to compare teachers (for whatever reason) then there is no alternative but to pursue any one of the faculty evaluation paradigms constructed for this purpose. One should not confuse this type of evaluation with value judgements about teaching or learning however.

If, on the other hand, faculty evaluation is to facilitate qualitative change a different conceptual framework is required.[3, 8, 9, 14] Recognition has to be given to factors such as institutional 'climate', normative practices for tenure and promotion, the politics of, and resistance to, educational evaluation, to name but a few. A comprehensive development programme that is tailored for a particular institution can then be implemented. The 'Clinic to Improve University Teaching' at the University of Massachusetts is a striking example of how this may be accomplished.[4, 5] Comparisons still take place, but the comparisons are aimed at diagnosis and improvement rather than discrimination between individuals or the courses they teach.

Conclusions

If the example cited above is an indicator (as I believe it is) of contemporary trends in teaching and learning improvement we, in South Africa, would be well advised to take advantage of our present position of mobility. There simply is no point in adhering to a philosophy that is already outdated and defending it on the grounds that we tend to lag behind.

Future efforts should be directed to the improvement of teaching in the context of a particular situation. The criteria on which value judgements will be based will obviously differ from one situation to the next and it is for this precise reason that qualitative innovation can take place.

In the wider perspective of institutional change there are many who believe that the *unit* of change remains the individual rather than his department or some larger organisational entity. Provided that the individual academic can gain recognition for his efforts (by publishing them) there is no reason for comparison-based evaluation systems to exist. There are many contemporary journals dealing exclusively with the *teaching* of subjects in a variety of disciplines and the inclusion of research of this nature into the traditional academic reward system may well be the key to future teaching improvement.

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Lithostratigraphy of the Swartkrans Formation

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The sediments and basic stratigraphy of the australopithecine "breccias" at Swartkrans, Transvaal, were first described and interpreted in detail by Brain[1], on the basis of exposures accessible after the 1952 excavations.[2] Further excavation by Brain after 1965[3] provided extensive, clean vertical faces that allowed major stratigraphic revisions.[4] At the same time, sedimentological reinvestigation of the South African australopithecine breccias, begun by the writer in 1970[5–7], was carried out in close coordination with Dr Brain at Swartkrans, and so permitted recognition of facies and micro-stratigraphic units within the new lithostratigraphic framework. This paper gives a preliminary analysis of 61 cave samples, collected jointly from 6 key profiles, that were studied in detail in the Paleo-Ecology Laboratory of the University of Chicago.

The basic procedures included: (1) Macroscopic identification of bedding[8], textural composition, and any pedogenetic characteristics[9] – prior to sample removal in the field. (2) Colour identification (dry state, by the *Munsell Soil Color Charts*) and low-power microscopic examination in the laboratory. (3) Decalcification in a 10% solution of cold HCl (which does not generally destroy the original dolomitic sand grains). (4) Hydrometer analysis of the residue, using sodium pyrophosphate as peptizing agent. (5) Wet sieving of the remaining sand fraction. (6) Microscopic scanning of the sand and granule fractions. (7) Plotting of cumulative textural curves (fraction under 2 mm), based on 7 size fractions under 6.4 mm, with textural classification after Link.[10] (8) Calculation of preliminary textural parameters, including the Trask coefficients of sorting ($So = \sqrt{Q_1/Q_3}$) and skewness ($Sk = \sqrt{Q_1 Q_3/Q_2^2}$), where Q_1, Q_2 and Q_3 are the first, second and third quartiles respectively.[11] Full graphic representation of these data, together with more detailed and rigorous statistical results, is reserved for a final report that will include the remaining australopithecine sites as well as a suite of modern soil and sediment samples from the Sterkfontein valley. Selective X-ray diffractograms were also obtained, and are currently being followed up in a systematic clay mineral investigation at Georgia State University by F. Manley.

Member I of the Swartkrans Formation

With reference to Brain's presentation of the new lithostratigraphy[4] and the generalized profile (Fig. 1), Member I can be subdivided and outlined as follows:

IA. White, finely laminated, mesocrystalline travertine, forming a number of distinct stalagmitic bosses and flowstone cascades, deposited at drips of up to 20° around the gigantic roof block and on the former cave floor. Thickness (prior to removal by miners in 1930/35) locally well in excess of 2 m. Upper contact wavy and abrupt but including terminal laminae or thin lenticles of light reddish brown, clayey-sand silt rich in bone fragments.

IB1. Poorly stratified mass of angular, gravel-to-cobble-grade dolomite rubble and occasional bone, in matrix of reddish brown, poorly sorted, clayey sand-silt. Secondarily calcified, with calcite repeatedly recrystallized. Thickness 1 m below former vent. Upper contact irregular and abrupt.

IB2. Angular granule-to-gravel-grade dolomite debris and bone fragments, in matrix of reddish brown, poorly sorted clayey sand-silt or sandy silt; conspicuous, non-parallel thin-bedding, accentuated by flowstone laminae and two wavy-bedded flowstone horizons in lower part, with inclinations of 5–20° to cave interior. Slow accumulation is indicated by continued growth of an interbedded travertine boss through most of sequence. Secondarily calcified, with evidence of repeated recrystallization. Average thickness 1.6 m, cumulative maximum thickness of lenticular beds 2.2 m. Upper contact wavy and abrupt, with terminal flowstone lenticle (10 cm thick) in the Inner Cave.

IC. Light reddish to reddish brown, poorly sorted sandy clay-silt, with discontinuous thin-bedding at 5–15° inclinations to interior. Includes subangular to subrounded, grit-to-gravel-grade detritus and abundant microbone near former vent, but nothing coarser than sand near the roof block or in the Inner Cave. Secondarily calcified but more limited calcite recrystallization. Terminated by conformable, 15–40 cm horizon of macrocrystalline, thinly-laminated, wavy parallel-bedded flowstone in the Inner Cave, where this unit represents a talus lense dipping 20–40°. Thickness 1 m.

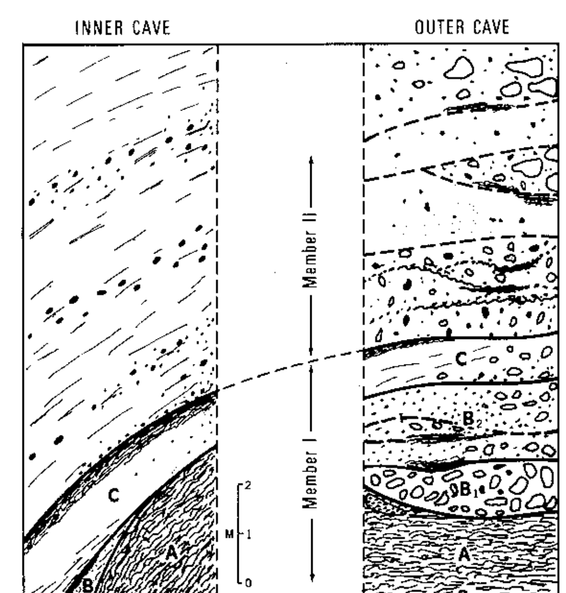

Fig. 1. Generalized lithostratigraphy for the Outer and Inner Caves at Swartkrans. Younger units omitted.

The major, basal flowstone of Member I was deposited on the clean floor of a deep dolomite cavern, to seal in a few fragments of roof debris. This cavern had no direct connection to the outside, although towards the close of this phase, small increments of external detritus began to wash into the cave, introducing the first fossils.

Unit IB1 marks a drastic change in the depositional environment, the opening of a karstic ponor or small doline very near the "*Paranthropus* section." The deposit is a minimally-bedded mass of blocks and residual soil, with reduction of size and improvement of stratification away from the former vent. Rapid, if not penecontemporaneous accumulation is suggested by the lack of flowstone interlaminations. This collapse breccia includes soil, bone, and rare artifacts probably derived from an older, higher-lying surface depression or external cave. The matrix includes minimal proportions of sand in the 0.6–6.0 mm grade, but approximately 20% clay in the fraction finer than 2 mm. This implies derivation from a deep, argillic surface soil, quite unlike the modern slope lithosols or stoney cambic profiles. The closest external analogues are provided by the (relict?) B-horizon preserved on the upland flat north of Swartkrans Hill or the dissected, red colluvium on the lower slopes below Sterkfontein.

Unit IB2 suggests a much slower, incremental build-up of sediments interrupted by local travertine episodes and including fewer and fewer crude scree components. Stratigraphic differentiation is impeded by the rapid vertical and lateral changes within the successive sweeps of sediment that constitute this complex of minor beds. Eventually the topmost strata develop greater horizontal uniformity, with a composition remarkably similar to gritty, modern slope lithosols and cambic profiles. Although some soil and organic debris will have washed into the doline overhead after each protracted rainstorm, the presence of thin bedded, multiple sediment increments argues for deposition in the wake of unusually strong surface runoff, following major 1-in-10 or 1-in-100 year downpours. In between such sporadic surges of water, loose sediment, bone and artifacts probably accumulated slowly on the sides of the sinkhole above.

Ultimately the vent area of the Outer Cave was largely filled with sediment, and accretion was restricted to thin flowstones. At about or after this time the huge dolomite block on the cave floor appears to have settled to open a new vent of at least 60 cm height between the Outer and Inner caverns, allowing a new generation of deposits to accumulate in both cave sectors.

Unit IC is relatively shallow but extensive and homogeneous, except where crude detritus is interbedded in former vent proximity. Erosion from argillic soils by surging, concentrated runoff waters and soil creep is suggested, with some rubble picked up within the overhead sinkhole. Except for their high grit level, modern slope lithosols are texturally identical; this implies the former presence of B-horizons within the catchment of the doline, i.e. a deeper external soil mantle than at the time unit IB2 was accumulating. After unit IC had filled most of the Outer Cave, thin flowstones were deposited in the Inner Cave.

Member II of the Swartkrans formation

The second complex of deposits at Swartkrans is equally well developed in the Outer and Inner Caves, indicating that large solution cavities had been created in the Outer Cave during the interim, and that the Lower Cave was now partly blocked, so that more sediment was trapped in the Inner Cave until it had been completely filled. The basic properties of Member II differ somewhat between the Outer and Inner Caves, as a result of an intervening "filter." There are no significant stratigraphic subdivisions.

Outer Cave. Reddish brown, poorly sorted, clayey sand-silt, secondarily calcified with moderate calcite recrystallization. Disposed in 3 major facies: (1) Lenticular subunits with granules, gravel-grade rubble, and occasional bone, mainly thin-bedded (dips 8–15°), with finely laminated, wavy flowstone interbeds and lenticles of laminated silts; (2) sheets with discontinuous thin-bedding (inclined 4–8°) and little crude rubble or grit but some bone; and (3) aggregations of gravel-to-cobble-grade rubble, mainly subangular to subrounded, often massive bedded, with basal, laminated, wavy flowstones and inclinations of 8–27°. At least 6 m thick.

Inner Cave. Reddish brown, moderately well sorted, clayey sand-silt or sandy silt, secondarily calcified with moderate calcite recrystallization. Finely laminated, subparallel thin-bedding, dipping 3–10° to back of cavern; with occasional small-scale, shallow crossbeds as well as gritty horizons or zones with ferric microconcretions. Bone tends to be dispersed and fragmentary. Topmost 50 cm interbedded with lenticles of silty flowstone. Thickness 10.5 m.

Member II in the Outer Cave suggests a cavern with direct access to a doline in process of active enlargement. Periodic rock collapse complicates a record of alternating deposition and erosion. The lower third of this sequence includes distinct erosional disconformities, and one large block of already-cemented sediment appears to have been dislodged (after extensive corrosion?) and rotated backwards by at least 20°. The topmost 2 m suggests mass movements, possibly slow earthflows. The bulk of the sediment implies gradual accretion in response to periodic, surging runoff combined with soil creep, but the frequent flowstone interbeds argue for repeated episodes with very limited transfer of clastic sediment. The closest modern analogue for this overall suite is provided by the B-horizon on the upland flat north of Swartkrans Hill, so that a deep soil mantle must be posited beyond the margins of the stoney doline.

The Inner Cave facies of Member II represents a "filtered", sorted variant of the Outer Cave, lacking both the coarsest fraction (trapped in the Outer Cave) and much of the clay (flushed out via the Lower Cave). There are no external analogues that are texturally similar, but comparable sediments have been laid down in small depressions of the cave during the last few years: these are laminated silts, swept together from the miners' back-dirt into small muddy pools during downpours. The 10 m column of Member II in the Inner Cave indicates a very protracted interval of periodic, high but uniform-velocity influx from one or more openings, with silt and sand accumulation in the ponded waters of the Inner Cave.

Younger deposits of the Swartkrans caves

Several generations of younger deposits at Swartkrans include: (i) Cemented, crudely stratified, and very poorly-sorted, rubbly fillings of solution conduits (30–50 cm diameter) penetrating older deposits of the Outer Cave; (ii) Cemented, well-stratified, poorly-sorted, lenticular infillings (including rodent breccias) of larger karstic fissures reopened into the lower recesses of the Outer Cave; and (iii) partly consolidated, well sorted and stratified soil wash in the incompletely-filled Lower Cave. In the Outer Cave these deposits are identical to local Member II, while those in the Lower Cave are similar to but a little coarser than Member II in the Inner Cave. The Lower Cave fill seems to contain only a little corroded bone, reworked from older beds; it may be contemporary with some of the dissected hillslope colluvia of the Sterkfontein valley.

Objective distinction of the sedimentary suites

The relatively large sample suite from Swartkrans allows definition of textural "populations" representative of the major units. The 61 samples are divided as follows: unit IB, 14; unit IC, 10; unit II, Outer Cave, 9; unit II, Inner Cave, 12; younger sediments, Outer Cave, 7; younger sediments, Lower Cave 5; recent wash, Outer Cave, 4. The external samples, not described here, total 18. Because of their small number, the recent wash and Lower Cave samples, which are comparable, were combined to provide a total of 6 lots for comparison.

As a measure of particle size, Q_1 was plotted against Q_3 in Fig. 2, both as means and as ellipses describing the first standard deviations for each group. Figure 3 is a plot of *So* versus *Sk*, as a function of the key textural parameters.

It is at once apparent that units IB and IC are distinct in terms of typic "populations." On the other hand, there is an almost total overlap between IB and II (Outer), and substantial similarity between II (Outer) and the younger, Outer Cave fills. II (Inner) and Lower Cave are also broadly comparable. In terms of Q_1, unit IC diverges from most other samples in the cave. Applying Student's t-test, the difference between Q_1 of units IC and IB, as well as of units IC and II (Outer), is significant well below the 0.01 level; also *Sk* of units IC and IB differ at an equal level of significance. This demonstrates conclusively that IC represents a distinct textural "population."

Except for IC, the lithostratigraphic units within the Outer Cave are alike, and those of the Inner and Lower Caves are alike. This underscores the role of the cave micro-environments in differentiating cave-specific facies. However, Figs 2 and 3 also provide strong indications that the temporal facies variability within the Outer Cave reflects on changing external environments as well. The provisional clay mineral determinations appear to support such changes: whereas the key clay minerals of modern external soils are illite (*I*) kaolinite (*K*) and montmorillonite (*M*) (in that order), the dominant proportions in IB1 appear to be *I-M*; in IC, *M-I* (with interlayered muscovite); and in II, *M-I* (with interlayered kaolinite). Low-magnification scanning further indicates considerable variability in chert proportions, as originally established by Brain[4], and relatively limited differences in quartz-grain micromorphology; these aspects require restudy in view of the revised and more complex microstratigraphy.

In the field, unit II (Outer) can be readily distinguished from

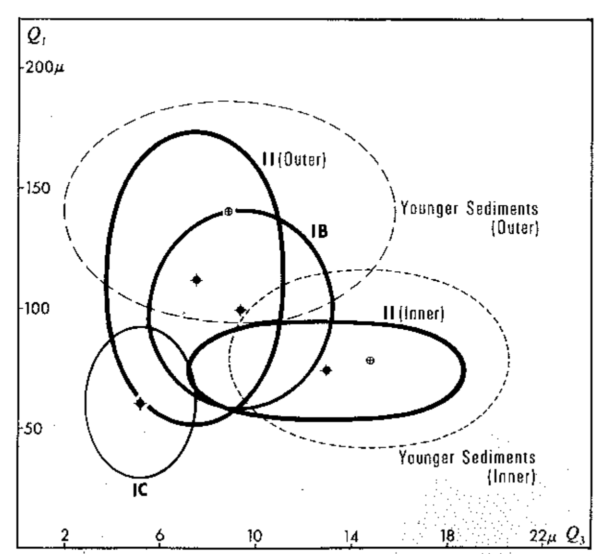

Fig. 2. First and third quartiles (mean and ellipse of standard deviations) of cumulative texture (under 2 mm) for Swartkrans lithostratigraphic units.

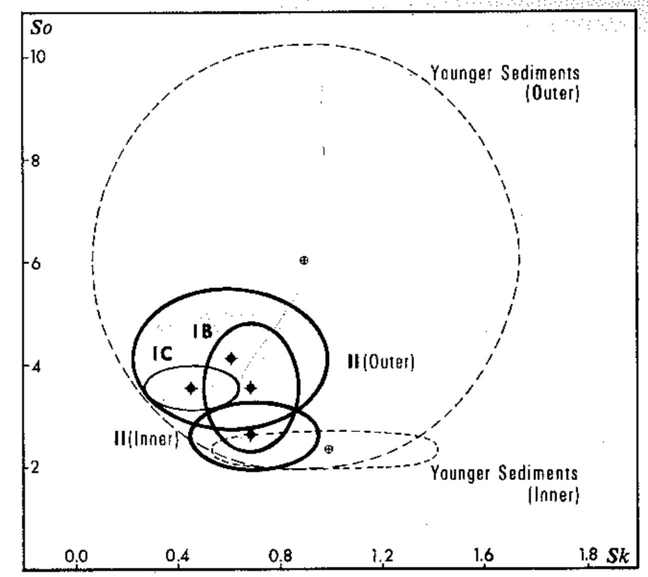

Fig. 3 Trask indices of sorting and skewness ($\bar{x}$ and σ) for Swartkrans lithostratigraphic units.

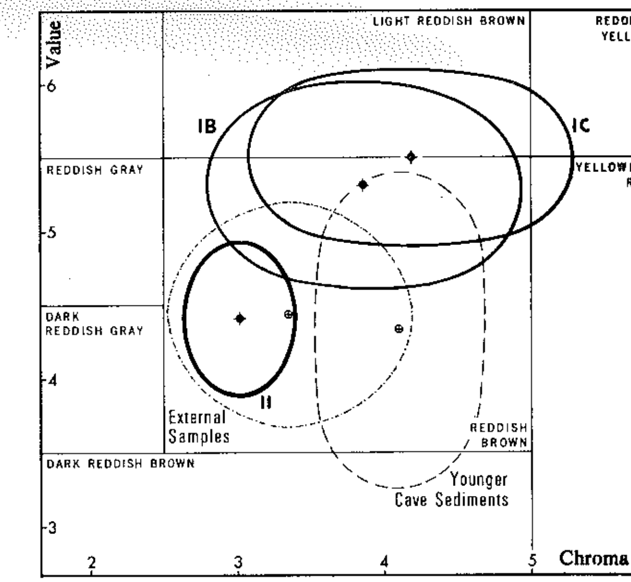

Fig. 4. Munsell colour values and chromas ($\bar{x}$ and σ) for Swartkrans lithostratigraphic units.

IB on the basis of contacts, distinct arrangements of facies sequences, and to some extent by the repeated recrystallization of the calcite in IB or by colour. Unit IC is generally marked by distinctive stratification, but other diagnostic field traits are subtle, despite clear identity in the laboratory. Finally, the younger sediments include units that are incompletely cemented or may be unconsolidated; they are also identifiable on the basis of field disposition. For these reasons Members I and II form convenient mapping units and deserve member status, within a Swartkrans Formation that typifies key biostratigraphic horizons for Southern Africa.[12–15] Despite its identity, IC is not a useful mapping unit and is therefore classified as a Bed within Member I. The stratigraphic scheme set out in Table 1 is therefore warranted on the basis of present evidence. The sequence permits interesting comparisons and contrasts with the Sterkfontein Formation as recently defined by Partridge[16], but discussion is beyond the scope of this paper.

To what extent can the matrices attached to the existing collections of hominid fossils and artifacts be distinguished? Colour is certainly useful but not entirely diagnostic. Over 80% of the Swartkrans detrital samples are "reddish brown" (5YR hue) by the Munsell code. The differences within this range are small in absolute terms, with Member II samples having lower "values" (i.e. darker) and "chromas" (i.e. duller). Colour values are plotted against chromas in Fig. 4. Members I and II provide distinct colour "populations," with units IB and IC both differing significantly in terms of value as well as chroma (below the 0.01 level) from II. On the other hand, IB and IC do not differ significantly, while II overlaps extensively with the younger sediments as well as with the suite of external samples, particularly in terms of value. All of this second group either include organic matter or exhibit diffuse or concentrated pyrolusite (MnO_2), often reworked as concretions. Pyrolusite is scarce in Member I, and restricted to precipitates on or in bone and to some bedding planes of the Inner Cave. The cautious differentiation applied by Brain[4] to the older materials is therefore convincing within its own explicit limits. Equally apparent, however, is the need to carry out controlled excavations in each subdivision of the Swartkrans Formation.

Preliminary environmental implications

Geomorphic evolution of Swartkrans during the late Cenozoic has involved cavern enlargement by solution and roof collapse, accumulation of flowstone and dripstones, filling by soil and vent detritus, and renewed corrosion and erosion of such fills. These partly interactive processes were basically controlled by the local groundwater table, by the distance and diameter of vents to the surface above, by the external topography, and by the regional geomorphic balance as reflecting soil type, ground cover and climatic regime. Development of the cavern complex has been discussed[4], and it remains to evaluate the detrital fills in the context of the Swartkrans hillside.

On the basis of morphometric analysis of the 400 km² Riet- and Bloubankspruit drainage (of which the Sterkfontein valley is part) and plotting of the modern talweg gradient and elevations of preserved dolomite hills and ridges in the Sterkfontein valley (also mapped in detail by T. C. Partridge, unpublished), it can be inferred that a general surface once existed at 1 500–1 510 m in the Swartkrans-Sterkfontein area. The top of the ridge above Swartkrans is at 1 496 m, the top of the fossiliferous deposits at 1 489 m, and the valley floor at 1 454 m. Whatever karst cavern origin (deep-phreatic or watertable)[17] one may favour for Swartkrans, the local watertable was above the floor of the present Inner Cave (1 481 m) when solution of the original, underground cavern began. Despite the complexities of local rock structure[18], and even with a watertable dipping towards (rather than away from) the stream, these relationships argue for at the very least 30 m of subsequent bedrock incision along the valley axis. During this time, what once was a smoothly undulating upland above the cave, was reduced to a small hill with

Table 1 Lithostratigraphy of Swartkrans (biostratigraphic horizons and correlations after Vrba[14])

Younger conduit, fissure, and cavern fills	Late Skb (Upper Pleistocene)
Swartkrans Fm., Member II (10 m); complex sequence of fine and coarse detrital units	Early Skb (Middle Pleistocene)
Swartkrans Fm., Member I (6 m):	Ska (Lower Pleistocene)
Bed (C) (1 m) Fine detritus	
Bed (B2) (2 m) Coarse detritus	
Bed (B1) (1 m) Coarse detritus (collapse breccia)	
Bed (A) (2 m) Travertine (everywhere on bedrock)	

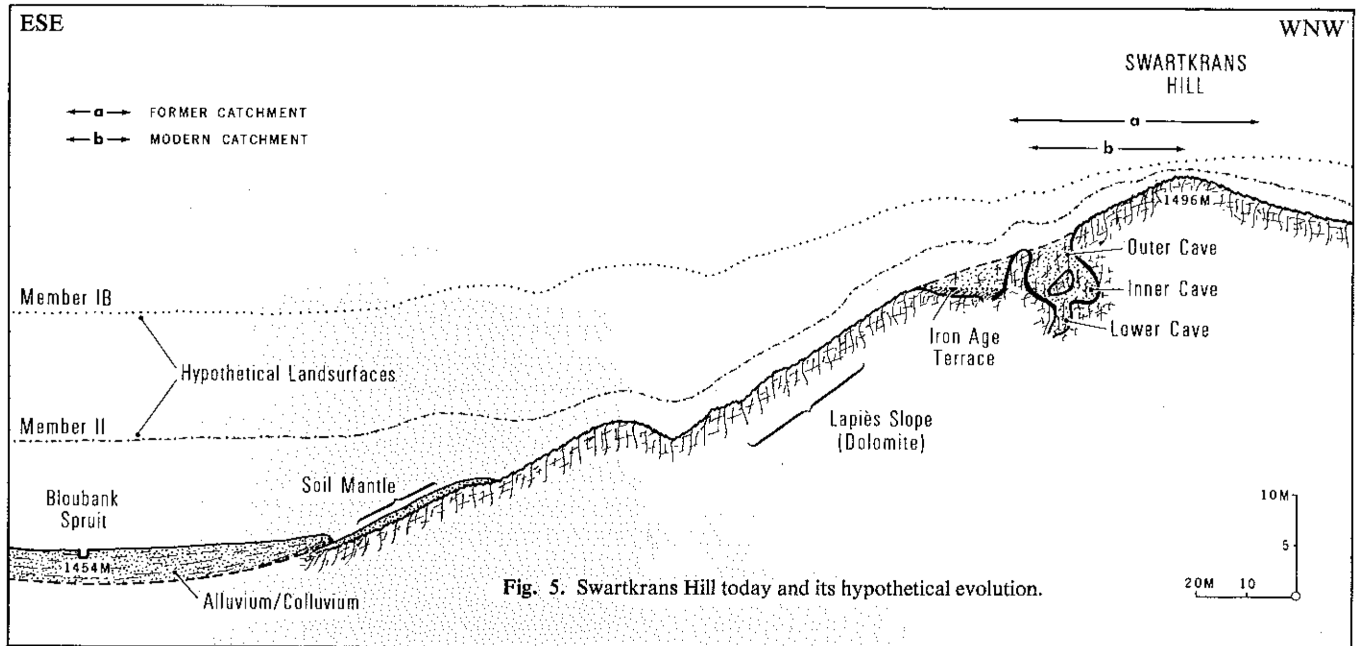

Fig. 5. Swartkrans Hill today and its hypothetical evolution.

a relief of some 40 m and an average inclination of 16°. It is highly probable that at the time the cavern was "opened," Swartkrans Hill had twice its present area but only half its relief. As suggested in Brain's evolutionary diagram[4], 5–10 m of dolomite has since been denuded from above the site. Today the top of the ridge is only 25 m beyond the (northern) edge of the roof, providing a catchment of less than 600 m^2, with a longitudinal gradient of 25° that allows for little but pockets of lithosols and relict B-horizon soil among the rough, micro-karstic *lapiès* topography. When unit IB began to accumulate, it is probable that the micro-catchment of the Swartkrans doline was twice as large, that the gradient was perhaps a half that of today's, and that a subcontinuous mantle of soil covered most of the *lapiès*. Although hypothetical in its details, such an evolutionary framework (Fig. 5) allows a more realistic appreciation of the geomorphic balance and the potential soil sediment yield of the micro-catchment through time.

Even a 1 200 m^2 micro-watershed with an average slope of 12° cannot support sporadic soil erosion indefinitely, without being reduced to a *lapiès* surface unfavourable to sustained chemical weathering. This is borne out by the sedimentary record; even when not choked with detritus, the cavern experienced long intervals without deposition, or with pure travertine accretion, or even with net corrosion and removal of fill. Since the majority of these intervals cannot be explained by physical changes within the cavern or by topographic modification outside, differences in ground cover and/or climatic regime must have been involved. In effect, the (probably very extended) intervals of non-accretion within the cavern must (in part) have coincided with soil deepening outside. The available data speak for alternating morphodynamic and morphostatic conditions in the original sense of Erhart[19], or as analogy to the K-cycles of Butler.[20] In this interpretation of periodic landscape evolution, episodes of accentuated erosion lead to accelerated landform sculpture and net, long-term soil attrition, exemplified by active erosion, transport and deposition. Such morphodynamic episodes alternate with intervals of comparative stability and slow geomorphologic change, during which the rate of weathering equals or exceeds the rate of erosion.[21] Geomorphic periodicities of this type have already been verified for other areas of South Africa.[6, 22, 23]

Swartkrans units IB, IC and II, as well as the several generations of younger soil sediments, each record periods of active slope balance[24] with soil attrition. This repeatedly implies a thinning of soil mantles until a new balance of weathering and erosion obtained, predicated on lithosols or organic topsoils

Table 2 Simplified interpretation of geomorphic events and environmental trends as recorded at Swartkrans.

	Modern conditions, with limited change.
	Youngest sediments (Inner Cave, one or more generations): active balance with effective runoff, reduced ground-cover.
〰	Development of cambic soil in micro-catchment: passive balance with reduced runoff, improved ground-cover.
	Next-to-youngest sediments (fissures and conduits of Outer Cave, one or more generations): active balance with effective runoff.
〰	Long complex period of cavern solution and erosion, as well as cambic soil development outside: variable conditions, mainly with reduced runoff and/or improved ground-cover.
	Member II (protracted accumulation, with interruptions): active slope balance dominant, with effective runoff but also optimal ground-cover.
〰	Development of argillic soil in micro-catchment: passive balance with reduced runoff and effective ground-cover.
	Member IC: slight but protracted, active slope balance, with effective runoff but also optimal ground-cover.
〰	Development of argillic soil: passive balance, reduced runoff, effective ground-cover.
	Member IB2: active slope balance with effective runoff and reduced ground-cover.
〰	Member IB1 (brief event as cavern opens).
	Member IA (cavern sealed, but IB1 sediment accumulating in sinkhole above): slight but protracted, active slope balance, with effective runoff but also optimal ground-cover.
〰	Development of argillic soil: passive balance, reduced runoff, effective ground-cover.
	(Earlier events not locally recorded)

Note: Scrolls indicate periods of pedogenesis and non-sedimentation.

resting on truncated B2-horizons among the *lapiès*. During part of each of the preceding intervals, passive slope balances[24] saw re-establishment of subcontinuous soil mantles with complete A-B1-B2 profiles. Needless to say, not all patterns of active versus passive slope balance were identical. In part, optimal soil depth would have decreased and stoniness increased as slopes steepened. Further, different climatic regimes could have reduced evaporation or altered rainfall intensity and/or duration, affecting surface runoff without necessarily changing annual means – modifications that may or may not have resulted in different ground-cover conditions. Also, many relatively uneventful periods would remain unrepresented in the record. So, for example, despite a slightly degraded ground-cover and heavy enough rainfalls today, little mineral sediment but a certain amount of organic debris is washing into the cavern, although reworking of backdirt is very active; it appears that the adjacent soil mantle is too incomplete, with soil pockets protected by the permeable, organic horizons trapped among the *lapiès*. Finally, it should be emphasized that some sediment was always getting into sinkholes: the argument here is one of net, long-term trends.

A provisional and simplified "external" interpretation of the Swartkrans sequence is proposed by Table 2. The entire sequence probably reflects on a predominantly open, grassland or parkland environment, considering the almost universal range of such physiognomic vegetation types in the South African interior. But the extent of fringing tree growth in valleys, or of accessory bush cover on slopes and in sinkholes, presumably varied a great deal. Applied to the major fossiliferous horizons, the evidence speaks for a degree of effective moisture comparable to, or even slightly greater than, that of today during the accumulation of units IB1, IC, and II, but "drier" than today for IB2 and most of the younger fills. The "moistest" intervals were those with net development of argillic soils; such soils also provide the most acid subsoils (pH 5.5 today), and related percolating subsoil waters would probably favour corrosion of cavern fills. However, it is unlikely that any of the hominid fossils derive from phases of passive slope balance: bone preservation would have been too poor with minimal sedimentation.

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A Re-interpretation of the Swartkrans Site and its Remains

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A re-interpretation of the stratigraphy and stages in formation of the Swartkrans site has been necessitated by geological and palaeontological evidence. The Outer Cave, source of virtually all the fossils, is now thought to contain deposits of three distinct ages; the relationships of these are described and a separation of the fossils into two main assemblages is made.

The study of a breccia-filled dolomitic cave is complicated by the fact that very little of the cave is normally open to inspection. Consequently, any interpretation of cave form and stages in formation is likely to change radically as excavation proceeds. This has certainly happened at Swartkrans. The present re-interpretation of the site and its remains may not be the last, but we must surely be approaching an understanding now of the cave form as well as the relationships of the deposits and the remains which they contain.