necessary conditions by comparing the shape of the experimental scattering curve with that predicted for widely separated rod-like particles. Such analysis of the scattering from our molecules shows that the Guinier conditions are not met, because the experimental plot of log sI against s^2 is not linear, due to the fact that the chromosome fibres we have studied are not widely separated (*vide infra*).

In our letter we outlined three basic arguments to prove that the 400 Å band is due to the packing of fibres and therefore not the result of scattering from widely separated rod-like molecules. These arguments were that: (1) the 400-Å peak is found in the I versus s plots of living chicken erythrocytes after subtraction of the non-nuclear background (represented by the scattering from living rabbit erythrocytes); (2) the 400-Å band in the s^2I vs s plots can be directly related to the 300-Å centre-to-centre spacing of fibres often seen in thin sections of a wide range of cells, including chicken erythrocytes[2]; and (3) the 400-Å peak in the s^2I curves of the scattering from intact nuclei is lost when the thick fibres are intentionally disaggregated into soluble thick fibres (as assayed by our electron microscopy) by elimination of divalent cations from the buffer. Each of these arguments disproves that scattering from isolated thick fibres has given rise to the 400-Å features in our patterns.

If, as we suggest, erythrocyte chromosome fibres are homogeneous cylinders of 370–400 Å diameter, a dilute dispersion of fibres would give rise to a maximum in s^2I at ~850 Å. To see a peak at these very small angles would require better first-order resolution in our X-ray camera.

Thus we feel that our experiments have demonstrated that the 400-Å feature is due exclusively to the side-by-side packing of chromosome fibres. The absence of a 400-Å feature in disaggregated fibres is inconsistent with the hypothesis put forth by Subirana. Furthermore the analytical technique he has proposed is not generally valid because it cannot test whether the necessary conditions for a Guinier analysis are met.

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Stability of loess in light of the inactive particle theory

A RECENT article by Smalley *et al.*[1] has suggested an interesting theory pertaining to loess stability. The inactive particle theory of soil sensitivity attempts to explain the sensitivity of quickclays on the basis that these soils possess only small amounts of clay minerals and as a result, develop no long-range bonds. Therefore once disturbed, they do not retain the adequate shear strength needed to remain stable[2,3].

In the classical Terzaghi sense, loess soils, which are composed predominantly of silt particles, would probably not be considered sensitive soils, in that the ratio of undisturbed to remolded strength, at constant moisture content, is usually around 3, depending on clay content, and therefore would generally fall into the category of medium sensitivity. If, however, sensitivity is taken as the ratio of undisturbed to saturated strength (in unconfined compression) as indirectly suggested by Feda[4], then some loess soils would have to be considered quick.

Loess soils, particularly bluff-line deposits, typically lose shear strength as a result of moisture saturation; in which case landslide potential becomes an extreme hazard. Loess in this state may be susceptible to "spontaneous liquifaction"[5] which could help explain the extent of landslides during the 1920 earthquake in the Kansu Province of China.

In recent investigations throughout the midwestern US, *in-situ* stability of loess has been related to liquidity index, that is when the *in-situ* moisture content reaches the liquid limit, usually on saturation, stability is all but lost and can be readily identified by isolated flow in boreholes. Because liquid limit is related to clay content, and saturation moisture is a function of density, this instability only occurs in special circumstances, typically low density and low clay content. As both calcareous and leached examples of this condition have been noted, the leaching theory of Rosenquist does not seem applicable in that carbonate leaching need not be complete, however, the cementation bond may be weakened. Scanning electron microscopy (SEM) qualitatively reveals that only a small portion of the clay fraction (<2 μm) of loess is composed of clay minerals, with the remainder being comprised of clay sized quartz particles. The amount of clay is related to closeness of the deposit to the source. An indirect measure of sensitivity is given by Skempton's[6] "activity" which for bluff-line loess averages ~0.46, clearly in the "inactive" range.

The inactive particle theory seems to have significance to loess stability, however, to investigate the theory fully thermogravimetry will be necessary to quantify the amount of active minerals present in each of the various particle-size fractions.

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SMALLEY REPLIES—LUTENEGGER makes quite a good case for considering loess a sensitive soil, and for applying the inactive-particle short-range-bond hypothesis to it, but if we are going to take this approach we shall have to acknowledge the pioneering opinions of Denisov[1]. He stated that a subsident loess (the sort described by Lutenegger) is extremely sensitive, particularly when saturated. The water content in such a state is above the liquid limit; the condition which occurs in the classic quickclays. Denisov pointed out that loess in this state preserves some strength and can form steep sides to canals and pits. When disturbed the shear strength drops to zero. The basic reason, according to Denisov, for the appearance of highly sensitive quickclays is their "preservation under natural conditions of the uncompressed state": an observation which could be very close to the truth.

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0028–0836/81/220360—02$01.00