

George Efstathiou, and Anthony Lasenby (Cambridge University Press, 2006; reviewed in PHYSICS TODAY, March 2007, page 62).

I received my PhD in theoretical solid-state and low-temperature physics from Texas A&M University in 1978. After an industrial career at Boeing, I retired in 1999. I realized that I needed to stay in shape mentally and that there were extremely interesting areas of physics, including general relativity, about which I knew nothing.

I worked through Bernard Schutz's *A First Course in General Relativity* (discussed in the article) and a couple of other standard texts. Then I discovered the book by Hobson and coauthors. A model of clarity and a joy to read, it is pedagogical and contains remarkably few errors and misprints. I was delighted to see that it includes chapters on the Kerr geometry, inflationary cosmology, and variational approaches to general relativity. One of the best textbooks I've read in any area of physics, it is the one I would use if I were teaching a course on general relativity or cosmology.

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## National labs compliance maze stymies foreign visitor

An item by David Kramer in the May 2012 issue of PHYSICS TODAY (page 26) discusses problems between the National Nuclear Security Administration and the weapons laboratories. Compliance with federal management directives is among the central issues. I offer here a pedestrian view to some of the points raised. I am a visiting faculty member from Germany to the unclassified part of Lawrence Livermore National Laboratory, where I have accumulated several years of work experience over the past 15 years.

A new contractor took over the administration of Livermore a few years ago. As with any new contract, compliance is the goal, even though the value of some details turned out to be questionable. As an example, the new contract curtailed travel support for students, stranding those on assignments away from the lab. They had not been thought of beforehand, but the contract could not be violated or changed.

Also under the contract, all rehires

are to be considered as new hires, with the full application of new-hire security procedures. The US State Department's visa rules permit me only a string of short-term visas once my multiyear one expired. Thus six weeks after one appointment ended, my being employed for another six weeks required the full rehire and visa procedures. An outside company purporting to do worldwide criminal background investigations was tasked with investigating my career and talking to five personal references in the US and Germany. The process got hung up for weeks for the lack of one essential piece of verification: a confirmation of my degrees and the dates I earned them.

At least five times, the same laboratory—by different proxies—had requested that information from the same German university. In the more than 30 years since I received my PhD, the personnel at my university have probably processed some 200 000 students. Even if they were to understand the meaning of a cryptic form faxed from some US verification company, why would they send somebody to the archives to dig again for records that

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had been documented and shipped several times before? Imagine the labor cost! Curiously, as a cost savings the verification agents are instructed to avoid incurring long-distance telephone charges, so phone interviews with applicant references in foreign countries apparently are delegated to the local US consular staff.

Evidently, "compliance" has a very far reach and helps to significantly reduce the work efficiency even of national laboratories that are supposedly laboring in the national interest.

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## Simple, low-tech option for carbon sequestration

The August 2012 issue of PHYSICS TODAY (page 22) contains an item by David Kramer that discusses problems associated with present carbon capture and storage technologies that use geologic sequestration. Several high-tech methods for carbon seques-

tration are being developed, but one low-tech method is as simple as disposing of discarded wood by burying it rather than burning it. Wood is approximately 50% carbon, and when it decomposes or burns, the temporarily sequestered carbon is returned to the atmosphere. Planting trees can help, but new forests act as carbon sinks only until the rate of decay of the wood catches up to the rate of growth. As a complement to the present scientific and engineering efforts, encouraging communities to "bury, don't burn" discarded wood could be a relatively cheap and easy way to sequester carbon.

Nothing is more low tech than digging a hole, and in landfills that are simply covered with soil, 0–3% of the carbon from wood is released as carbon dioxide and methane after several decades, with the remaining carbon mostly stored as a long-term nonreactive solid mass. In landfills designed to remain dry, methane release is negligible, and the wood doesn't decompose.<sup>1,2</sup> Globally, the emission rate from fossil-fuel consumption is about 8 gigatons of carbon per year (GtC/yr), with an accumulated load of about 165 GtC in the atmosphere. An uptake

of 60 GtC/yr, including an estimated 10 GtC/yr from large pieces of dead wood, is temporarily sequestered by land vegetation. Municipally collected waste (old furniture, construction waste, cleared brush, and so forth) is estimated at 1 GtC/yr, although the percentage presently burned is unknown.<sup>3</sup>

## References

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2. J. Bogner, K. Spokas, in *Soils and Global Change*, R. Lal et al., eds., Lewis/CRC Press, Boca Raton, FL (1995), p. 67.
3. N. Zeng, *Carbon Balance Manage.* **3**, 1 (2008).

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## Correction

**November 2012, page 22**—The third sentence below the subheading "Which strategy?" should read, "For example, the American Institute of Physics (AIP) and the American Physical Society (APS) both have journal copyright policies that allow authors to post the publisher's PDF on their personal websites or in their institution's repository." ■

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