

A Soil Classification for Great Britain by B.W. Avery

Notes on a discussion at Rothamsted Experimental Station on 19th & 20th November, 1968. (Present: D.M., R.D.G., N.G.J., and R.G.S.)

General Comments

1. Fixing of the system by units and ideas in current usage indicates its practicability. The tightness of definitions limits its flexibility to a desirable level.

2. Symbolism confuses, especially the many uses of the same l.c. suffix. Example⁶⁸ of the symbolism in use for profile descriptions, particularly where newly created concepts could be illustrated, would be welcome.

3. The lithological codes are good, and provide a means for describing parent material largely independent of stratigraphy and age. Not necessary to accept revised particle size limits and groupings, to apply the same principles at once.

Discussion - points are discussed in the order they arise in the text and original text Arabic numerals are used for the main underlined headings.

3. Identification and description of soil horizons3.1 Master Horizons

- O (i) Is a stony soil one with as few as $\frac{1}{2}$ stones, as per the field handbook? Why not ^{measure} O.M. content on the whole soil in all cases?
- (ii) Significance of the sliding scale for % O.M. with clay content is questioned.
- B There is no absolute definition of a B horizon (nor of E) Since a balance sheet of silicate clay, sesquioxides or O.M. is assumed, can limiting percentages of, particularly clay, be proposed?
- G The lack of structure in such horizons ought to be emphasized.

C & R For C, what is difference between physical weathering and slight structural modification?

Is R meant to exclude riverine gravel? Normal digging with a spade is often essentially impracticable, yet 'significant displacement' by cryoturbation is common.

3.2 Transitional or intermediate horizons

Do we need two systems for indicating transitional character, be it a wide merging boundary, or a case of uncertain identification?

3.3 Sub-horizons

A capital letter designation for which no further differentiations has been made should be distinguished from one where no suffix is applicable (if there are such cases) A dash is suggested for the latter e.g. B-

3.5 Horizon designated by l.c. suffixes.

- a, albic; distinction of organic rich a horizons from Ah horizons difficult on colour value.
- Bb ; soils with a highly ferritic B horizon, evidently also Bb, are not given a place in the ped. class (come out in lith class) e.g. Banbury series. Since there is high dithionate-extractable Fe in such horizons, could they come under Bt?
- c ; 'fine earth' = < 2 mm. particles?
- d ; strong objection to changing from well established x for fragipans. Scrap d, retain x.
- g, (g) ; (i) degrees of intensity of gleying are implicit in the use of (g), slightly gleyed, and g, gleyed. Can criteria be given for making this distinction?
- (ii) Require saving clause in gleying criteria which eliminates application to parent materials low in iron e.g. Upper Greensand. Some soils, e.g. Harwell series, apparently have Eg, and Bg horizons because of the inherent low chroma.
- h, humic; (i) ambiguity about humose; does an Ah horizon have to meet chroma and value criteria as well as O.M. content criteria?
- (ii) Objection again to sliding scale for O.M. with clay.
- (iii) h seems to mean different things when applied to O (state of decomposition of O.M.) and when applied to A and B.

(iv) Oh; could 'significant amounts of mineral matter' be given some limits?

(v) Subscript primes e.g. h', t', e' are likely to get lost in typing. Suggest a bar e.g. \bar{O} , \bar{h} instead (Also al. 1. may not be distinguishable from 1 in typescript)

i. iron pan; Bi is the only horizon with a thickness limitation.

S; (i) does a B_o horizon exist on its own?

(ii) Although 'brightly and strongly coloured' are mentioned, no actual colour criteria given. Could some be given?

(iii) Clarification please (for D.H.) of comment on p.22.....

"isotropic coatings on mineral grains, indicating that they are definitely illuvial".

(iv) Ambiguity in first sentence, next paragraph, p.22 does 'having a higher content of both totals and extractable sesquioxides' apply to 'B_{hs} or B_i' or to 'other sesquioxidic horizons'?

t (i) p.22 argillans not a very specific term. Could mean illuviation or stress outwash.

(ii) Must examine microscopically to determine whether have a B_t.

(iii) Field characters are the only ones that can be used in mapping. There will be ^{inevitably} grouping of some classes of tessera, because they cannot be distinguished in the field. This applies to groupings based on B_t recognition.

General (i) Concern expressed about very varied ^{use} nature of h; as a l.c. suffix, throughout the classification proposals.

(ii) Brian's comments are required on the speculation about the relative ordering of lower case suffixes in Robin's Table 1 (p.v.)

(iii) It seems likely that some of the symbol nomenclature will become redundant if and when computers are involved in compiling data stores from 'raw' incoming data (i.e. unsymbolised). Also, most line printers do not have lower case letters.

4.2 Diagnostic Horizons and Features of Mineral Soils

General (i) Although it clearly will work, there are difficulties in grasping the need for diagnostic horizons.

(ii) Not very satisfied with symbol nomenclature in this section.

Why not use Capital letters for diagnostic horizons?

(iii) A range of depth limitations is given under different diagnostic horizons viz; 35, 40, 50, 80 and 120 cm. What is the significance of these, and in particular between 35 and 40 cm.? Why not 90 cm. as the normal depth limit of a soil tessera? (see p.2).

Weathered B Not clear when to apply the symbol do.

sg. staugley characters

(i) Does staugley have any different meaning from surface water gley?

(ii) If not, drop staugley, and retain s.w.g. (but see 5 (ii))

GG Gley characters

(i) Note that a G horizon is not essential

(ii) Why is a buried organic layer diagnostic of gley soils?

p.29 Welcome distinction between gleying and drainage status.

No need at all for a new term, 'hydromorphy'. Use degree of gleying scale only.

t, argillic 7th approximation thickness limits better.

N.G.J. thinks $\times 10$ cm. is too restrictive. In paragraph (3), is 'argillans' intended to be equivalent to illuviation cutans?

t', paleo-(i) paragraph (2), D.K. wants to insert thought to be attributable.....

argillic (ii) Sopic fabrics are not a useful criteria^{on} here - characteristic of all clayey soils of Britain.

(iii) Question the point that texture need not be a diagnostic criteria.^{on}

4.3 Diagnostic horizons and features in Organic soils

Not discussed

5 Pedological Classification

General (i) Definitions of Major Soil Groups are almost wholly negative.

(ii) Rendzinas; the most important positive statement about this class of soils, namely that it has a C horizon, is omitted from the defining diagnostic features.

(iii) Admit easier to use word staugley instead of s.w.g. in

combination with other names e.g. stangley podzol.

- (iv) Our preference for the name to be used when alternatives are given is as follows:
 - (a) p.38 stangley brown earth (symbol bg) instead of gleyed b.e., to contrast with Gley-brown earth (symbol BG)
 - (b) p.38 Sesquioxidic b.e. (symbol pb) as opposed to podzolic b.e.
- (v) Rankers: basic symbol x not acceptable (see note on fragipan horizon under 3.5)
- (vi) Podzolic ranker - should there be an h preceding the p?
- (vii) Fragic brown earth symbol should be bd p.38
- (viii) Are regic and lithic Rankers in the classification or not?

Major Soil Groups

Rankers

No depth limitations are given in the pedological classification (but there are in the lithological class). Is the Major Soil Group intended to include deep as well as shallow soils?

Calcimorphic Soils (Rendzinas)

- (i) Object to implication in above heading that all calcimorphic soils are Rendzinas.
- (ii) Prefer name calcareous soils; hence more suitable to introduce the type soil of the major soil group Calcareous soils as a brown calcareous soil.
- (iii) As the proposals stand, the subgroups are given to horizons which do not appear in the basic soil.
- (iv) Object to Hanlope and Evesham series having a name including the word rendzina.

Brown earths

What is the justification for not separating a unique soil like the Banbury series in the ped. class? High Dithionite extractable iron and/or structure which its ferritic B horizon exhibits are significant pedological attributes (see note 3.5b).

Podzols

The division between hydromorphic and non-hydromorphic podzols should be scrapped.

Stangley soils

There is justification for a calcareous subgroup. Well-expressed stangley features exist in some Breckon-like soils and such soils should be called stangleys and not rendzinas (see calcimorphic soils, under 5) refer to profile HJ39/2384.

Organic soils - no discussion but p. 44 under Phi - should be having instead of lacking.

H.S.S. and subgroup symbol nomenclature.

- (i) It is recognized that horizon symbols are being used in the order in which they occur in the profile. But what about stangley rendzina g? see p. 36.
- (ii) Does each discrete diagnostic symbol in a compound name, represent a distinct horizon? If so, H50c (humic calcareous gley) presumably means that a calcareous subsurface horizon exists below a Gley horizon. However, the GS itself is not excluded from being calcareous.
- (iii) Recommend the underlining of the basic symbol to indicate quite clearly what the class name should be, and which symbols are adjectival qualifiers e.g. ggt argillic stangley.

6 Lithological Classification

6.1 Particle Size classes

- (i) D.S. to circulate others with consent.
- (ii) Change the letter notation for the subgroups e.g. GS for coarse sandy; C is now constative of coarse.
- (iii) Change C for clayey to something else.
- (iv) G - fragmental (Gravel) is illogical G - Gravel is all that is needed.
- (v) Minority report: H.S.S. subgroup lettering is constative of the proportions of size fractions which are being used to distinguish them. Therefore retain. No need to change C for clayey.

6.2 Application

The use of separate textural classifications for different pedological classes militates against the separate application of the lithological and

and the ped classes (see p.45)

Soils with Textural B horizons (i) object to ^{additional} SL textural group

(ii) why different limits for some particle-size groups e.g. > 40% clay?

p.49 (4) - explanations of weighted average please.

6.3 Supplementary differentiae

(i) Is not 5% too low a limit for significant proportions of coarse fragments? Suggest 20%

(ii) If these criteria applied to the C and E horizons of soil (i.e. the parent material as understood before) or to a horizon immediately above a lithological discontinuity there would be no need for the threefold division of soil on p.50.

(iii) Designation of rock types

a - ultramafic; substitute ultrabasic - serpentine and picrite are ultrabasic rocks

p - pelites; omit 'more or less metamorphised'

g - redundant - group with f

(iv) Deep stoneless soils; recommend that r is merged with d.

d is a much bigger group than r and embraces a wide range of situations.

z not clear; are soils formed in clayey drifts to 90 cm. to be regarded as the same group as clayey soils formed in 'solid' materials in situ?

p.54 Heading should be "other mineralogical differentiae".

8. Climatic Classification

Is the division 'perhumid' so called advisedly? There is a 'cool superhumid' group later on. Why not 1/bt/dZx (p.5) indicating that three dimensions of the co-ordinate classification are being used?

Concluding Comments

Other groups and subgroups can exist in the pedological classification which Brian has not codified.

(i) Where does the Hook series go? Is it a gleyed argillic brown earth?

(ii) There are now 59 subgroups listed in the text. How many more has Brian in mind?

(iii) What is the missing figure in 6.3 (2) p.50?

Strongy
(iv) The use of the word significantly) does not contribute much to definitions unless some measure of significance is given see pp. 13, 15, 23, 25, 37, 45 and 52.