eton that were exposed by the *S. viride* bites, preventing recovery. According to data collected by one of us (J.M.C.) during January 1998, there has been a dramatic decline in attacks by *S. viride*. Horizontal and vertical transects (measured by J.M.C. and T.J.G.) reveal a significant decrease in the quantity of corals attacked. Lesions were less evident during our most recent visits to Bonaire. Horizontal 15-meter belt and video transects (measured by J.M.C. and T.J.G.) show that during February 1997, there were 0.5 cases per meter of RWS lesions, compared with 0.075 cases per meter during March 1998.

RWS, the term now used for RWD, is characterized by a fungal invasion of the coral. A distinctive fungus takes up residence within and on top of the coral tissue, causing cell damage. The coral-bite lesions appear to be connected to the fungal invasion characteristic of RWS. Sometimes the fungus resides on coral that has been bitten by *S. viride*, which explains why the two syndromes were originally thought to be one disease. In fact, PWSB has been documented at the exact location where two of us (T.J.G. and J.M.C.) first described RWD in February 1997 (*3*).

We are jointly engaged in field observations and experiments, laboratory experiments, and microbiological studies to determine the origin of the RWS fungus and to resolve the association of PWSB and RWS. The fungus associated with RWS has been examined in the laboratories of Ray Hayes, Garriet Smith, and Steve Golubic. It was initially hypothesized that the fungus might be endolithic to the corals. However, an investigation by Golubic (*4*) showed that the fungus is not present within normal coral tissue. There are many possible mechanisms for the fungal invasion of the corals. These include a secondary infection, perhaps spread to the corals by *S. viride*, or transport of the fungus by runoff, or the fungus could be an opportunistic infection aggravated by environmental degredation. All that is clear at this time is that RWS is the result of a complex process.

More work is needed to characterize the spatial and temporal scales of PWSB and RWS. It is possible that the fungus present in RWS samples may be present before the damage inflicted by the parrotfish and that it expands opportunistically when the coral is stressed by the bite. Diseases and putative disease syndromes other than RWS may also be increasing in frequency and extent (*5*), but none of these others seem to be related to parrotfish-inflicted lesions on living corals.

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References

1. J. M. Cervino and G.W. Smith, *Ocean Realm* (Summer 1997), p. 33; T. J. Goreau *et al.*, *Rev. Biol. Trop.*, in press.
2. P. Frydl, *Int. Rev. Hydrobiol.* **64**, 737 (1979).
3. H. Bruggemann, M. van Oppen, A. Breeman, *Mar. Ecol. Prog. Ser.* **106**, 41 (1994); J. M. Van Rooij, E. de Jong, F. Vaandrager, J. J. Videle, *Environ. Biol. Fishes* **47**, 81 (1996).
4. S. Golubic, personal communication.
5. R. Hayes and N. Goreau, *Rev. Biol. Trop.*, in press.

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Origin of the Eukaryotic Nucleus

In support of William Martin and Miklós Müller's hypothesis that the eukaryotic nucleus originated in a methanogen (G. Vogel; Research News, 13 Mar., p. 1633) (*1*), we note that, whereas most eukaryotes use histones to compact their nuclear DNA into nucleosomes, the only prokaryotes that have histones and nucleosomes are the Euryarchaeota, the division of the Archaea that includes the hydrogen-consuming methanogens (*2*). At the high DNA concentrations present in the nucleus, DNA molecules spontaneously aggregate if not hindered by histone packaging, and it has been proposed that it was the availability of the nucleosome system of DNA packaging that facilitated nuclear expansion and therefore eukaryotic evolution (*3*). Perhaps eukaryotic evolution continued beyond the ancient hydrogen-based metabolic symbiosis postulated by Martin and Müller because the hydrogen-consuming partner fortuitously also had a histone-based system of genome packaging.

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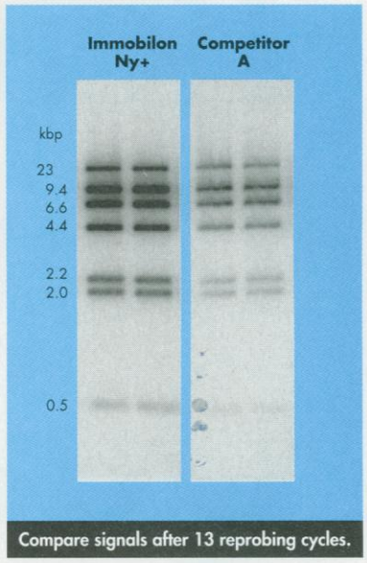

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References

1. W. Martin and M. Müller, *Nature* **392**, 37 (1998).
2. J. N. Reeve, *et al. Cell* **89**, 999 (1997).
3. A. Minsky *et al.*, *J. Theor. Biol.* **188**, 379 (1997).

■

Tracing Steps of the Earliest Americans

In her article "Mother tongues trace steps of earliest Americans" (AAAS Meeting, 27 Feb., p. 1306), Ann Gibbons reviews linguistic evidence that the Americas were populated by humans long before the generally accepted date of roughly 11,000 years ago. She states that "Archaeologists trying to address that question [when did the ancestors of Monte Verde's inhabitants of 12,500 years ago first set foot in North America?] have come up empty-handed, as there are few reliably dated digs in America older than the Chilean site."

Digs are not the only way to obtain reliable data about antiquity. The steps of the earliest Americans have already been traced more directly by archaeologists Rogers (*1*) and Hayden (*2*), who derived their data from artifacts left along ancient trails and migratory routes in what are termed "fragile-pattern areas" (*3*), and their data demanded the same interpretation as given recently by the linguists: that the Americas were populated long before the dates accepted by the conventional view (*2*).

It is gratifying to note the self-correcting nature of science and the fact that at least one of the two authors (Hayden) whose analysis of footsteps originally challenged the conventional view was still alive to witness this correction (*4*).

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References and Notes

1. M. Rogers, *Kiva* **24**, 1 (1958).
2. J. Hayden, *Am. Antiq.* **41**, 274 (1976).
3. ———, *ibid.* **31**, 272 (1965).
4. Julian Dodge Hayden died on 6 March 1998 at the age of 87 years.

■

The Brain's Normal Function

The identification of new peptides acting in the lateral hypothalamus to modulate feeding behavior is intriguing (M. Barinaga, Research News, 20 Feb., p. 1134), but we would like to comment on the key issue of whether they "may be key to that brain area's normal function."

In the past 10 years, many different peptides have been identified within the brain acting on specific receptors to suppress or stimulate appetite. However, their critical role in determining feeding behavior is yet to be demonstrated. A clear example is represented by neuropeptide Y (NPY). This orexigenic peptide has been implicated in mediating food intake under normal conditions (*1*), as well as during illness (*2*). This thesis has been challenged by a recent report showing that mice genetically lacking the NPY gene have the same eating activity as controls, but are more susceptible to seizures (*3*). Thus, it appears that NPY is not essential for certain feeding activities, but is an important modulator of neuronal excitability. We therefore reason that NPY, and possibly the orexins, do not mediate feeding behavior per se, but possibly, or at least in part, because of their modulatory effects on brain neurotransmission (*4*). As a consequence, the study of the peptide-neurotransmitters (including serotonin and dopamine) interactions is the critical issue in better understanding of the mechanisms controlling feeding behavior under normal conditions and during illness.

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References

1. J. E. Motley *et al.*, *Am. J. Physiol.* **252**, R599 (1987).
2. W. T. Chance *et al.*, *Ann. Surg.* **221**, 579 (1995).
3. J. C. Erickson *et al.*, *Nature* **381**, 415 (1996).
4. M. M. Meguid *et al.*, *Nutrition* **12**, S57 (1996).

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The Black Sea: A Freshwater Lake?

In his Research News article "Black Sea deluge may have helped spread farming" (20 Feb., p. 1132), Richard A. Kerr discusses a paper by W. Ryan and W. Pitman (*1*). According to these researchers, a spectacular flood event would have raised the freshwater Black "Sea" by some 150 meters in less than 3 years (15 centimeters per day) some 7500 years ago, when a sea-level rise caused the Mediterranean Sea to spill over the Bosporus into the Black Sea basin. Many Earth scientists and archaeologists seem to be reluctant to accept the fast rates of infilling on the one hand and their consequences on population migration on the other. The idea has another flaw, with regard to the saltiness of the Black "Lake" before and after the event. I wonder how Ryan and Pitman would explain their statements that the Black Sea was at the same time (before the flood): a freshwater lake; cut off from the Mediterranean; and at 150 meters below present-day sea level (that is, without any outflow).

To be a freshwater lake, the basin must have had an outflow somewhere (for example, southward into the then lower Mediterranean Sea); in this case, it could hardly have been at 150 meters below sea level. If the Black Sea basin was cut off from the Mediterranean Sea and if the lake level was lower than today, the only way it could have maintained that state would have been by evaporation. Then we should expect it to have been a salt lake or an inland sea, not freshwater.

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Response: The giant (more than 300,000 cubic kilometers) and deep (more than 2 kilometers) New Euxine freshwater lake in the ancient Black Sea is well attested by the assemblages of its infauna (mollusks, gastropods) and phytoplankton (diatoms and dinoflagellates), by its seabed porewater salinity, and by the isotopic composition of its calcareous sediment belonging to the lake phase of deposition more than 7500 years ago (calibrated), as summarized in our figure 3 and in the many citations contained in reference 1 of our original paper. This lake was a flow-through type basin (*2*) as recently as Meltwater Pulse 1 (13,500 to 12,500 years ago) of the global postglacial sea-level rise (3). Its total river input at peak glacial discharge has been estimated to have been 300 cubic kilometers per year (*4*). Beginning with the Younger Dryas return to near-glacial conditions (12,500 to 11,400 years ago), there was not only a marked episode of regional aridity throughout southwest Asia, but also meltwater that formerly reached the Black Sea as overflow of the Aral and Caspian seas became permanently diverted to the North and Arctic seas (5). A back-of-the-envelope calculation shows that if river discharge (with a maximum salinity of 0.5 parts per thousand) had continued at two-thirds of its previous discharge value (generous) for the next 5000 years without outlet at the Bosporus, the salinity of the lake would have increased only a little more