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The Annual Quiz

As New Zealander geophysicist Gilian Turner's book *North Pole, South Pole: The Epic Quest to Solve the Great Mystery of Earth's Magnetism* [1] shows, our planet's magnetic properties have intrigued people since ancient times. This quiz offers a quick tour of the early history of geomagnetism. It is now time to grab a pen and test your own knowledge of this fascinating subject! Google and ChatGPT are *not* allowed. The answers appear on page 116 of this issue.

- 1) The solar wind (energetic charged particles from the sun) and cosmic rays are safely deflected by Earth's...
 - a) ozone layer
 - b) magnetosphere
 - c) ionosphere
 - d) none of the above.
- 2) The sun is strongly magnetic, and (in addition to Earth), so is/are the following planet(s)...
 - a) Venus, Mars, and Mercury
 - b) Pluto
 - c) Jupiter, Saturn, Neptune, and Uranus
 - d) none of the above.
- 3) The earliest ideas on the nature of magnetism are attributed to the Greek philosopher...
 - a) Aristotle
 - b) Pythagoras
 - c) Thales
 - d) none of the above.
- 4) The earliest recorded use of the compass was in the first century AD in ...
 - a) India
 - b) China
 - c) Egypt
 - d) None of the above
- 5) Englishman Alexander Neckam, writing in the late 12th century, reported the use of a magnetic compass for navigation by European sailors. This was _____ Marco Polo's visit to China.
 - a) before
 - b) after
 - c) much later than
 - d) none of the above.
- 6) The _____ Medal of the European Geosciences Union honors the 13th-century French scholar who discovered the difference between the north and south poles of a magnet and the polarity-based magnetic attraction/repulsion.
 - a) Petrus Peregrinus
 - b) William Gilbert
 - c) Andre-Marie Ampere
 - d) none of the above.
- 7) The inclination (the "dip" of a freely suspended magnetic needle, which depends on the latitude) was described in 1581 by the English hydrographer _____.
 - a) Georg Hartmann
 - b) Robert Norman
 - c) Francis Bacon
 - d) none of the above.
- 8) The American Geophysical Union held a special session at its Spring 2000 meeting to celebrate the 400th anniversary of the publication of *De Magnete (On the Magnet)* by _____.
 - a) Wilhelm Eduard Weber
 - b) Carl Friedrich Gauss
 - c) William Gilbert
 - d) none of the above.
- 9) In the final chapter of Book I of the multivolume treatise *De Magnete*, the author presents his famous conclusion that the Earth _____.
 - a) owes its magnetism to moving charges
 - b) has a lodestone core
 - c) is a great magnet
 - d) none of the above.
- 10) The author of *De Magnete* was aware of declination (the deviation of the compass needle from the geographical north). We know now that this declination _____.
 - a) is time invariant
 - b) is location independent
 - c) varies with both time and place
 - d) none of the above.

REFERENCES

- [1] G. Turner, *North Pole, South Pole: The Epic Quest to Solve the Great Mystery of Earth's Magnetism*. New York, NY, USA: The Experiment, 2011.
 [2] R. Bansal, *From ER to E.T.: How Electromagnetic Technologies are Changing our Lives*. New York, NY, USA: Wiley-IEEE Press, 2017.

(continued on page 116)

Journal of Antennas and Propagation. I am so grateful to Ross for all of his help; he was always available to discuss any matter over the phone. Not enough words describe the sadness of missing him, knowing I will not see him in the next meeting with his smile and nice welcoming words. My deep sympathy to Sue and his family members, and we all know that he is in a better place; that is the destiny of all.

Michael Jensen, 2016 past president of Antennas and Propagation Society:

I am grateful to Ross for all of his service to AP-S and IEEE, and I have been amazed at the breadth of his experience and knowledge. But what I will remember most about Ross is his kindness and professionalism. I spent my career observing him in many capacities, and in every case he demonstrated respect for his colleagues, even during difficult times. To me personally, he was a mentor and friend, and I will miss him.

Michael Newkirk, chair of United States National Committee-International Union of Radio Science:

Dear colleagues,

There are no words to express my sadness upon learning of Ross' passing. While I was aware of his health issues, I had hoped that he would recover and continue to support the organizations that he was so devoted to: AP-S, USNC-URSI, and URSI itself. The last time I spoke to him he sounded quite positive and upbeat, which I thought was a promising sign. I was looking forward to the possibility of seeing him in Portland, Oregon this summer. This is truly sad news and my thoughts and prayers are with Sue and their family and friends.

There is no question that Ross is irreplaceable, both to his family and our organizations. I have known Ross since my first attendance at a National Radio Science Meeting in Boulder, Colorado when I was a graduate student. I was amazed that he seemed to know everyone and everything about URSI. Who knew that all these years later I would be working alongside him for the benefit of our organizations. I will miss not only his deep historical knowledge of AP-S and URSI, but also his keen sense of humor and most of all his friendship and kindness. Ross

worked tirelessly for both organizations, so I am glad to help recognize his unique contributions. We mourn his loss and are comforted that he can now rest in peace.

With a heavy heart.

Weng Cho Chew, 2018 IEEE Antennas and Propagation Society president:

Ross has been an important resource to our society. His indefatigable energy is most admirable. He is like a walking encyclopedia. Deepest condolences to Sue.

Sue Stone:

Ross spent his time on the things he loved: family, IEEE, URSI, EurAAP, MAPE. He never considered his volunteer hours *work*; it brought him great satisfaction. He looked forward to the conferences where he could interact in person with his colleagues. I am thankful I could accompany him and be a part of what was so important to him. The friendships we made enriched our lives and I appreciate the outpouring of support from so many. He is missed.



TURNSTILE (continued from page 97)

ANSWERS TO THE ANNUAL QUIZ

All the answers are derived from [1] and [2].

- 1) b) Magnetosphere (the region around Earth dominated by our planet's magnetic field).
- 2) c) Jupiter, Saturn, Neptune, and Uranus.
- 3) c) Thales (circa 624–546 BC) was a contemporary of Pythagoras. His own writings do not survive, but his hypothesis ("magnet has a soul because it moves the iron") was reported later by Aristotle (384–322 BC).
- 4) b) China. (It was apparently also used in the ancient art of feng shui.)
- 5) a) Before. (Marco Polo did not visit China until 1275, almost a century after Neckam's descriptions of the magnetic compass for navigation.)
- 6) a) Petrus Peregrinus.
- 7) b) Robert Norman.
- 8) c) William Gilbert.
- 9) c) Is a great magnet. (The original Latin was "Magnus magnes ipse est globus terrestris.")
- 10) c) Varies with both time and place.

