mental Mohole off central Baja California. The floras in these rocks are more difficult to correlate than those of older stages apparently because of more pronounced temperature differences between North America and the lower latitudes. Several species (*Discoaster kugleri, D. variabilis, D. hamatus* and *Catinaster coalitus*) indicate correlation with the "*Globorotalia fohsi*" sequence of zones, and the *Globorotalia mayeri* and "*Globorotalia cultrata*" zones. The "*G. fohsi*" sequence of zones is absent from the type sections of the European stages, and thus was arbitrarily assigned to the Helvetian[6] because this term was recommended for use[10]. The other two zones are equivalent to the Tortonian[10].

The stratigraphic occurrence of calcareous nannoplankton in rocks of western North America permits correlation with tropical area plankton zones and the type sections of the European stages in spite of differing oceanographic conditions between the two regions during the mid-Caenozoic. These correlations indicate that the California Zemorrian Stage is equivalent to the European Chattian, the Saucesian to the Aquitanian, the Relizian to the Burdigalian and lower Helvetian, the Luisian to the Helvetian and the Mohnian to the upper Helvetian and lower Tortonian.

JERE H. LIPPS

Department of Geology,
University of California,
Davis, California, 95616.

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Lake Lappajarvi, Central Finland: a Possible Meteorite Impact Structure

SVENSSON[1] has drawn attention to a most interesting cryptic structure—one more in the growing list of such cryptoexplosion structures. I would, however, question how much weight should be attached to the recognition of shock lamellae in quartz grains as a criterion of meteorite impact involvement. I have previously endorsed Bucher's scepticism regarding numerous so-called astroblemes[2], and since that publication Snyder and Gerdemann[3] have put forward what seems to me to be an overwhelming case for the endogenous origin of the numerous cryptoexplosion structures east of the Appalachians. Currie and Shafiqullah[4] have recovered potassic trachyte and alnöite from the Brent Crater, Ontario. Both these accounts confirm my conclusions, and the Brent discovery supports the idea that some sort of highly explosive alkalic vulcanism produced these structures. It is apparent that shatter cones and coesite, both found in association with cryptic structures of this group, are not restricted to meteoritic cryptoexplosion structures. One may well question whether shock lamellation in quartz has any more validity: surely it has been reported from the Brent and Holleford craters, which are clearly of endogenous origin? (A fortuitous association of alnöite with an astrobleme is extremely unlikely, for alnöites are very rare igneous rocks associated, in most cases, with localized, highly explosive diatreme activity, involving carbonatites, and such endogenous eruptivity produced the Pretoria Salt Pan which appears just like many of the cryptoexplosion craters attributed to meteorite impact explosion.)

Geologists who, like myself, have worked extensively on carbonatites[5] must realize that the supposed restriction on the energy involvement involved in volcanic explosions (accepted without question by many authorities because it is repeated so often in the literature) is without foundation. The sort of phase change reaction that must be involved in the production of the immense carbonatite explosion breccia fillings of some carbonatite vents, and of the associated cone sheets—a reaction producing a colossal explosion at a point focus at depth—does not seem to be limited in any way by the strength of the overlying thickness of crustal rocks. Such an explosion, involving adiabatic expansion, could, physicists assure me, involve a virtually unlimited amount of energy, and so we are left with the possibility of two mechanisms, one internal and one of extraterrestrial origin, capable of producing these cryptoexplosion structures. No one would argue that there is much conflicting evidence: and this conflict applies to the Rieskessel, New Quebec Crater, Manacouagan Lake, Clearwater Lakes, Bosumtwi Crater, and even to Wolf Creek Crater. One thing, however, is clear from the literature: there are at present no valid criteria that afford strong support for either theory, except the actual association of meteoritic material; and even where that is present, as at Wolf Creek[6,7], one can reasonably harbour just an iota of doubt[7].

J. MCCALL

Department of Geology,
University of Western Australia, Nedlands.

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Contrasting Origins of the Eastern and Western Islands of the Canarian Archipelago

MOST geologists working on the Canary Islands (Figs. 1 and 2) believed that the individual islands were connected to one another and to the African continent during the Tertiary period[1-7]. Biologists seem to have agreed unanimously with this view[7-9]. Recent evidence, however, shows that the hypothesis of a continuous Canarian landmass during the Tertiary should be abandoned. Geological evidence from the eastern island of Fuerteventura indicates that this and the island of Lanzarote are underlain by continental crust. Gran Canaria, on the other hand, and possibly the other western islands as well, seem to be oceanic in origin.

Most of the island of Fuerteventura is made up of volcanic rocks, chiefly alkali basalts and related tuffs. These are deeply dissected late Tertiary shield volcanoes and Quaternary preserved cinder cones and lava flows. In the western part of the island, this basaltic sequence overlies a basement with erosional unconformity. This complex basement is made up of plutonic rocks (stratiform ultramafic rocks and a younger circular syenite complex[10]). It is cut by abundant, N.N.E. trending, steeply dipping dykes usually consisting of metamorphosed basalts. These dykes, interpreted earlier as "spilitic" lava flows[2], also cut a complex of sedimentary rocks which are contact-metamorphosed but are not offset along the dykes. The sequence of sedimentary rocks forms part of the basement to the west of the plutonic rocks, but the contact between the plutonic and the sedimentary complex is not exposed; several lines of evidence indicate the plutonic rocks to be younger than the sediments[11].