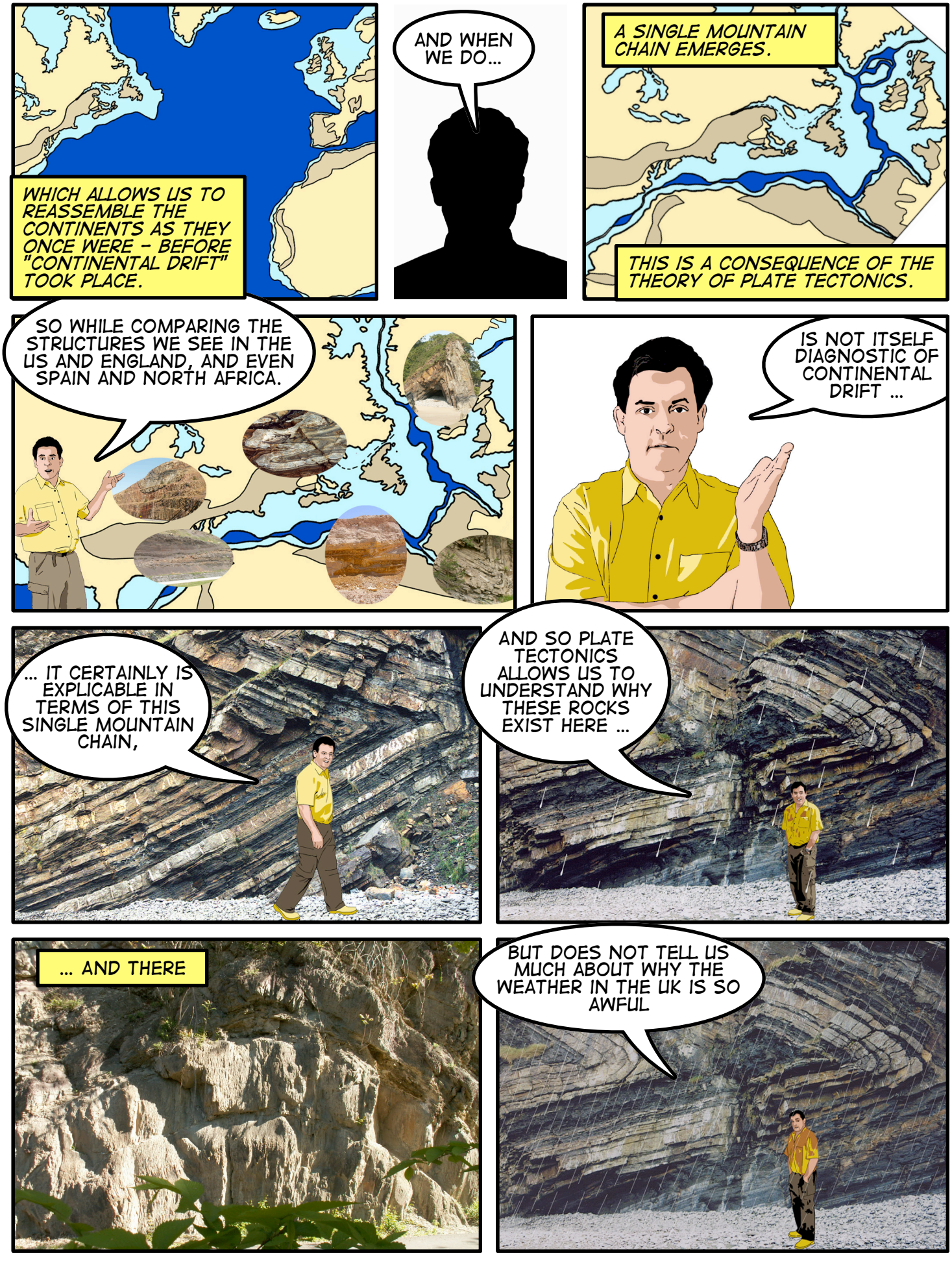




BUT WE MUST BE CAREFUL NOT TO DRAW TOO MANY CONCLUSIONS FROM SUCH SUPERFICIAL SIMILARITIES. OTHER, MORE COMPELLING, EVIDENCE SHOWS THAT THESE LOCALITIES ARE BOTH PART OF THE SAME MOUNTAIN RANGE



WHEN WE EXAMINE THESE GRAINS WE CAN FIND OUT THEIR SPACIAL RELATIONSHIP TO THE NORTH MAGNETIC POLE, WHICH, IN TURN, ALLOWS US TO RECONSTRUCT THEIR POSITION ON THE GLOBE IN TIMES PAST - WHICH SHOWS THAT THE TWO LOCALITIES WERE PART OF THE SAME PLATE MARGIN WHEN THESE MOUNTAINS FORMED.


WHICH ALLOWS US TO REASSEMBLE THE CONTINENTS AS THEY ONCE WERE – BEFORE "CONTINENTAL DRIFT" TOOK PLACE.
AND WHEN WE DO...
A SINGLE MOUNTAIN CHAIN EMERGES.
THIS IS A CONSEQUENCE OF THE THEORY OF PLATE TECTONICS.
SO WHILE COMPARING THE STRUCTURES WE SEE IN THE US AND ENGLAND, AND EVEN SPAIN AND NORTH AFRICA.
IS NOT ITSELF DIAGNOSTIC OF CONTINENTAL DRIFT ...
... IT CERTAINLY IS EXPLICABLE IN TERMS OF THIS SINGLE MOUNTAIN CHAIN,
AND SO PLATE TECTONICS ALLOWS US TO UNDERSTAND WHY THESE ROCKS EXIST HERE ...
... AND THERE
BUT DOES NOT TELL US MUCH ABOUT WHY THE WEATHER IN THE UK IS SO AWFUL