Smalley

LL

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Loess Commission among the Parna - and the 5th Palaeosol Joint Project

The Dust Mantle Workshop - the first major event organised by the WPWG - was held successfully in Canberra in December 1980. It was preceded by a field tour which took the participants as far west as Leigh Creek in South Australia, with opportunities to admire many parna deposits en route. The first 'Parna Dinner' (in honour of Bruce Butler) was held in Broken Hill on 29 November 1980. The proceedings of the Workshop are being published by the Research

School of Pacific Studies, Australian National University. The editors are Bob Wasson and Jim Bowler and they can answer queries about availability and progress. Accounts of the field tour and the Dust Mantle Workshop by Neill Kennedy and I.J. Smalley have been published in New Zealand Soil Bureau Record 71 (1981).

After the Workshop, a WPWG business meeting was held to decide future policy. This was attended by Messrs. Bowler, Wasson and Mabbutt (for Australia), Liu, Wen and Wu (for China) and Milne and Smalley (for New Zealand). The most significant decision taken was to work towards a possible joint correlation project. It could be desirable to concentrate on the younger and more accessible deposits, and a reasonable region to demarcate is that above the 5th palaeosol in the Chinese loess which is dated (see p.6) at about 200 000 BP. This could be a convenient base point from the New Zealand point of view, since it is near (in temporal terms) to the Mount Curl tephra at 230 000 BP. A truly joint correlation exercise may prove too ambitious at this stage, but it was proposed that three complementary reports could be prepared in time for the Moscow INQUA meeting to give the present and palaeo-climatic environments in the three countries, the resulting sedimentary regimes and from this a summary of the nature and distribution of aeolian deposits in the three countries. Brief accounts of the chronology, where available, are to be included. In the long term, it was agreed that work should proceed towards a correlation project to relate geomorphic, sedimentary, and weathering events through Late Quaternary time in the three countries.

The Colour of Loess

There seems to be fairly general agreement that our cover gets a Munsell rating of 2.5Y8/4 - 2.5Y8/6.

Publications

Der quartäre Osteifel-Vulkanismus im Rahmen der Lössbildung - ein Beitrag zur Lössgenese. W. Tillman & H. Windheuser. Eiszeitalter u. Gegenwart 30, 29-43, 1980.
(The influence of the Quaternary East Eifel Vulcanism on loess formation - a contribution on loess genesis): Keywords - loess, genesis, origin, volcanism, Middle Pleistocene, particle size analysis, heavy mineral, zircon, clinopyroxene.
ABSTRACT: Intensive volcanic activity has taken place in the precisely defined Laacher volcanic area since the Middle Pleistocene. It can be shown through the heavy mineral and grain size analyses that the volcanic region is a considerably important local source area for the formation of loess.

The proportion of the volcanic heavy minerals proves the dominant significance of reworking processes for the loess genesis in the Laacher volcanic area.

The content of the volcanic heavy minerals and the grain size of the clinopyroxenes in the loesses decrease due to the increasing distance of the volcanic source area in relation to the Rhine axis.

Clay-mineral indicators of glacial and non-glacial sources of Wisconsinan loesses in southern Indiana, U.S.A. R.V. Ruhe & C.G. Olson. Geoderma 24, 283-297, 1980.
ABSTRACT: Clay-mineral compositions of Peoria loess of later Wisconsinan age derived from Wabash Basin and Ohio Basin riverine sources differ in southern Indiana. In the Wabash province the composition is illite > expandable clay minerals > kaolinite and relates to the clay-mineral composition of glacial drift in the basin of 91% glacial cover. In the Ohio province the composition is expandable clay minerals > or ≃ illite > kaolinite and relates indirectly to the clay-

mineral composition of the Sangamon Soil terrain on bedrock. Above the confluent Wabash Basin, 77% of the Ohio Basin is unglaciated. The clay-mineral composition of thin Farmdale loess of earlier Wisconsinan age also relates to the composition of the paleosol terrain. During Peorian time while glacial outwash was supplying loess source materials to the valleys in the Wabash Basin, ordinary alluvium derived from soils and bedrock in unglaciated terrain was supplying loess source materials to the valleys in the Ohio Basin.

The loess of North-East Essex, England. D.N. Eden. Boreas 9, 165-177, 1980.

ABSTRACT: A thin mantle of cover-loam over much of North-East Essex has been recognised as consisting of loess. The cover-loam represents the intermixing, to a varying degree, of a layer of loessial silt with a thin layer of underlying sand which is also of likely aeolian origin. The heavy mineral content of the coarse silt fraction of North-East Essex loess is generally similar to that of last glaciation age loesses elsewhere in Eastern England, Belgium and the Netherlands. This suggests the North-East Essex loess is part of a single loess sheet deposited over Eastern England and parts of Western Europe. Nevertheless, detailed examination of the heavy minerals content from all of these areas reveals slight areal variations especially in the proportion of hornblende. These differences show the coarse silt from North-East Essex loess to have closest affinities with that from Norfolk. A distant source for the loess within the present North Sea Basin is proposed on textural evidence. Loess accumulation in North-East Essex probably commenced in the few thousand years leading up to the maximum extent of Devensian ice (about 18,000 years B.P.) and may have continued to about 14,000 years B.P.

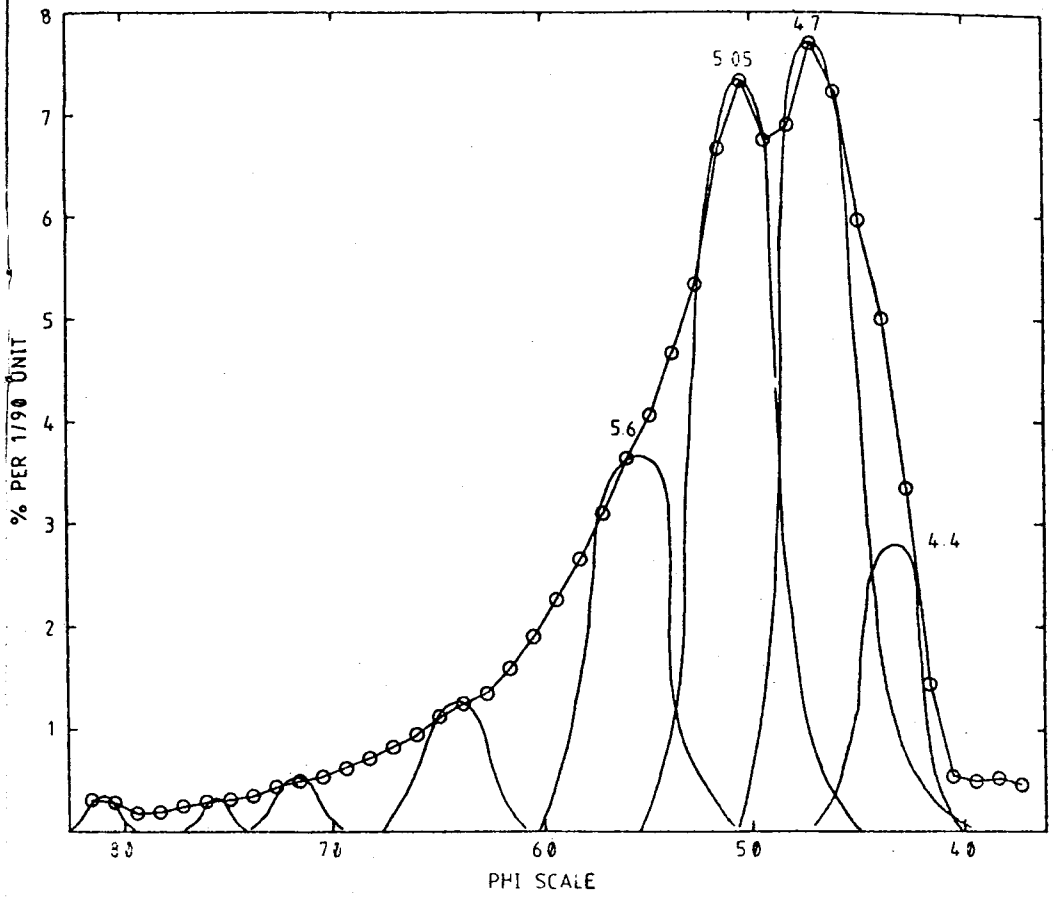


Fig. 6. Particle-size frequency distribution of the silt peak in loess: a typical example from the Naze (TM 267242).

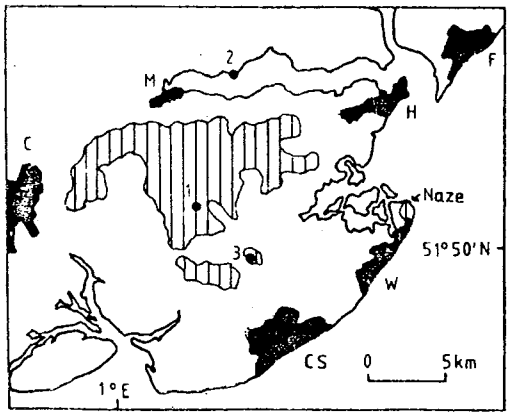


Fig. 2. Distribution of cover-loam in North-East Essex (based on soil survey data made available by courtesy of R. G. Sturdy, Soil Survey of England and Wales). C – Colchester; CS – Clacton-on-Sea; F – Felixstowe; H – Harwich; M – Manningtree; W – Walton on the Naze. Ordnance Survey grid references of sites 1–3: (1) TM 126245; (2) TM 151330; (3) TM 133232.

The glacial boundary in southern Illinois. H.B. Willman & J.C. Frye. Illinois State Geological Survey, Circular 511, 23 p, 1980.

EXTRACT: Except where it has been eroded along valleys, loess covers the drift north of the glacial boundary and the bedrock south of the boundary. Where deposited on relatively flat surfaces and protected from erosion, the loess thins progressively back from its source areas in the Mississippi, Wabash, and Ohio Valleys. The loess is as much as 100 feet (30 m) thick at a few places on the Mississippi bluffs, but 50 feet is more common. It thins eastward to about 25 feet in 5 miles (8 km), 12 feet in 10 miles, and 8 feet in 15 miles. It is as thin as 4 to 5 feet where the glacial boundary turns northward in southeastern Williamson County. North of there, the loess continues to be 4 to 5 feet thick for about 20 miles. Where the border of the drift turns easterly, the loess begins to thicken, and it reaches about 15 feet on the Wabash Valley bluffs at New Haven. In much of the area near the Wabash Valley, the boundary is covered by the sediments of Lake Saline rather than by loess.

Although loess is the surface material on nearly all slopes, sheetwash and slumping on many of the steeper slopes has concentrated the silt into thick accumulations on the lower slopes. The dominant material in the flood-plain sediments in the valleys is silt derived from erosion of the loess.

Because the dominant winds are westerly, silt blown from the Mississippi Valley forms the bulk of the loess to within 15 to 20 miles (24 to 32 km) of the Wabash Valley, which then becomes the major source of the loess (Glass et al., 1968). (p.10)

The fifth layer palaeosol in the Lishi loess and its palaeoclimatic significance. An Zhi-sheng & Wei Lan-ying. Acta Pedologica Sinica 17 (1), 1-10 February 1980 (in Chinese).

ABSTRACT: In the famous aeolian loess plateau of north China a number of paleosol layers were recognized early. Thirteen layers of buried paleosols can often be found in well preserved late Pleistocene Malan loess and middle Pleistocene Lishi loess, that deposited during the Brunhes Normal epoch. Among them, the fifth layer, counting from top to bottom, paleosol in Luochuan loess section, Shaansi province, is characterized by its greater thickness, red brown colour, and a well developed clay enriched horizons as well as carbonate concretions at the bottom. The reversed magnetization observed in samples from the top of soil section records short reversed event during the Brunhes epoch; corresponding to I Biwa reversed event in Japan. Thermoluminescence dating shows that this unit was formed between 212000-178000 years ago.

The Luochuan fifth layer paleosol, with two closely related clay enriched horizons, consists of two thin layers paleosol. Large quantity of illuviation ferri-argillans observed in the soil section show that the clay had been transported and deposited. In addition, results of micropedology and soil magnetization studies, mechanical and chemical analyses prove that the fifth layer paleosol approach burozem type. It is a product of bioclimatic belt between temperate deciduous-broadleaf forest and dry forest types. As a consequence, the occurrence of fifth layer paleosol indicates that the climate in the loess plateau about 0.2 million Y.B.P., is warmer and wetter than in Holocene at the same place, because the nature landscape in Holocene in Luochuan region belongs to steppe type.

The authors consider that the paleosols in loess plateau of North China represent interglacial climate just as the loess represents glacial climate. According to the degree of the paleosol development and chronological studies, the fifth layer paleosol, the Sangamon interglacial soil in the United States and Mindel Riss interglacial soil in Europe are all

contemporaneous. The fifth layer paleosol can be compared with oxygen isotope stage 7 in climatic records of deep-sea sediments. At the same time, stage 7 shows two pronounced warm peaks can be compared with the warm interval reflected by the two thin soil layers in the fifth layer paleosol. As the preceding discussion indicates the Northern Hemisphere climate was obviously getting warm about 0.2 million Y.B.P.

A Quaternary soil sequence in the Kennet Valley, Central Southern England. C.J. Chartres. Geoderma 23, 125-146, 1980.
EXTRACT: In contrast, the mineralogy of the silt fractions from above the textural discontinuities and throughout the terrace profile at Beenham Grange is similar to that of aeolian deposits reported throughout lowland England (Avery et al., Catt et al., 1971; Harrod et al., 1973; Perrin et al., 1974). Though the silt deposits above the discontinuities and at Beenham Grange are not "loess" as such, they do contain considerable quantities of exotic aeolian material apparently derived from outside the confines of the Kennet catchment. The higher quantities of staurolite and kyanite observed in the silts of the Kennet deposits compared with aeolian deposits elsewhere, probably reflect the mixing of the exotic aeolian materials with locally derived silts, which are relatively rich in these minerals. Though it seems possible that there may have been several periods when such aeolianites were deposited over southern England, it is commonly suggested that the major period of deposition was during the late-Devensian cold period (Harrod et al., 1973; Perrin et al., 1974). It is postulated by these authors, on the basis of textural and mineralogical evidence, that such aeolian deposits were derived from glacial outwash deposits of the European mainland and North Sea Basin, and transported across Britain by easterly

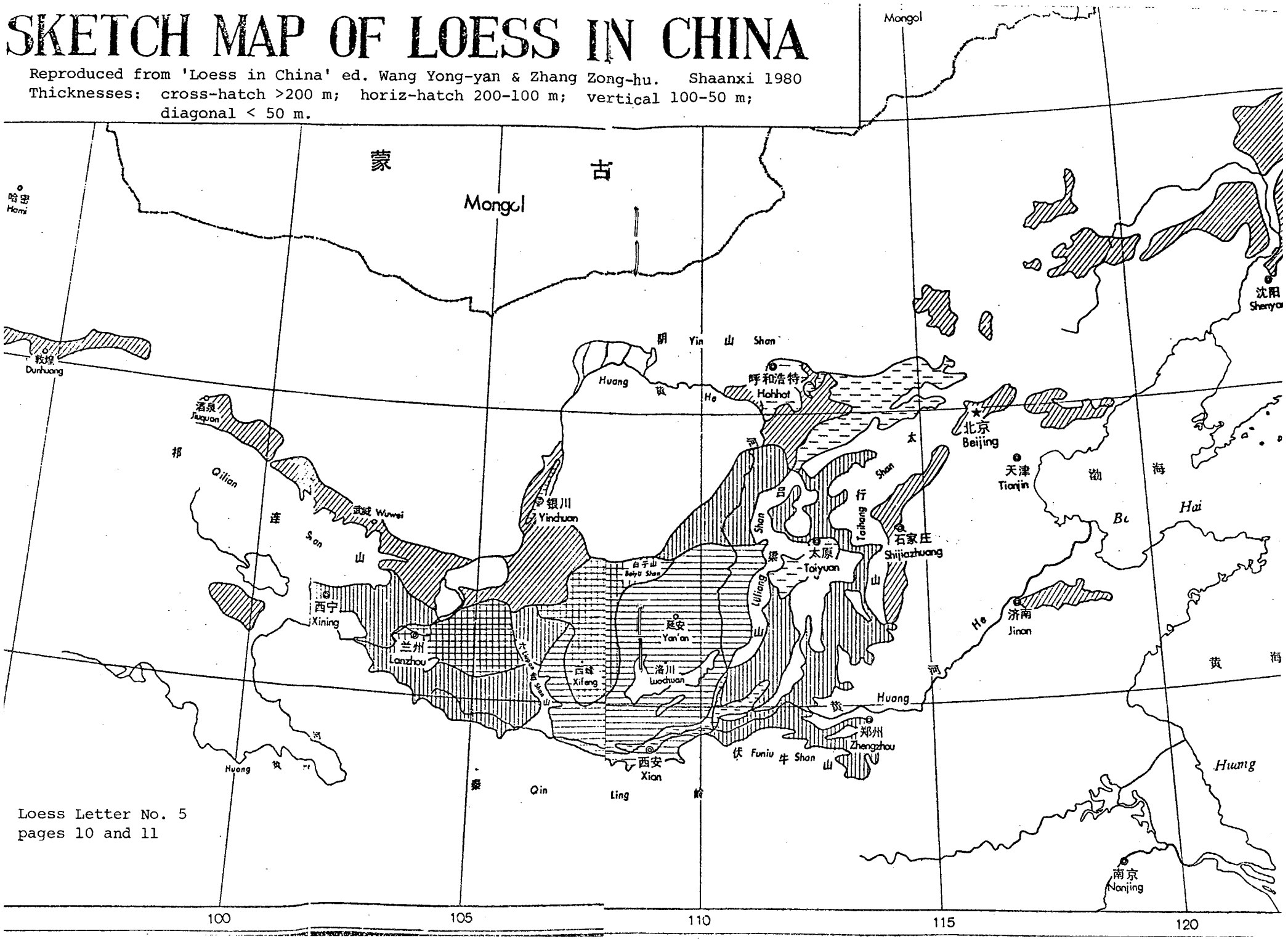
winds associated with a glacial anti-cyclone centred over Scandinavia (Lill and Smalley, 1978). (pp.138-139)

Thermoluminescence dating of late Devensian loesses in southern England. A.G. Wintle. Nature 289, 479-480, 5 February 1981.
ABSTRACT: Scattered across southern England are many isolated deposits of loess-like material. A few, such as that at Pegwell Bay in Kent, are highly calcareous and unweathered but most have been reworked by fluvial or colluvial processes. There is good stratigraphical evidence for a few pre-Devensian loesses, also in Kent, but dating of more recent loess has so far been based on indirect indirect evidence. Much work has been done on the Pegwell Bay loess as it is the most extensive, truly aeolian loessic deposit in Britain. Kerney compared the late Devensian deposits in the Isle of Thanet and at Pegwell Bay with similar deposits in Holland and Belgium where radiocarbon dates have been obtained for interstadial deposits. Correlations of the East Kent deposits with these in Northern Europe indicates that the loesses in Kent were formed between 30,000 and 14,000 yr ago. I report here dates for six of the more recent deposits in southern Britain from the Scilly Isles to Kent. The dates have been obtained on the loess itself, using a recently developed thermoluminescence (TL) dating technique, and confirm the ages as being late Devensian.

Loess in China. Wang Yong-yan & Zhang Zong-hu (Editors in Chief). Shaanxi People's Art Publishing House, 1980.
The ultimate picture book for loess fanciers! A superb selection of photographs elegantly produced in a large format on high quality paper; truly a publishing masterpiece. A short text in Chinese and English accompanies the pictures - but the pictures are the

SKETCH MAP OF LOESS IN CHINA

Reproduced from 'Loess in China' ed. Wang Yong-yan & Zhang Zong-hu. Shaanxi 1980
Thicknesses: cross-hatch >200 m; horiz-hatch 200-100 m; vertical 100-50 m;
diagonal < 50 m.



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pages 10 and 11

main reason for the book. Every loess fancier (and Quaternary scientist) should have one on his/her coffee table; and there should be a copy prominently displayed in every library to proclaim the glories of loess.

There are five sections: 1 - Landforms of loess in China; 2 - Stratigraphy of loess in China; 3 - Constituent materials and micro-textures of loess in China; 4 - Human fossils and cultural finds in loess regions of China; 5 - Utilization and reformation of loess in China. A sketch map shows the location and thicknesses of the loess deposits (see pp.10-11).

Dust Bowl: The Southern Plains in the 1930s. Donald Worster. Oxford University Press, New York. 277 p. 1979.

It's a story of people rather than soil, but the southern plains - that "vast austerity" - are largely composed of loess material so the book should be noticed in LL; and as a study of the perils of soil erosion, it has a message for all of us. Worster has some nice quotations, from Woody Guthrie's "The Great Dust Storm":

It fell across our city like a curtain
of black rolled down,
We thought it was our judgement, we thought
it was our doom.

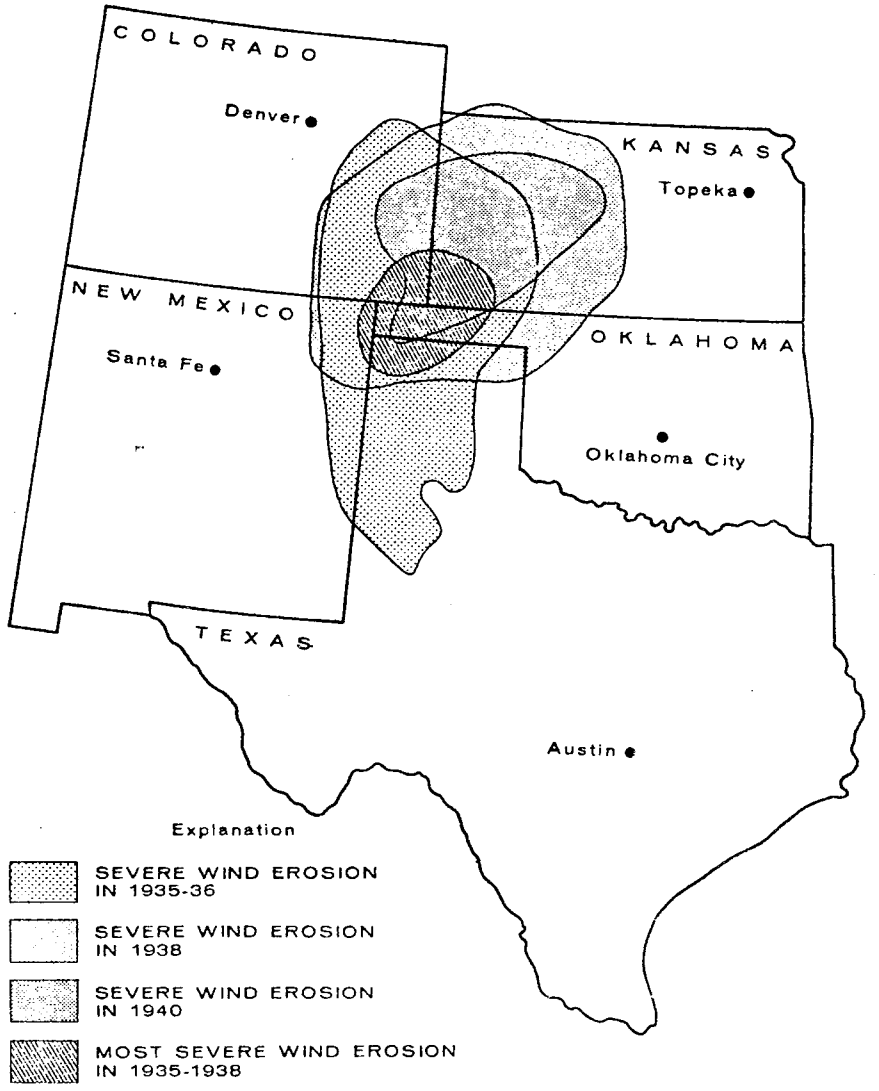
to Karl Marx in "Capital":

All progress in capitalistic agriculture
is a progress in the art, not only
of robbing the laborer, but of robbing
the soil.

EXTRACT: From those chaotic, erosive forces soil patterns emerged. Curtis F. Marbut, the most authoritative student of the subject, isolated two universal characteristics in matured soils of the Great Plains, including eolian, or wind-deposited, loess. The first was a dark surface layer

EXTENT OF AREA SUBJECT TO SEVERE WIND EROSION

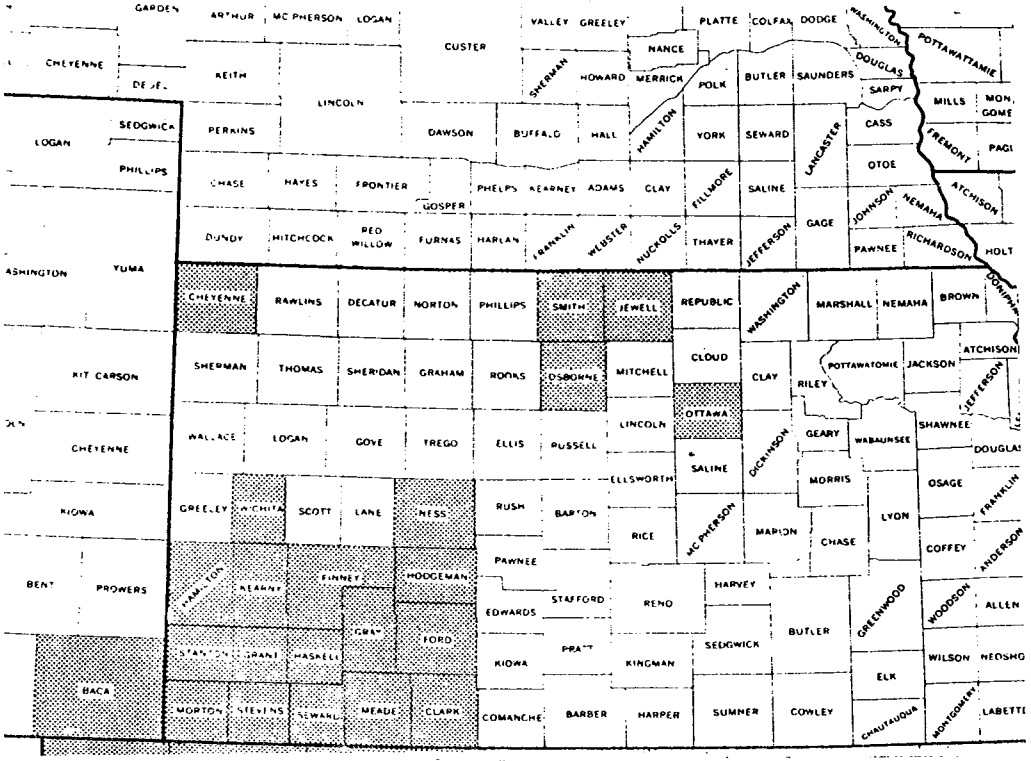
1935-1940

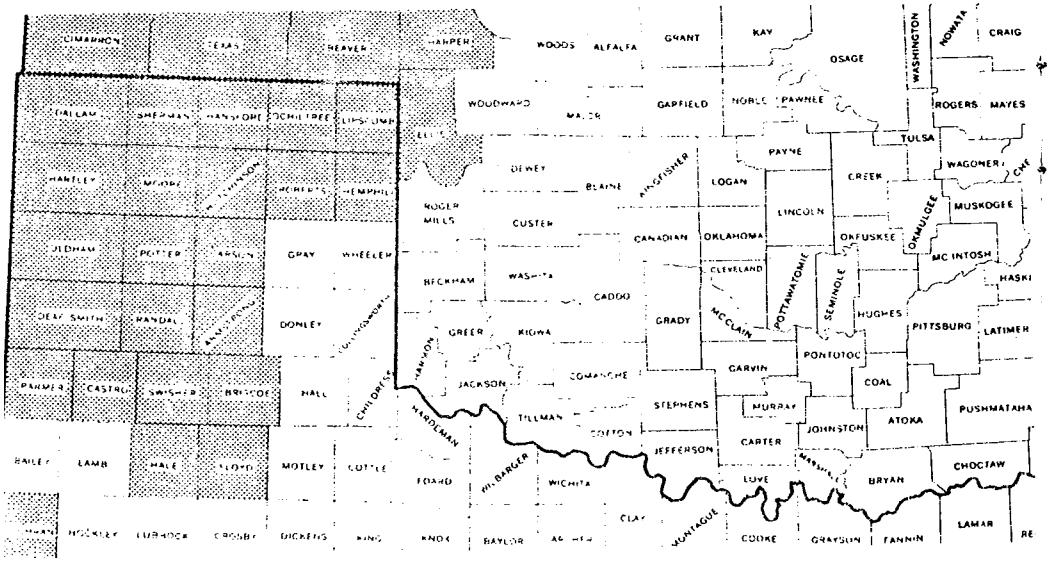


(Sharon Hagen)

AREAS OF INTENSE DROUGHT DISTRESS

1930-1936





containing organic matter, ranging in color from black in the east - similar to the chernozem of the Eurasian steppe - to shades of brown as one approached the Rocky Mountains. The second was a zone of alkaline salt accumulation, usually lime carbonate, created by the leaching effect of limited rain. On the extreme eastern edge of the Great Plains there was no alkaline zone because the rain was heavy enough to wash the salts down to the groundwater level. But farther west it appeared, first at a depth of 16 to 20 inches, then only 13 or 14 inches down. This calcareous material under the loose surface formed a hardpan, or, more technically, a caliche deposit, beneath which the earth stayed dry. Soils with this layer were called "pedocals", indicating that they had lost less mineral matter than had those of humid climates. Give them rain and they would support a rich vegetation - but then the same rain would eventually leach away their soluble nutrients.

So little moisture falls on the southern plains today that they are classed as semiarid: not quite a desert, but very dry, receiving an average of twenty inches or less of precipitation a year. (p.69)

Early Man in Soviet Central Asia. R.S. Davis, V.A. Ranov & A.E. Dodonov. Scientific American 243, No. 6, 92-102, December 1980.

EXTRACT: *Various paleomagnetic events are detectable in the loess of Tadzhikistan, the most important one being the transition some 690,000 years ago between the Matuyama magnetic period, when the earth's magnetic polarity was the opposite of what it is now, and the Brunhes period of today. In the Tadzhikistan loess sections currently being studied the total number of buried soil complexes varies, the maximum being 37. In the six sections where the Matuyama-Brunhes boundary has been detected, however, nine of the soil complexes consistently lie above it. The number of soil complexes above the Matuyama-Brunhes boundary in*

Tadzhikistan corresponds fairly closely to the number above the boundary in the loess of central Europe. The number of soil complexes is also in agreement with the record of climatic oscillations preserved in deep-sea sediments. (p.96)

On the loess in Canada

From Archie Stalker (co-founder of CANQUA)

There is indeed loess in Canada, and it is fairly widespread on our Great Plains and in some mountain valleys, I know less about it in eastern Canada. A minor amount is shown on my map "Surficial Geology, Lethbridge, Sheet 82H, east half", Geological Survey of Canada, Map 41-1962, 1962. More commonly, however, it is just mapped as "Wind (or aeolian) Deposited Silt". Most often it is just not recognized at all and is mismapped as glacial-lake silt. This, I believe, is now changing, with loess being recognized more often, and with an increasing interest in its study.

Most of Canada has been glaciated and so, except for certain rare exposures in sections, our loess is of postglacial age and largely picked up from outwash and from deltas built into glacial lakes. Since it has only had 12,000 or so years in which to accumulate it is typically thin; commonly less than a metre thick. This causes difficulty in recognizing it, especially where it is vegetation covered. Further, even if it is recognized during mapping, a decision is required as to whether to show a thin loess cover or underlying till or lake deposits. The first is more important for pedology, the others for water-supply and general geological studies. The choice is often for the latter, and as a result loess commonly is under-represented on our maps. This is offered as a part explanation for the sparsity of loess records, not as an excuse for our shortcomings.

From Douglas Grant (of CANQUA Secretariat)

Re. your query about the apparent lack of loess in Canada. This is true and the reason is partly given on page 10! (LL.4) as partly dependent on glacial limits. During most glaciations Canada was largely ice-covered, hence periglacial aeolian deposits are only known (in limited amount) from the 2 repeatedly extraglacial areas in Canada where fine sediments could be produced for accumulation: southwestern Prairies (Alberta) and northwestern Arctic (e.g., Banks Island; paper by J.S. Vincent).

Meetings

INQUA Moscow, 1-9 August 1982. First circulars should have been returned by the end of October 1980. Abstracts of papers to be presented should reach the Secretary-General by 1 November 1981. IGCP Project 128 Late Cenozoic Magnetostratigraphy will hold a symposium at the INQUA Congress; it will be convened by N.D. Opdyke and M. Pecsi and will focus on the correlation of magnetic stratigraphy with biozones and soil horizons in loess (see Geological Correlation No. 8, July 1980, p.157).

IAS Hamilton, Canada, 22-28 August 1982. At a tidy interval after INQUA the International Association of Sedimentologists will hold the 11th Sedimentological Congress at McMaster University in Hamilton, Ontario. Of particular interest to LL readers will be Symposium 16 on 'Eolian Sediments & Processes'; if anyone wants to contribute or needs further information, they should contact:

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CANADA

Pacific Science, Dunedin 1983. Now is the time to start planning for the 15th Pacific Science Congress to be held in Dunedin, New Zealand in February 1983. A WPWG organised symposium on 'Quaternary Airfall Deposits in the Circum-Pacific Region' will be held and papers for this are invited; intending authors are asked to contact Ian Smalley, Soil Bureau, Lower Hutt, New Zealand.

Pleistocene Palaeoclimates

In Current Contents (Agric., etc.) for 13 October 1980 (Vol. 11, No. 41) Eugene Garfield published his list of 'top topics' in the physical sciences. These mostly involved topics like 'Weak Neutral-Current Reactions' and 'Quantum Chromodynamics', but tucked away among the overwhelming physics was 'Pleistocene Palaeoclimates'. Some of the data for this topic must come from loess stratigraphy - it's nice to know that we are getting popular. LL has been abstracted by Geo Abstracts; perhaps we shall make Current Contents one day!

New Quaternary Journal

A new journal has been announced; the first issue is due in the northern hemisphere Autumn of 1981 (with luck that will be Springtime in N.Z.). It will be an "International Multidisciplinary Review Journal" and its title will be 'Quaternary Science Reviews'. David Bowen of the University College of Wales at Aberystwyth is the Editor-in-Chief and the publisher is Pergamon. For details and free specimen copy write: Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, England or Fairview Park, Elmsford, New York 10523, U.S.A. This looks like an admirable undertaking and deserving of support by LL readers: there is no doubt that Quaternary Studies (and all science) could benefit from more reviews and bibliographies and collections of data properly distilled

and critically assessed. As J.K. Charlesworth said in his mammoth work - talking about the facts which bombard us:

> *There is ... an urgent need of an objective work collecting and correlating this heterogeneous material and embodying in reasonable compass a digest of the imperfectly organised data that have accrued from the labours of generations of workers in the Quaternary field. When brought into juxtaposition with related facts in the mind of the observer, these stores of useful information may stimulate the growth of knowledge and the birth of new ideas.*

LL is very much in favour of the growth of knowledge and the birth of new ideas (and of new Quaternary journals which promote these aims).

Courses

IFAQ/International Post-Graduate Training Course on Fundamental and Applied Quaternary Geology. Organised by the Free University of Brussels under the sponsorship of Unesco, INQUA, the Belgian National Fund for Scientific Research and the Belgian Unesco Committee.

A two year course leading to an M.Sc. degree, instruction in English. Courses start on 1 February each year and applications for enrolment should be sent to Prof. Dr. R. Paepe, Director of IFAQ, Kwartairgeologie, Vrije Universiteit Brussel, Pleinlaan 2, B-1050 Brussels, Belgium, from whom further information can be obtained.

This issue of LL was produced by Ian Smalley, Marjolane Ball and Heather Simmonds at Soil Bureau, Taita, and printed by the N.Z. Government Printer in Wellington.