increased by more than 30% over the ensuing 40 years, despite a threefold increase in population. In 1967 only 10% of the Palestinian households were connected to the water infrastructure, whereas by 2012 that figure had risen[2] to 95%. Furthermore, the joint water committee established in the Oslo accords in 1995 has approved approximately 100 new wells and 55 upgrade requests in the areas under jurisdiction of the PA in the West Bank. The approvals resulted in a 50% increase in annual freshwater availability, to more than 250 million cubic meters—about 10% beyond that called for in the accords.

Careful consideration of the historical, political, and cultural context offers a much clearer insight into the regional water issues than impressions gleaned from a superficial view of the situation. One such study is a scholarly thesis that analyzed the water issue in the context of the political failings on both sides, including internal Palestinian politics that undermined the water agreements.[3]

Examples of politically motivated impediments to water supply abound.[2] For instance, Palestinians refused to accept a donation from foreign donors of a seawater desalination plant on the Israeli coast for their exclusive use.[2] They also have refused donations to set up sewage treatment plants, and as a result less than 8% of the sewage from Palestinian towns and cities is treated. Some 30% of the remaining 92% effluents are treated by Israel after flowing into Israel by way of polluted streams; infusion of untreated sewage water—some 33 million cubic meters per year—into the Mountain Aquifer endangers the viability of that important water source. Furthermore, 250 illegal wells dug by Palestinians were documented[2,4] from 1995 to 2005, accounting for 10 million cubic meters of water per year. Because the flow of aquifer water is from east to west in the region where those wells were dug, the illegal drilling further endangers the delicate balance required in maintaining underground water quality within Israel.

Gaza is in a far worse situation than the West Bank. Immediately after Israel's withdrawal from the Gaza Strip in 2006, over 3000 unapproved wells were dug, which caused a severe drop in the aquifer level.[2] Agricultural methods in Gaza not only waste water, but they also allow fertilizer to enter the already depleted and polluted aquifer. The only solution for Gaza to avoid a true humanitarian crisis is cooperation on resource management with Israel, which looks unlikely now due to lack of political will between the ruling Hamas and Israel. Here again, political impediments have made their mark. A new sewage treatment plant funded by the World Bank is ready for operation in Gaza, but there is no electricity to run it: PA president Mahmoud Abbas has cut off payments for electricity to the Hamas-controlled Gaza Strip.[5]

In short, without belittling the very real water problems faced by the PA, particularly in Gaza, the picture is much more complex than Israel monopolizing this precious resource. Efforts to improve the situation are taking place, but there are many political obstacles. In fact, rather than, as Antonius says, "tacitly endorsing the brutal oppression of the Palestinian people" by publishing the June 2016 article (as stated by Antonius), the American Institute of Physics has shown the important role scientists can play in improving regional quality of life. Many of the technologies showcased in that article could go a long way toward alleviating the problems.

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Magnetic monopole search, past and present

For a longtime magnetic-monopole aficionado like me, it was thrilling to learn from Arttu Rajantie's article (PHYSICS TODAY, October 2016, page 40) that we soon shall have data from the highest available energies at the Large Hadron Collider on whether magnetic monopoles with mass up to a few TeV have been detected.

Such an observation would be an even bigger shock to the standard model than would have been *non*-observation of the Higgs boson at mass 125 GeV. As Charles Goebel concluded in 1970, a consistent description of photon–monopole scattering requires the monopole to have a radius much larger than its Compton wavelength.[1]

Sometime later I developed another argument for the same conclusion.[2] The reasoning used simple energy considerations. In principle, a monopole could be confined in a region not much larger than its Compton wavelength, with only a modest addition to its energy. However, the magnetic Coulomb field outside that region would carry an energy much greater than the rest energy. To avoid that contradiction, the monopole radius should be at least an order of magnitude bigger than the Compton wavelength.

Dirac's quantization condition on the product of electric and magnetic charge holds in quantum electrodynamics and in the standard model. Thus in either of those theories the monopole charge can-

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not be spread out because little bits of magnetic charge would violate the quantization condition. As Rajantie notes, there are models, such as the 't Hooft–Polyakov model,[3] which give a very good classical-field approximation, in terms of *SU*(2) gauge fields, for the interior structure of a monopole.

Another possible dynamic would be a confinement mechanism for fractional monopoles, analogous to quark confinement in quantum chromodynamics. Therefore, finding a monopole with mass of a few TeV would imply the existence of new objects on scales of several hundred GeV or less to account for the fact that the magnetic charge is spread out. At the moment, we have no evidence for such objects. Thus discovery of a monopole would motivate searches for new phenomena at lower energies, which in turn would require dramatic supplementation of the standard model.

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In the article by Arttu Rajantie on the search for magnetic monopoles, I noticed there was no mention of other monopole searches that had negative results. The most significant of those is the work by Luis Alvarez and his coauthors.[1,2,3] The references to Rajantie's figure 4, the plot of monopole flux versus monopole mass, cite experiments by Alvarez and his colleagues. A description of the implications of their work would have been helpful.

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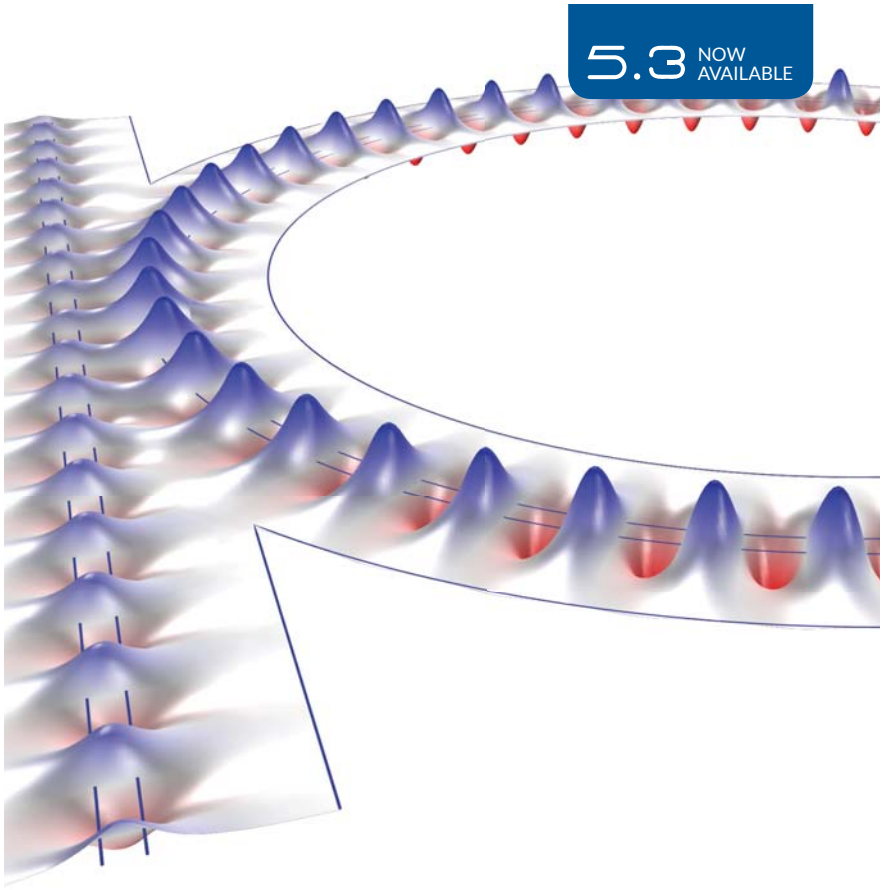
The feature article by Arttu Rajantie describes the various hypotheses concerning the existence of magnetic monopoles and attempts to discover them. However, it did not cover some of the earlier efforts—in particular, those by Henry Kolm and by Luis Alvarez. Both men thought that a search for magnetic monopoles in deep-sea sediments might be productive because in deeper parts of the oceans, the sedimentation rate is about 1 millimeter per millennium. With a constant supply of extraterrestrial material, the slow sedimentation rate would help in finding monopoles because they would be more concentrated than in other sediments.

I was involved in both of those



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