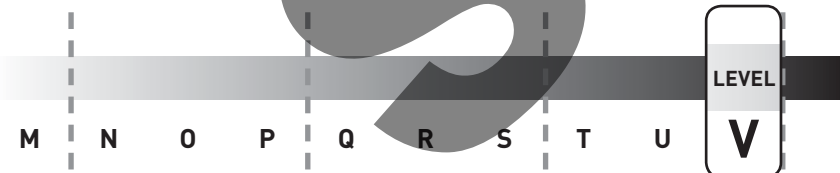


Dedication

Powerful and unpredictable forces churn beneath our feet every day. Occasionally, these forces break free with devastating and tragic results. This book is dedicated to Brian Taylor, a passionate, devoted educator and science enthusiast, who – along with many of his staff, students, and others – was lost on February 22, 2011, during the Christchurch, New Zealand earthquake.



SAMPLE

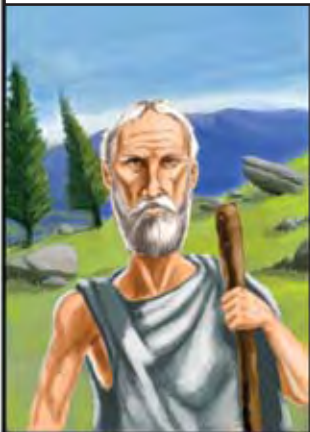


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THE MYSTERY OF THE MAGNET

OLD MAGNES WAS A SHEPHERD.



HE LIVED ABOUT 3,000 YEARS AGO IN MAGNESIA, NOW PART OF TURKEY.



EVERY DAY, HE TRUDGED UP THE MOUNTAINSIDE TO LOOK AFTER HIS SMALL FLOCK OF SHEEP.



ONE CLEAR MORNING, AFTER A STORMY NIGHT OF TERRIFYING THUNDER AND LIGHTNING ...

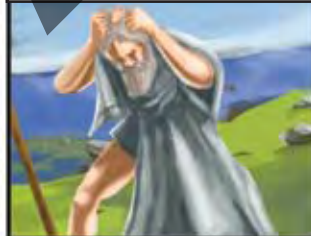


... HE NOTICED SOMETHING VERY STRANGE. THE IRON NAILS IN HIS SHOES ...



... AND THE IRON TIP OF HIS WALKING STICK MYSTERIOUSLY STUCK TO THE ROCKS ON THE GROUND.

THIS STORY IS A **LEGEND**. IT WAS WRITTEN DOWN ALMOST 1,000 YEARS AFTER IT HAPPENED. WE CAN'T BE SURE, BUT MANY PEOPLE BELIEVE THAT THE WORD "MAGNET" COMES FROM EITHER OLD MAGNES, OR FROM MAGNESIA, THE PLACE WHERE HE LIVED.

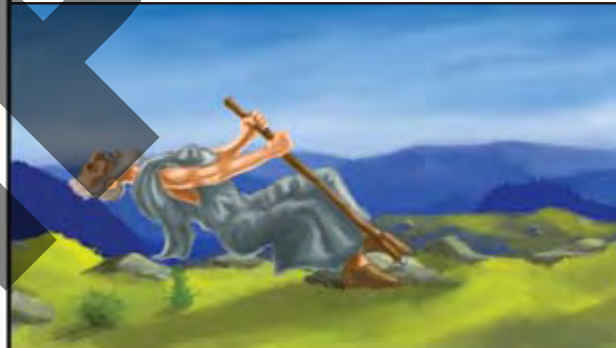


WE KNOW NOW THAT THE ROCKS CONTAINED **LODESTONE**, WHICH IS RICH IN A MATERIAL CALLED **MAGNETITE**.



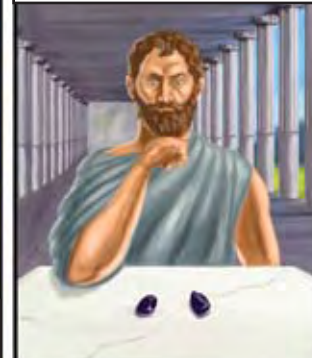
THIS CAUSED THEM TO BECOME MAGNETIZED BY THE **ELECTRIC CURRENTS** THAT STRUCK THE EARTH DURING THE LIGHTNING STORM.

THE IRON IN OLD MAGNES'S SHOES AND WALKING STICK BECAME ATTRACTED TO THE ROCKS.



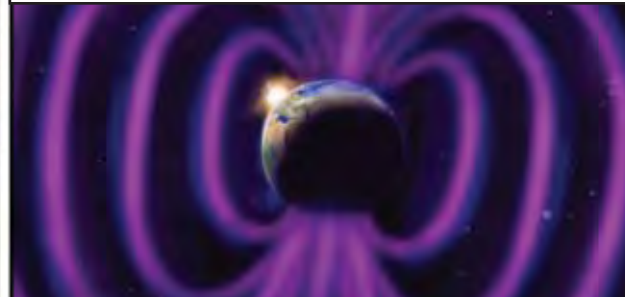
IRON AND MAGNETITE ARE TWO OF A FEW NATURAL MAGNETIC MATERIALS.

SOME EARLY GREEK **PHILOSOPHERS** THOUGHT THAT MAGNETS WERE ALIVE AND HAD SOULS!



THEY THOUGHT THAT, SINCE MAGNETS ATTRACT EACH OTHER, THEY MUST BE LIVING BEINGS.

THROUGH THE CENTURIES, MANY OF THE WORLD'S GREATEST SCIENTISTS HAVE TRIED TO EXPLAIN, IN MANY DIFFERENT WAYS, THE MYSTERIOUS FORCES BETWEEN MAGNETS.



THE EARTH IS A GIANT MAGNET, TOO. THIS ONLY ADDS TO THE INTRIGUE OF MAGNETIC FORCES, AS WELL AS THE DETERMINATION OF SCIENTISTS TO BETTER UNDERSTAND THEM.

TRY IT YOURSELF!

CONNECT THE POLES

TAKE TWO MAGNETS.



THE ENDS OF THE MAGNETS ARE CALLED POLES.



EACH MAGNET HAS A NORTH POLE AND A SOUTH POLE.

SLOWLY BRING TWO POLES TOGETHER. WHAT HAPPENS?



IF THE TWO JUMP TOGETHER, YOU HAVE JOINED ONE NORTH AND ONE SOUTH POLE.

IF YOU FEEL THEM PUSHING APART ...



REPELLING EACH OTHER ...

IT MEANS YOU ARE TRYING TO CONNECT EITHER A NORTH AND A NORTH POLE ...



... OR A SOUTH AND A SOUTH POLE.



LIKE POLES REPEL ...

UNLIKE POLES ATTRACT.

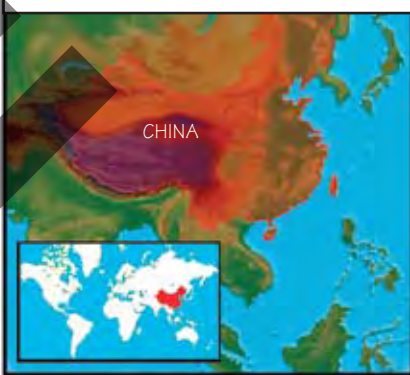
THE COMPASS

A **COMPASS** POINTS NORTH, RIGHT? YOU USE A COMPASS TO FIND YOUR WAY WHEN YOU'RE LOST, DON'T YOU?



WELL, THAT'S NOT WHY THE COMPASS WAS ORIGINALLY INVENTED.

THE FIRST COMPASSES WERE MADE IN CHINA, AND THEY POINTED SOUTH. THEY WERE USED AS **ASTROLOGICAL** INSTRUMENTS.



THE CHINESE BELIEVED THAT A COMPASS SHOWED THE BEST WAY TO DO COMMON THINGS, LIKE LINE UP THEIR HOUSES, LAY OUT THEIR VILLAGE STREETS, AND PLOW THEIR FIELDS.

