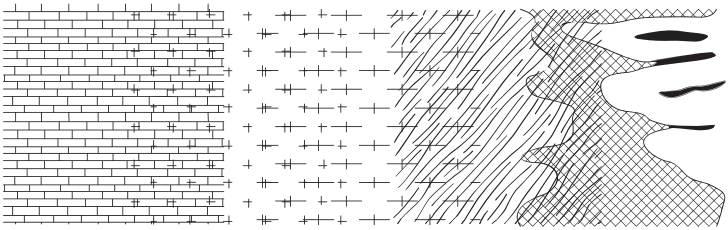


LITHO_BOOK

/LITHOLOGY

The lithology of a rock unit is a description of its physical characteristics visible at outcrop, in hand or core samples or with low magnification microscopy, such as colour, texture, grain size, or composition. It may be either a detailed description of these characteristics or be a summary of the gross physical character of a rock. It is the basis of subdividing rock sequences into individual lithostratigraphic units for the purposes of mapping and correlation between areas.

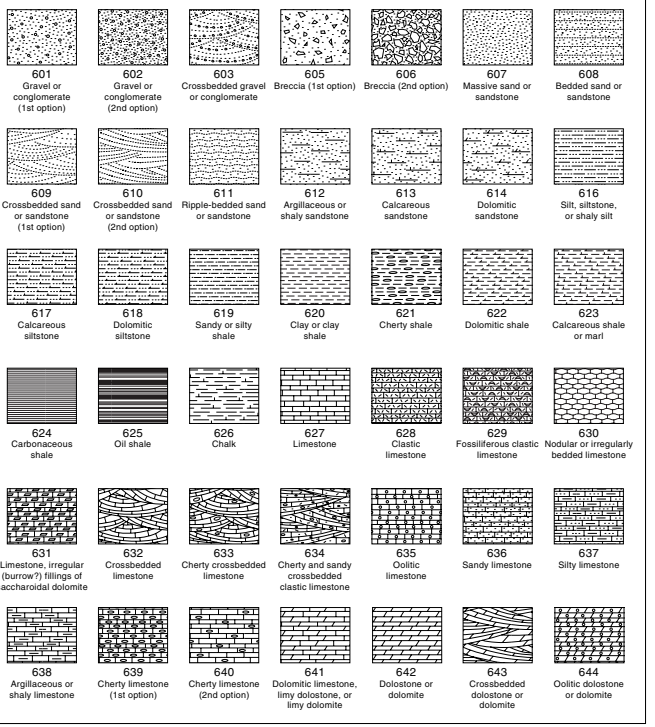
The patterns displayed here are lithologic patterns, usually reserved for use on stratigraphic columns, sections, or charts in geological graphics. These patterns has been found in the FGDC Digital Cartographic Standard for Geologic Map Symbolization, prepared in cooperation with the Geologic Data Subcommittee of the Federal Geographic Data Committee by the U.S. Geological Survey, 2006.

/PATTERNS

37—LITHOLOGIC PATTERNS

[Lithologic patterns are usually reserved for use on stratigraphic columns, sections, or charts]

37.1—Sedimentary-rock lithologic patterns

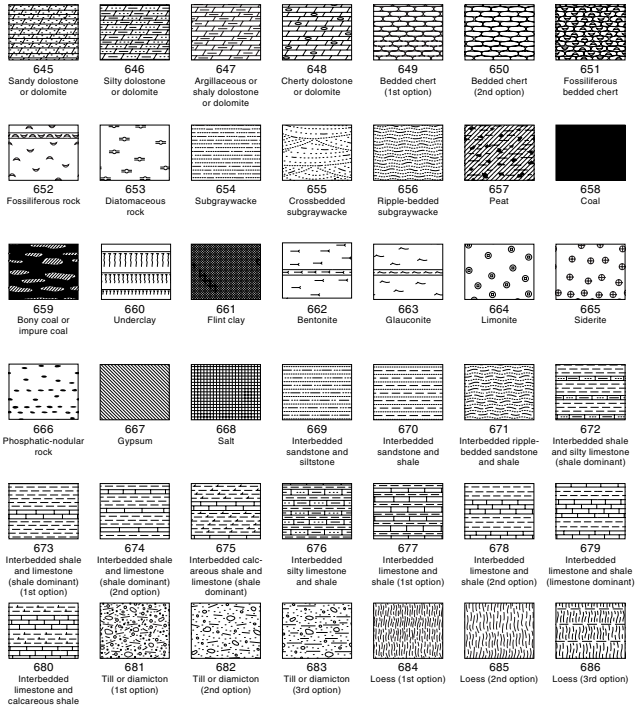


*For more information, see general guidelines on pages A-i to A-v.

37—LITHOLOGIC PATTERNS (continued)

[Lithologic patterns are usually reserved for use on stratigraphic columns, sections, or charts]

37.1—Sedimentary-rock lithologic patterns (continued)



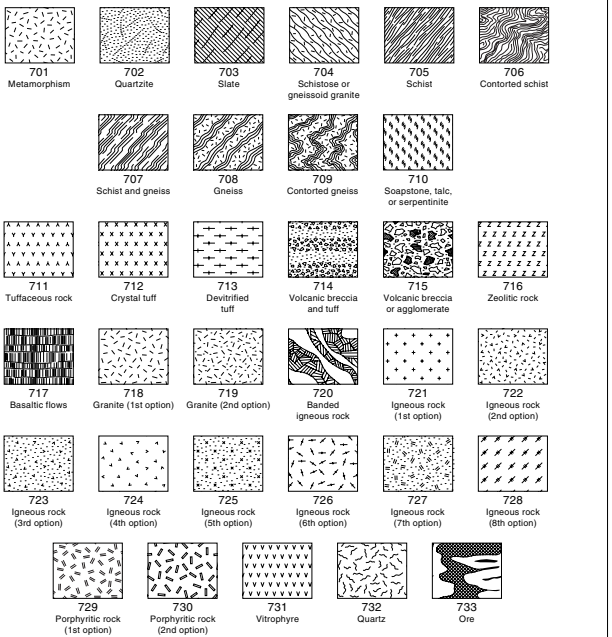
*For more information, see general guidelines on pages A-i to A-v.

Federal Geographic Data Committee (Doc. No. FGDC-STD-013-2006) U.S. Geological Survey Techniques and Methods 11-A2
FGDC Digital Cartographic Standard for Geologic Map Symbolization (PostScript Implementation) DOWNLOAD this Illustrator EPS file: AI8 / CS2

37—LITHOLOGIC PATTERNS (continued)

[Lithologic patterns are usually reserved for use on stratigraphic columns, sections, or charts]

37.2—Metamorphic-rock, igneous-rock, and vein-matter lithologic patterns



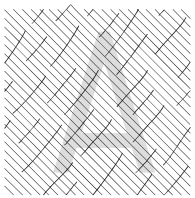
*For more information, see general guidelines on pages A-i to A-v.

/TYPEFACE

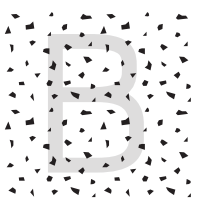
Litho Typeface est une police de caractères basé sur les motifs lithologiques utilise par les geologues americains. Les matieres principales correspondent a un glyphe qui leur est propre. La Litho transforme les motifs scientifiques conventionnels en veritable ecriture digitale et en propose une relecture.

Dans l'hypothese de l'Anthropocene, quels genre de motifs laisse(ra) l'homme dans les couches terrestres futures?

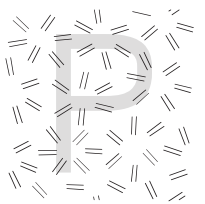
Que se passe-t-il typographiquement si ces couches se plient, se detachent, se recombinent, se tordent?

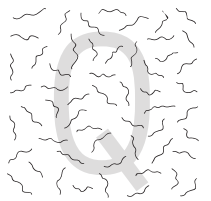


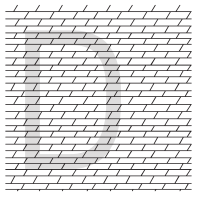
Slate

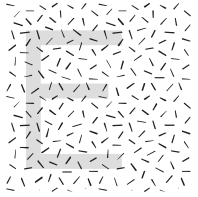


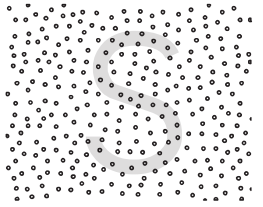
Breccia

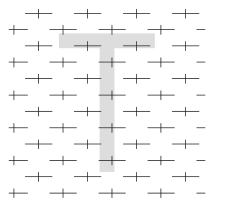


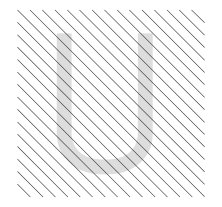


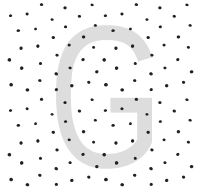


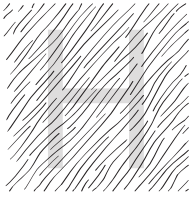


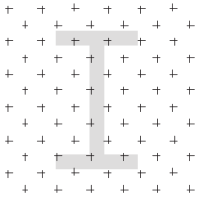


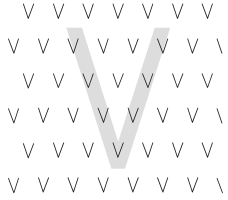


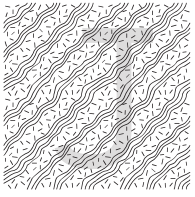


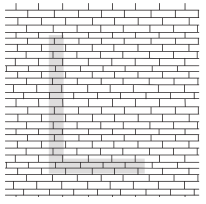


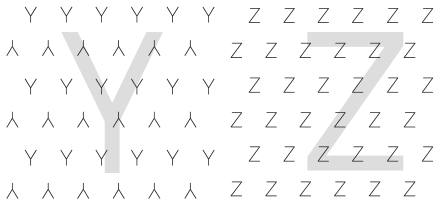


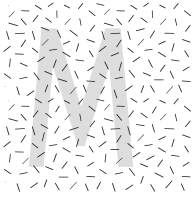


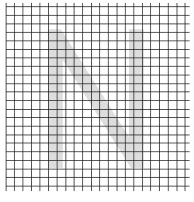


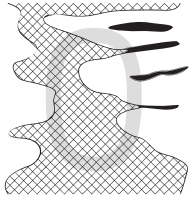


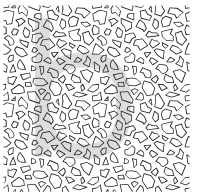
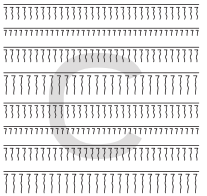
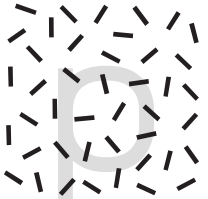
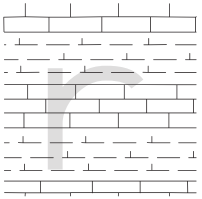
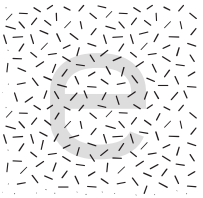
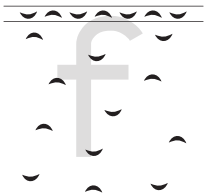
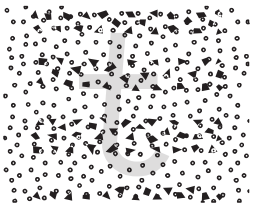
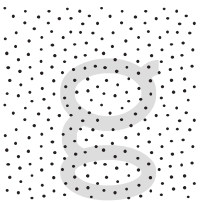
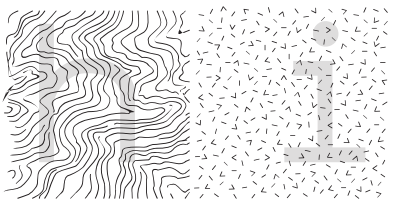
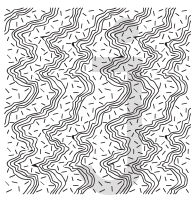
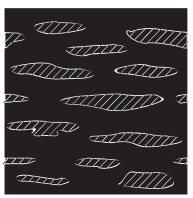
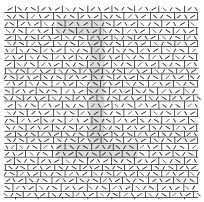
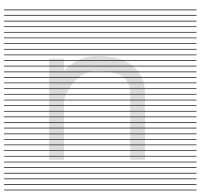
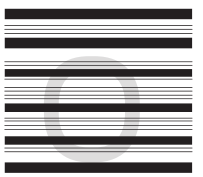


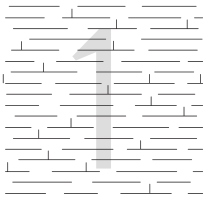
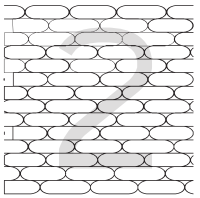
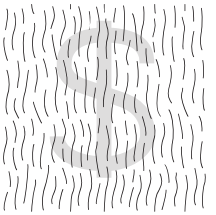
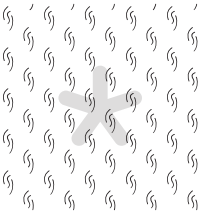
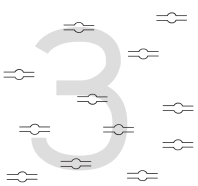
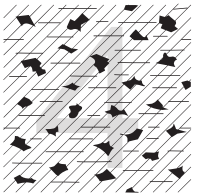
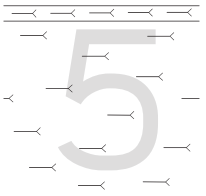
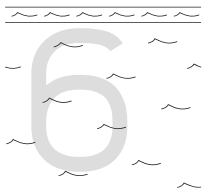
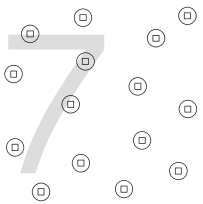


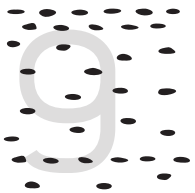






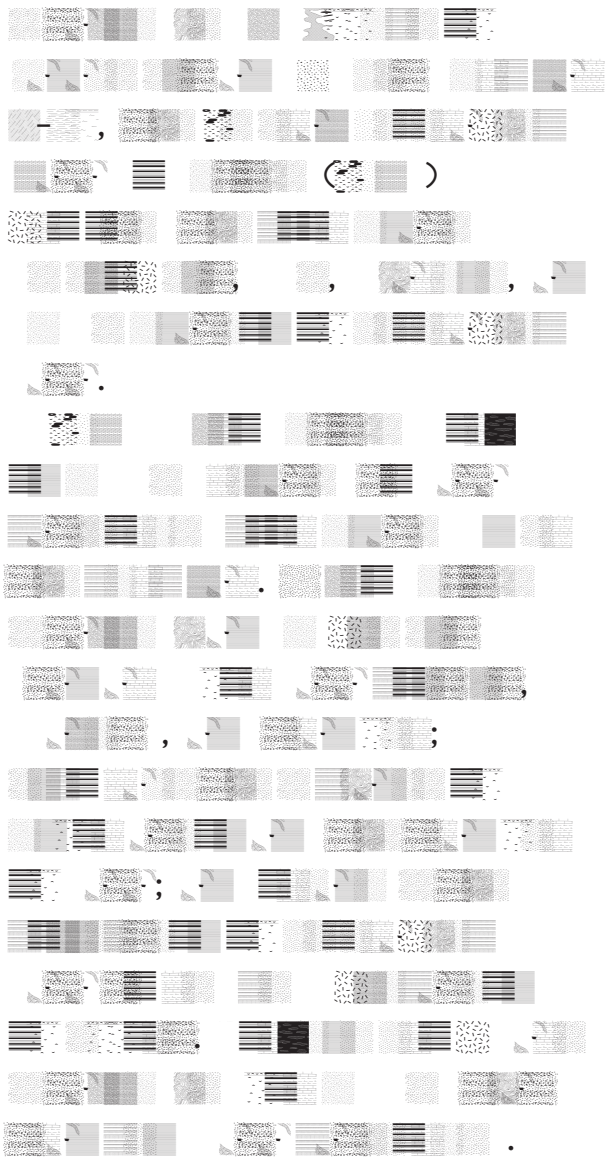


















Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

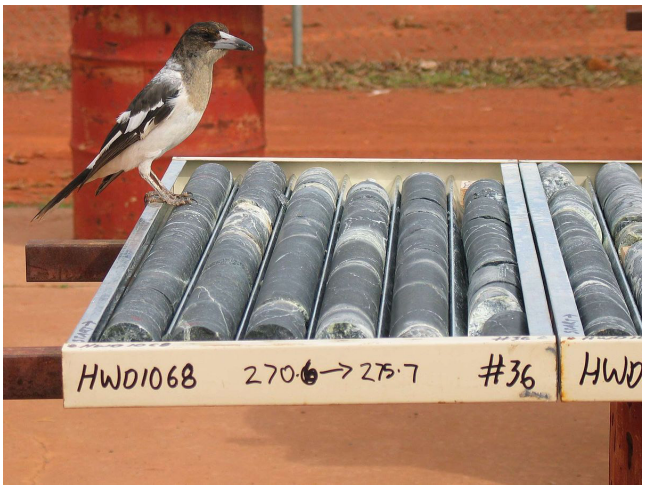


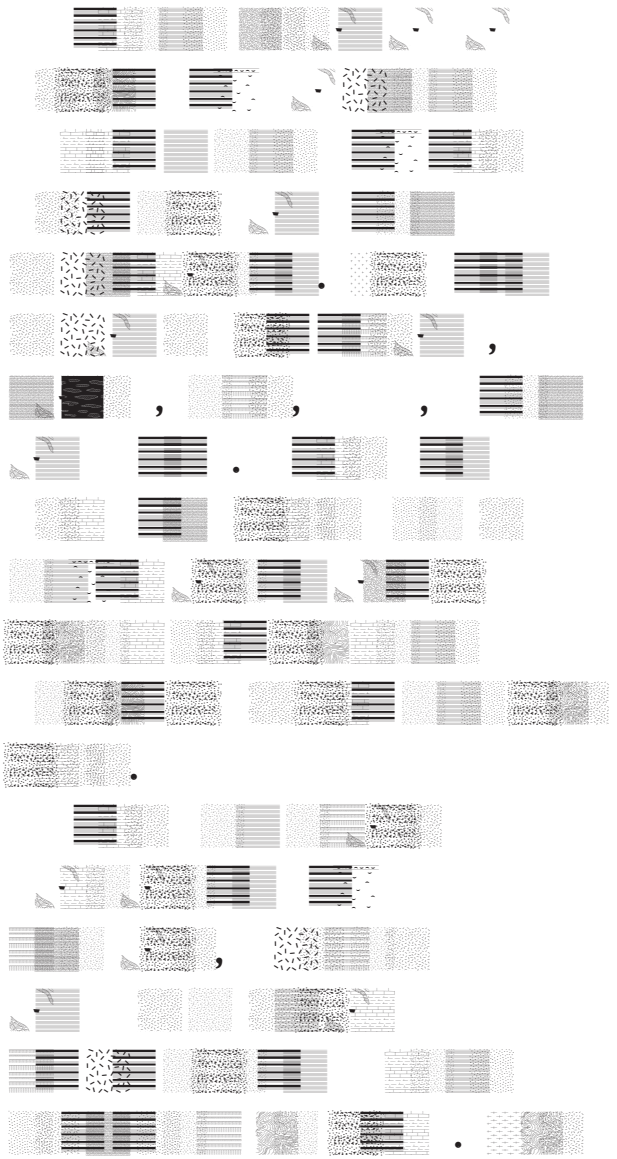
Coring began as a method of sampling surroundings of ore deposits and oil exploration. It soon expanded to oceans, lakes, ice, mud, soil and wood. Cores on very old trees give information about their growth rings without destroying the tree.

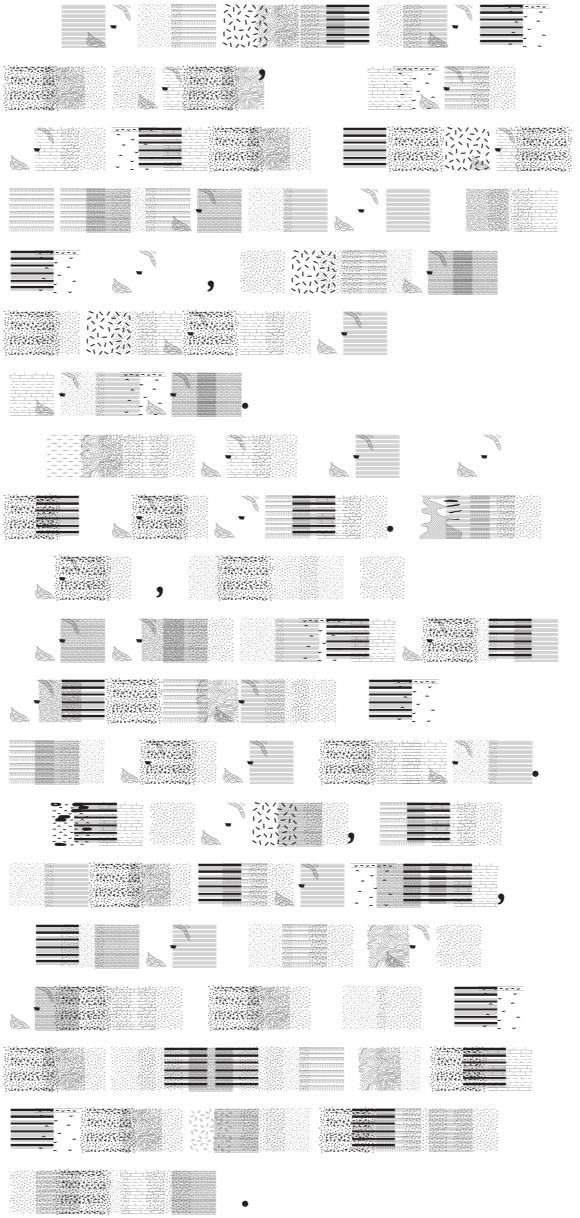
Cores indicate variations of climate, species and sedimentary composition during geologic history. The dynamic phenomena of the Earth's surface are for the most part cyclical in a number of ways, especially temperature and rainfall.

There are many ways to date a core. Once dated, it gives valuable information about changes of climate and terrain.

For example, cores in the ocean floor, soil and ice have altered the view of the geologic history of the Pleistocene entirely.







GEOTECHNICAL DESIGN

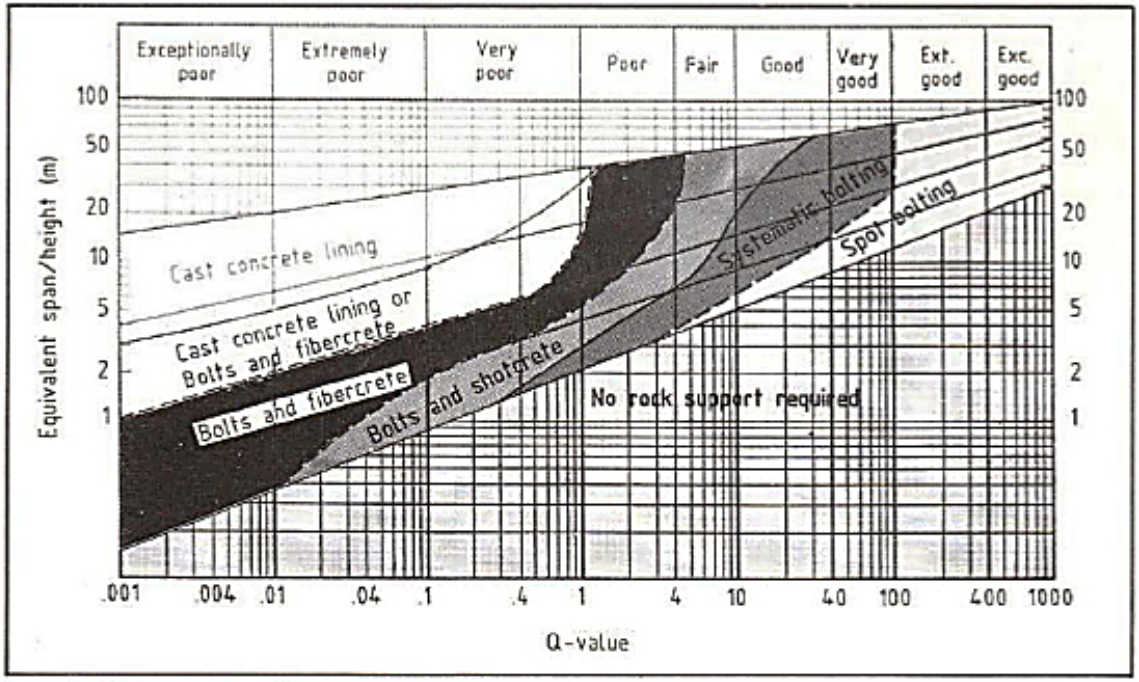


Figure 1. Synthesis of Q-system tunnel support recommendations updated to include fibre-reinforced shotcrete (after Grimstad et al 1986).

The rapid development of Norway's hydroelectric potential during the 1970s and early 80s, and major road tunnels during recent years, has had a significant influence on tunnel design work undertaken by the Norwegian Geotechnical Institute (NGI). Field investigations for some 1,200 km of tunnels, support design for 900 km and construction supervision for 600 km (both drill-and-blast and tunnel-boring machine) have set their mark on both the level of experience and on the design methods developed at NGI.

Norwegian tunnels are beset by diverse problems during drivage, such as occasional major water inflows, stress-induced slabbing and rock-bursting, unstable clay-bearing jointed rock with notable joint persistence, major faulting and zones of severe swelling clay. This great variability is reflected in the huge numerical range of rock qualities (from 0.001 to 1000), described in the NGI Q-system now used worldwide. Figure 1 shows a recent (1986) update and a new feature - 'S(fr)'.

Q-SYSTEM B AND S(FR) REINFORCEMENT

Moreover, the initially unreinforced shotcrete gives poor protection to mesh-fixing personnel.

In poor ground, or in a major excavation such as the 60m span Olympic ice-hockey cavern to be described later, it is usual to check the performance of the B + S(fr) support by convergence measurements or by MPBX extensometer installation. B + S(fr) has been used for at least a decade and gives superior advance rates and personnel safety. It is also the major component of final rock support in large caverns and tunnels through difficult ground.

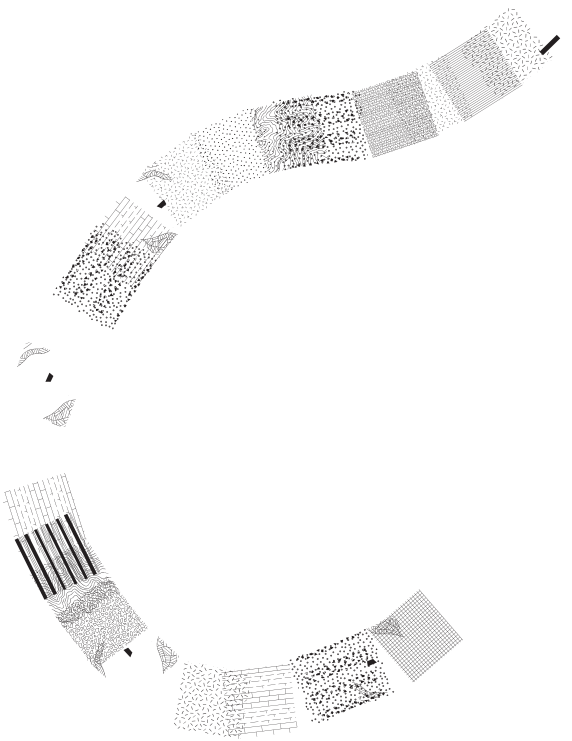
ROCK MASS VARIABILITY

To those familiar with the Q-system method of rock-mass classification[2] the following six numbers (selected from hundreds of thousands of alternative combinations) communicate a

data can be combined with subsequent data, and manipulated in PC-based spreadsheet format. In the case of the ice-hockey cavern cited earlier, sets of histograms were produced from preliminary mapping in existing, nearby excavations, and subsequently combined with the results of Q-logging of 250-m of drill core[3]. This data base provided cavern support designers with preliminary indications of rock reinforcement needs. The system has since been used for mapping the distribution of Q- values in the arch of the huge cavern and confirming the prognoses obtained from geophysical studies. These studies are described later.

PREDICTING ADVANCE RATES

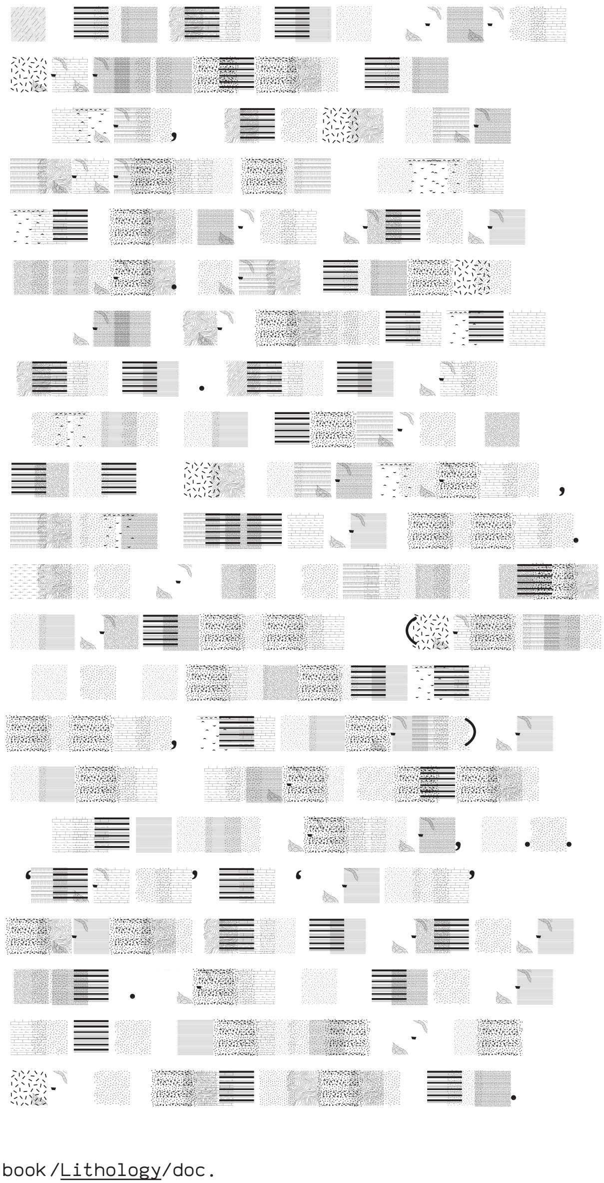
Nature abhors a straight line

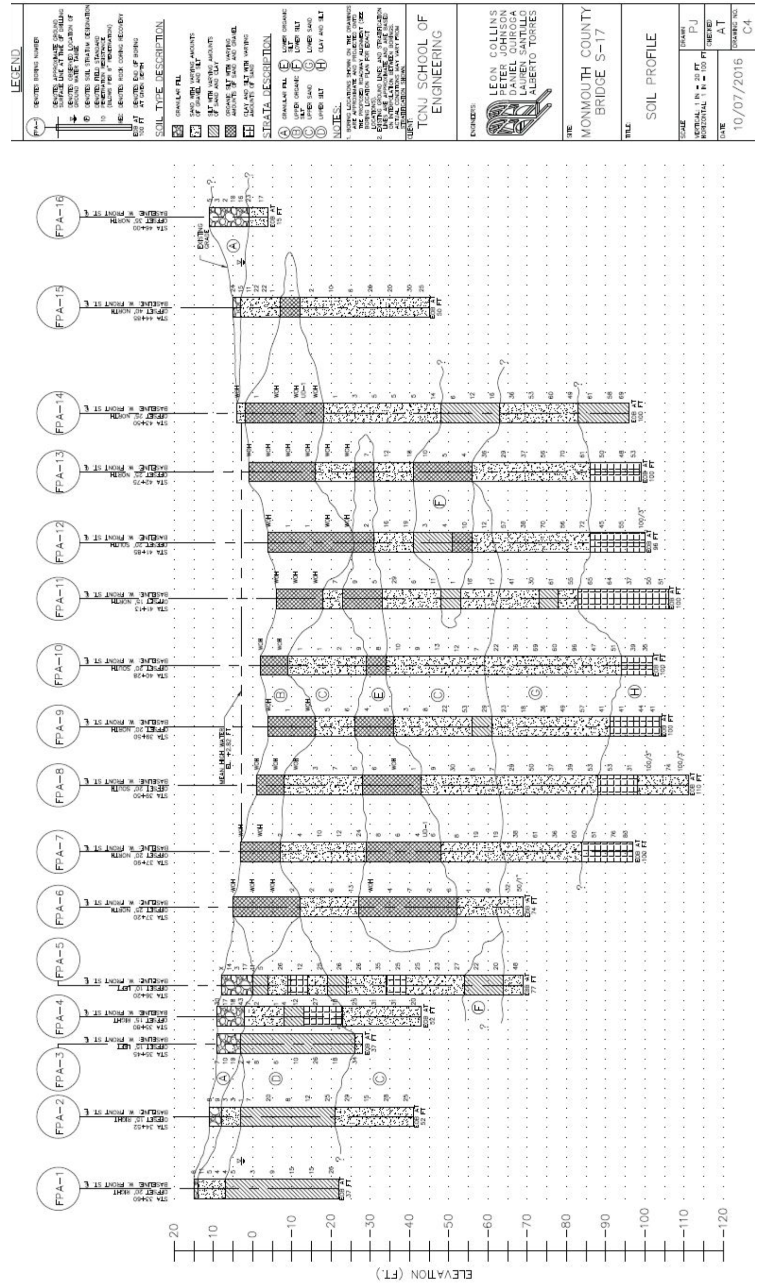


/LITHOGRAPHY

Lithography is a method of printing originally based on the immiscibility of oil and water. The printing is from a stone (lithographic limestone) or a metal plate with a ball grained surface. It was invented in 1796 by German author and actor Alois Senefelder as a cheap method of publishing theatrical works. Lithography can be used to print text or artwork onto paper or other suitable material.

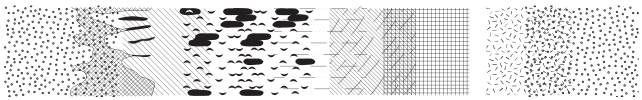
Lithography originally used an image drawn with oil, fat, or wax onto the surface of a smooth, level lithographic limestone plate. The stone was treated with a mixture of acid and gum arabic, «etching» the grease content of the drawing material into the pores of the stone and chemically creating grease reservoirs. The open stone (without drawing) was affected by the gum arabic creating a thin gum layer that would then attract water. When the stone was subsequently moistened, these gummed areas retained water; an oil-based ink could then be applied with a roller sticking only to the original drawing. The ink would finally be transferred to a cotton fine art paper sheet, producing a printed page. This traditional technique is still used as a fine art medium today.



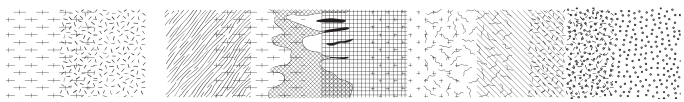

LEGEND
SOIL TYPE DESCRIPTION
STRATA DESCRIPTION
NOTES:
TCNJ SCHOOL OF ENGINEERING
LEON COLLINS
PETER JOHNSON
DANIEL QUIROGA
LAUREN SANTULLO
ALBERTO TORRES
MONMOUTH COUNTY BRIDGE S-17
SOIL PROFILE
10/07/2016
C4
FPA-1
FPA-2
FPA-3
FPA-4
FPA-5
FPA-6
FPA-7
FPA-8
FPA-9
FPA-10
FPA-11
FPA-12
FPA-13
FPA-14
FPA-15
FPA-16
ELEVATION (FT.)

LE LANGUAGE N’EST PAS UN INSTRUMENT,
C’EST UNE « GÉOLOGIE », UNE FORCE
DE LA NATURE ET DE L’HISTOIRE.
L’ŒUVRE ARTISTIQUE EST UN CORPS
VIVANT. IL FAUT LAISSER PARLER
LES ŒUVRES QUI SONT COMME DES CHOSES
DE LA NATURE, QUI SONT DES CORPS.

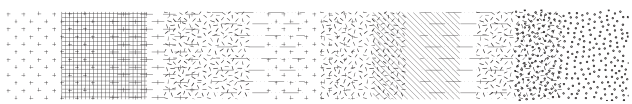
– HENRI BAUCHAU



SOUFFRANCES

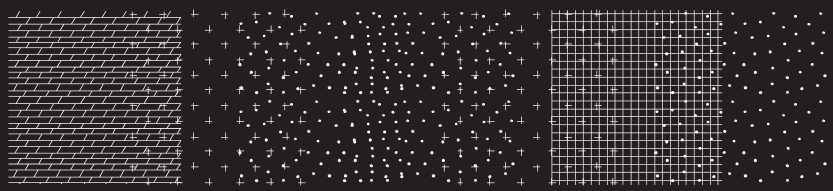


TECHTONIQUES

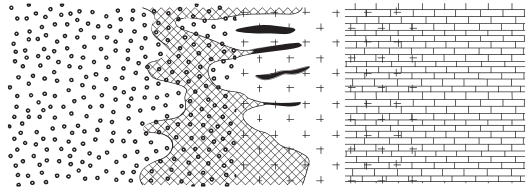


INTERIEURES

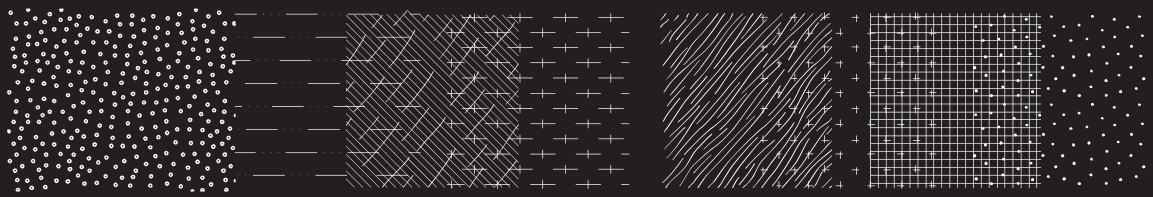
DIGGING



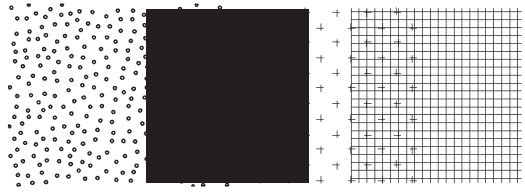
SOIL



SCRATCHING



SKIN



Nature abhors a straight line