the thrust zone. This is best explained in terms of a 'subducting oceanic lithosphere' model. In addition the marked similarity between 'alpine-type' flow layering and deformation and the tectonic layering observed in parts of the Complex[7,8] cannot be ignored in interpreting the origin and mode of emplacement of the sequence.

The presence of granulite facies metamorphism, annealed textures and other high P/T reactions are not incompatible with the model. Subduction to depths of the order of 30 km would produce pressures and temperatures (10 kbar, 800° C) within the lithospheric slab[9] suitable for the development of the observed phenomena[12].

The question then arises as to the order of events as recorded in the rocks, also taking into account the phases of folding that have affected the layering. The events from oldest to youngest appear to be: first, the ductile shearing, metamorphism and annealing resulting in a gabbro gneiss zone; second, the folding (F_2) of this tectonic layering[8]; third, the folding (F_3) of the Complex[8] on a more regional scale, and fourth, brittle thrusting.

The original model again gives the best solution. The oceanic lithosphere is first underthrust to depths sufficient to produce metamorphism, annealing and so on as indicated above. Further underthrusting produces a maximum compression axis parallel to the layering and gives rise to F_2 folding[11]. With the development of actual collision between continental blocks a period of tectogenesis and orogenesis (uplift) results in F_3 flexuring of the subducted lithosphere, slivers of which are consequently overthrust (obducted) on to the 'active' continental block[1]. The latter event produces the phase of brittle faulting (major thrust faults) and mylonitisation. This sequence of events also explains the lack of a metamorphic phase in the granulites correlateable to that producing the tectonic layering in the rocks of the Complex.

Moore's comment regarding the difference in metamorphic grade in the basement rocks north and south of the thrust zone is a valid one and recent work also indicates differences in structural geometry[12]. This, in fact, makes a collision model even more acceptable, as recourse to the tenuous concept of 'oscillation' is no longer required.

In conclusion, let me point out that the fundamental interpretation of the regional geology of the area by means of a plate tectonics model is still valid and is supported by other comments made by Moore in his discussion. The distribution of distinctive tectonic elements and their correlation with such a model remains the essential feature of the hypothesis. The only real alteration is that of distinguishing as separate entities the Musgrave-Mann granulites (proto-Musgrave block) to the south and the gneiss–amphibolite terrain (Arunta? block) to the north of the thrust zone.

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Ethylene and soil fungistasis

SMITH[1] has reported that ethylene is a causative agent of soil fungistasis, that its production in soil varies with organic matter and that in contrast with other work[2,3] it can occur in aerobic soil conditions. His second claim is repetition of earlier work[3]; more recent observations[4] suggest that soil anaerobiosis is necessary to mobilise substrates[5] for ethylene formation by soil microorganisms.

We have attempted to reproduce Smith's experimental conditions to investigate further the effect of oxygen on ethylene formation in soil and the significance of ethylene as a fungistatic agent. The soils used, which passed through a 0.1-cm sieve, were a chalk loam (10.3% organic matter) and a sand (1.4% organic matter). The soils were packed in open glass tubes and the water tension maintained at field capacity, that is, the moisture content of soil after it had drained from a waterlogged state on filter paper overnight. The oxygen concentration in the loam was reduced from atmospheric to less than 0.1% and the ethylene concentration reached 28 v.p.m. within 2 d at 25° C. In the case of the sand, oxygen remained at atmospheric levels after 15 d and the ethylene concentration never exceeded 0.1 v.p.m. When the experiments were repeated with soils which had been sieved to 0.2 cm instead of 0.1 cm, they did not become depleted in oxygen and no ethylene was detected. When the top of the tube was sealed, however, the concentration of oxygen decreased and ethylene was detected.

Whereas it has clearly been shown that ethylene can be fungistatic aerobically[1], it is neither fungistatic to nor metabolised by an ethylene-producing soil fungus, *Mucor hiemalis*[6]; further, there is no evidence that it is fungistatic in the soil under the conditions in which it is normally formed, that is anaerobic, since it is almost certain that anaerobiosis is itself fungistatic[7].

Ethylene formed in anaerobic zones, however, could diffuse to and act in aerobic zones if it were not lost by further diffusion or metabolism[8]. Germinating seeds also produce ethylene[9], presumably by an aerobic process, and this could be important in the seedling's resistance to attack by fungal pathogens.

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DR SMITH REPLIES—Most of the points raised by Lynch and Harper have been clarified by our latest research[1]. We have shown clearly that spore-forming anaerobic bacteria are the major producers of ethylene in soil; that ethylene is produced in anaerobic microsites in even relatively dry soil; that the anaerobic microsites result from the activity of aerobic microorganisms; and that the aerobes, in turn, are inactivated by the ethylene diffusing from the anaerobic microsites. In essence, we have described a self-regulating cycle in soil that controls microbial activity.

Other soil microorganisms, including *Mucor hiemalis*, may produce ethylene but the quantities will be limited by their own sensitivity to ethylene as