

be remembered as a distinguished scholar and pacifist.

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## Discovery of Earliest Hominid Remains

**THERE ARE INACCURACIES AND NEGATIVE innuendoes about my character in the Random Samples item “6-million-year-old man” (15 Dec., p. 2065), which discusses the Kenya Palaeontology Expedition’s recent find of 6-million-year-old hominid remains in Kenya’s Rift Valley. These are the earliest hominid remains yet found.**

Regarding statements in the item, I have never been “[in] trouble with the Kenyan government.” A court case brought against me charging that I was collecting fossils without a permit was not “suspended”; it was declared *nolle prosequi* by Kenya’s attorney general because my research permit was indeed valid. My permit was never withdrawn by the Kenyan government. A letter was handed to me in 1999 by a member of the staff of the National Museums of Kenya, who is currently studying in the United States, to the effect that my permit was withdrawn, but this letter was discovered to be a forgery.

As for comments by Bernard Wood quoted in the Random Samples item, to my knowledge he is not familiar

with our discovery, so on what basis can he say that the circumstances of the discovery are “extremely unfortunate”? In addition, the brief description of permit applications for palaeontology research in Kenya misrepresents the procedures. Research permits, until a few months ago, were granted by the Office of the President, not by museums (permits are now issued by the Ministry of Education). One does need to be affiliated with an authorized organization to apply for a permit; however, other organizations, including the Community Museums of Kenya (with which I am affiliated), not just the National Museums of Kenya, can issue affiliations for palaeontology research.

Another person quoted in the item, Andrew Hill, refers to my presence in the Tugen Hills as “highly irregular.” The Kenya Palaeontology Expedition, which I and Brigitte Senut lead, has been carrying out research in the area in collaboration with a Kenyan organization created to do this very type of research, with research permission from the Kenyan government in an area where no field survey has been done since 1993. What is so “irregular” about that? Hill also says, “If he knows the date [of the fossil], it’s because of our work.” However, in my Ph.D. thesis (1) written long before Hill began studying the region, I reviewed the ages of the Tugen Hills succession, and the Lukeino Formation was, even at that time, known to be about 6 million years old. Hill had no direct role in this early dating work.

Another inaccuracy is the description of the Community Museums of Kenya as a “private” organization. It is not private, but a nongovernmental organization licensed by the Kenyan government, with equal legal status to the National Museums of Kenya, which is a parastatal organization.

At the end of the Random Samples item, it is said that I am “apparently favored by President Daniel arap Moi,” because I met with him to discuss the find. What is wrong with showing fossils to the president of a country? In 1991, Glenn Conroy showed the *Otaviipithecus* mandible to President Sam Nujoma of Namibia, but no one, to my

recollection, suggested it was unusual. A final detail: the name of the journal we are going to publish in is “*Comptes*,” not “*Contes*,” *Rendus de l’Académie des Sciences*.

“Conte” means fairy tale.

I find it unfortunate that the flagship publication of the American Association for the Advancement of Science should see fit to publish such an inaccurate and biased article, the aim of which appears to be not so much scientific but paleo-political.

MARTIN PICKFORD

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References and Notes

1. M. Pickford, thesis, University of London (1974).

**THE CIRCUMSTANCES OF THE DISCOVERY OF hominid remains by Martin Pickford are not accurately portrayed in the Random Samples item. The Kenyan government has liberalized many sectors of public life, including museums, and scientists of good faith from anywhere in the world now have a choice to carry out research in Kenya, something that was not possible for the first 35 years of the country’s independence. Among the many changes that have occurred is the wish of Kenyans to oversee and benefit from their own fossil resources. The Community Museums of Kenya, with which Martin Pickford was affiliated at the time of the fossil discovery and still is, reflects this wish. It is registered under the antiquities law in Kenya and is affiliated with various institutions and scientists from around the world. The Community Museums of Kenya has been carrying out field research for 3 years in the Baringo district.**

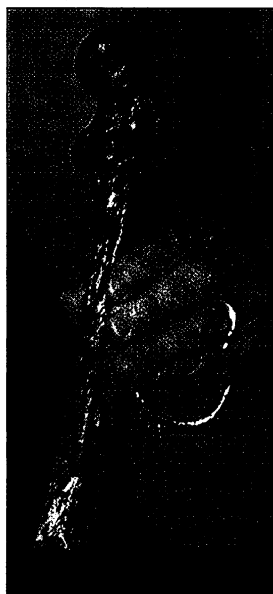
No longer is palaeontology in Kenya the monopoly of a single family or institution. Kenyans have recuperated their heritage, and with the help of the international community, will use it for development of its human and scientific potential.

EUSTACE GITONGA

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## Wording Blurs Survey on Animal Protection

**A SURVEY OF INSTITUTIONAL ANIMAL CARE and Use Committee (IACUC) members described by Plous and Herzog in their letter (27 Oct., p. 711) purports to show that this group of researchers favors the inclusion of rats, mice, and birds under the Ani-**



**Expedition co-leader Brigitte Senut holds the leg bone from a 6-million-year-old hominid.**

## SCIENCE'S COMPASS

mal Welfare Act (AWA). The survey question the authors use to justify this conclusion, however, is biased. Respondents are asked whether these animals should "receive AWA protection."

Use of the term "protection" blurs the concepts of "care" and "AWA coverage/regulation." With the question framed as one of "AWA protection" versus "no protection," respondents to the survey are not given an option of affirming the support for the ethical care and use of animals under current regulations (namely, those of the Public Health Service).

HOWARD H. GARRISON\*

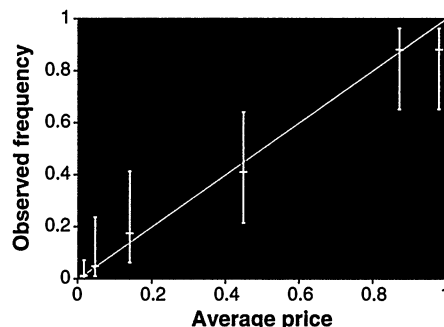
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## The Real Power of Artificial Markets

ASSESSING THE PROBABILITIES OF FUTURE events is a problem often faced by science policymakers. For example, CERN, the European laboratory for particle physics, recently had to judge whether the probability of discovering a Higgs boson was

high enough to justify extending the operation of its collider (see *Science*, 22 Sept., p. 2014, and 29 Sept., p. 2260). At the Foresight Exchange (FX) Web site (<http://www.ideosphere.com/>), traders can actually bet on the outcomes of unresolved scientific questions, including whether physicists will discover the Higgs boson by 2005. The going price of the security (0.77 as of 24 January) can be seen as the market's assessment of the probability of the particle's discovery. FX is only a game, run with play money (FX dollars). Empirical studies (1), laboratory in-

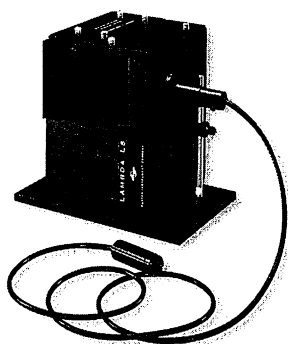


Past prices of securities in the play-money FX market accurately forecast true outcome frequencies for scientific and societal questions.

vestigations (2), and policy proposals (3) suggest that prices of real-money securities do constitute accurate likelihoods, because traders have strong (monetary) incentives to leverage pertinent information. But can we place legitimate credence on the accuracy of FX prices, which are determined solely through competition in a play-money market game?

To an extent, yes. We find that FX prices strongly correlate with observed outcome frequencies. We collected historical price information for 161 expired securities, corresponding to questions that had been definitively answered "yes" or "no," recorded prices 30 days before expiration, sorted securities by price, and grouped them into six price ranges. The figure is a plot of observed frequency (the actual number of "yes" securities divided by the total number) versus average price (in FX dollars) for each group. Error bars display 95% confidence intervals, under an assumption that outcomes are independent Bernoulli trials with a uniform prior. We find similar accuracy in another play-money market called the Hollywood Stock Exchange (<http://www.hsx.com/>). Prices of securities in Oscar, Emmy, and Grammy awards correlate well with actual

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