EARTH 471
Mineral Deposits

Exploration 1:
Ore Chimney Core logging

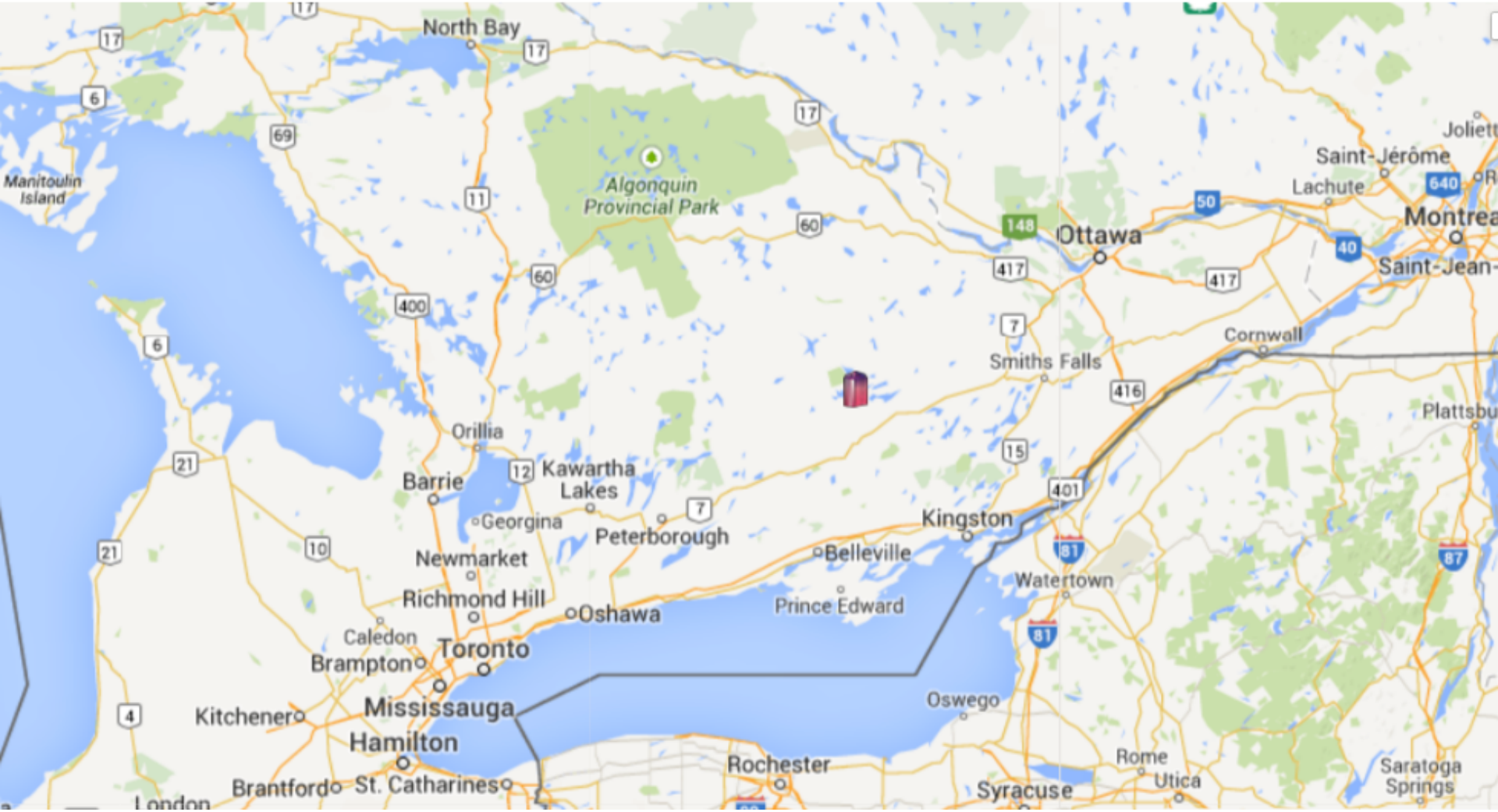
EARTH 471 exploration project

Stage 1: Log the core from the Ore Chimney Gold Mine in Ontario (this week and next week).

Stage 2: Using assay data, calculate a resource estimate for the Ore Chimney Mine (in three weeks). *NOTE THAT PDAC IS NEXT WEEK*

Stage 3: Prepare a report summarizing the geology, exploration history, resource estimates, feasibility for present mining and recommendations for future exploration (in three weeks).

Ore Chimney mine – N of Belleville ON



Local Geology

BISHOP CORNERS FORMATION

15a Muscovite schist, garnet-biotite schist, quartzite.
15b Quartzite.
15c Quartzite-pebble conglomerate; intercalated quartzite, pebbly quartzite, micaceous quartzite.
15d Polymictic conglomerate.
15e Impure calcitic marble, calcareous quartzite.

UNCONFORMITY

FELSIC TO INTERMEDIATE INTRUSIVE ROCKS

SKOOTAMATTA STOCK[f]

14 Monzonite, syenite, quartz syenite, porphyritic syenite.

MAZINAW LAKE GRANITE AND SMALL POTASSIC INTRUSIONS

13 Granite, granite porphyry.

CARBONATE METASEDIMENTS

9a Dolomitic marble, typically massive.
9b Calcitic and subordinate, intercalated dolomitic marble, thin-layered; minor siltstone, wacke.
9c Layered marble with numerous mafic and intermediate sills and dikes.
9d Interlayered marble and wacke.

CARBONATE AND CLASTIC METASEDIMENTS

8 Intercalated dolomitic marble, dolomitic siltstone, carbonate wacke, wacke, minor calcitic marble.

SULPHIDE-GRAPHITE METASEDIMENTS

7 Pyrite, and/or pyrrhotite-bearing, graphitic schist; black chert.

CLASTIC INTERMEDIATE TO FELSIC METASEDIMENTS

6 Volcanic wacke, siltstone, tuffaceous wacke, minor volcanic conglomerate.

CLASTIC MAFIC METASEDIMENTS

5 Interflow metasediments in basaltic rocks.

METAVOLCANICS[h i]

RHYOLITIC METAVOLCANICS

4 Rhyolite lapilli-tuff, tuff-breccia, ash-flow tuff; rhyolite, rhyolite porphyry and granite porphyry dikes and sills.

DACITIC METAVOLCANICS

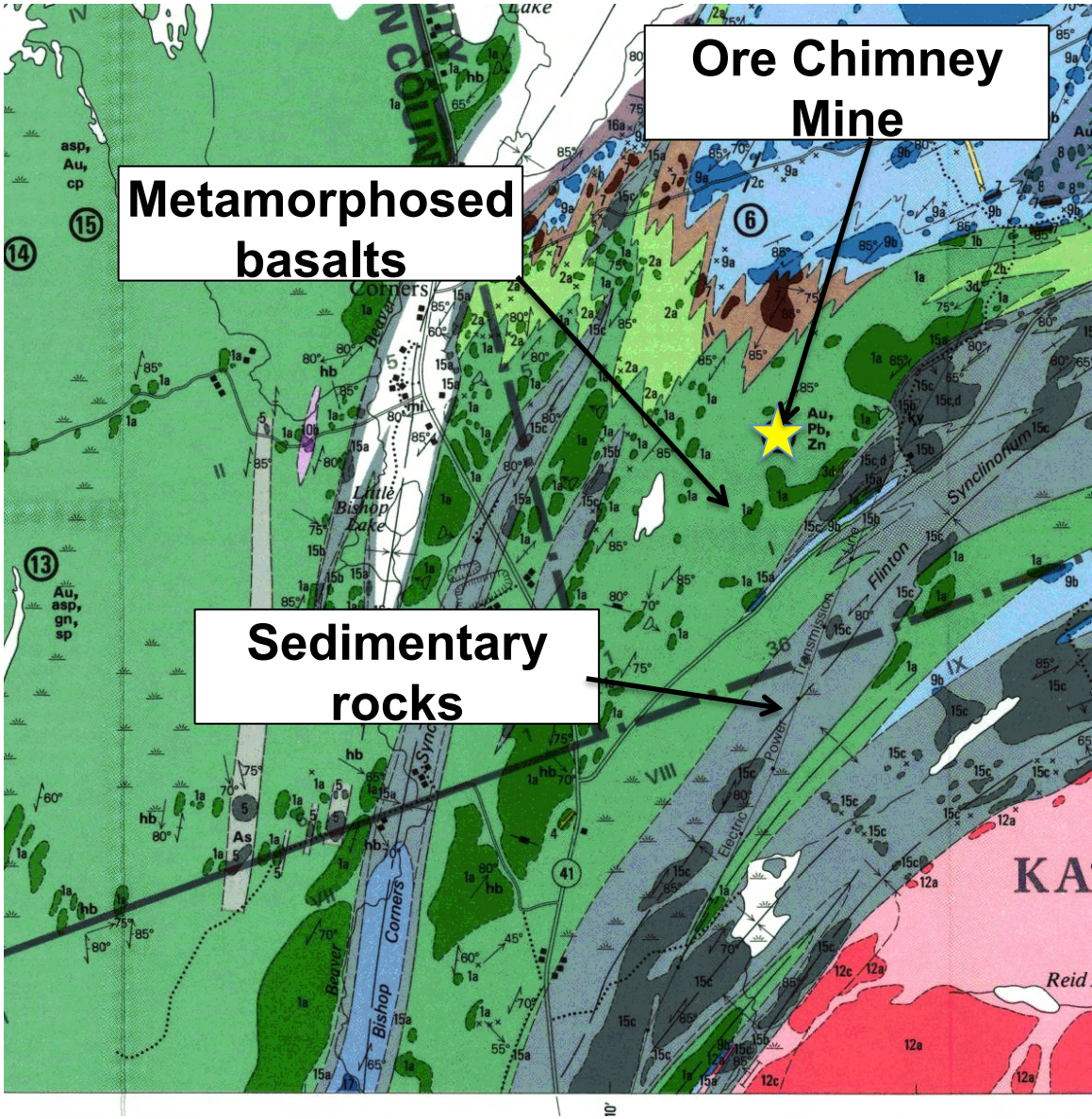
3a Dacite flows, flow breccia
3b Dacite lapilli-tuff, tuff-breccia, layered tuff.
3c Carbonate volcanic breccia.
3d Dacite, dacite porphyry dikes, sills, small intrusions.

ANDESITIC METAVOLCANICS

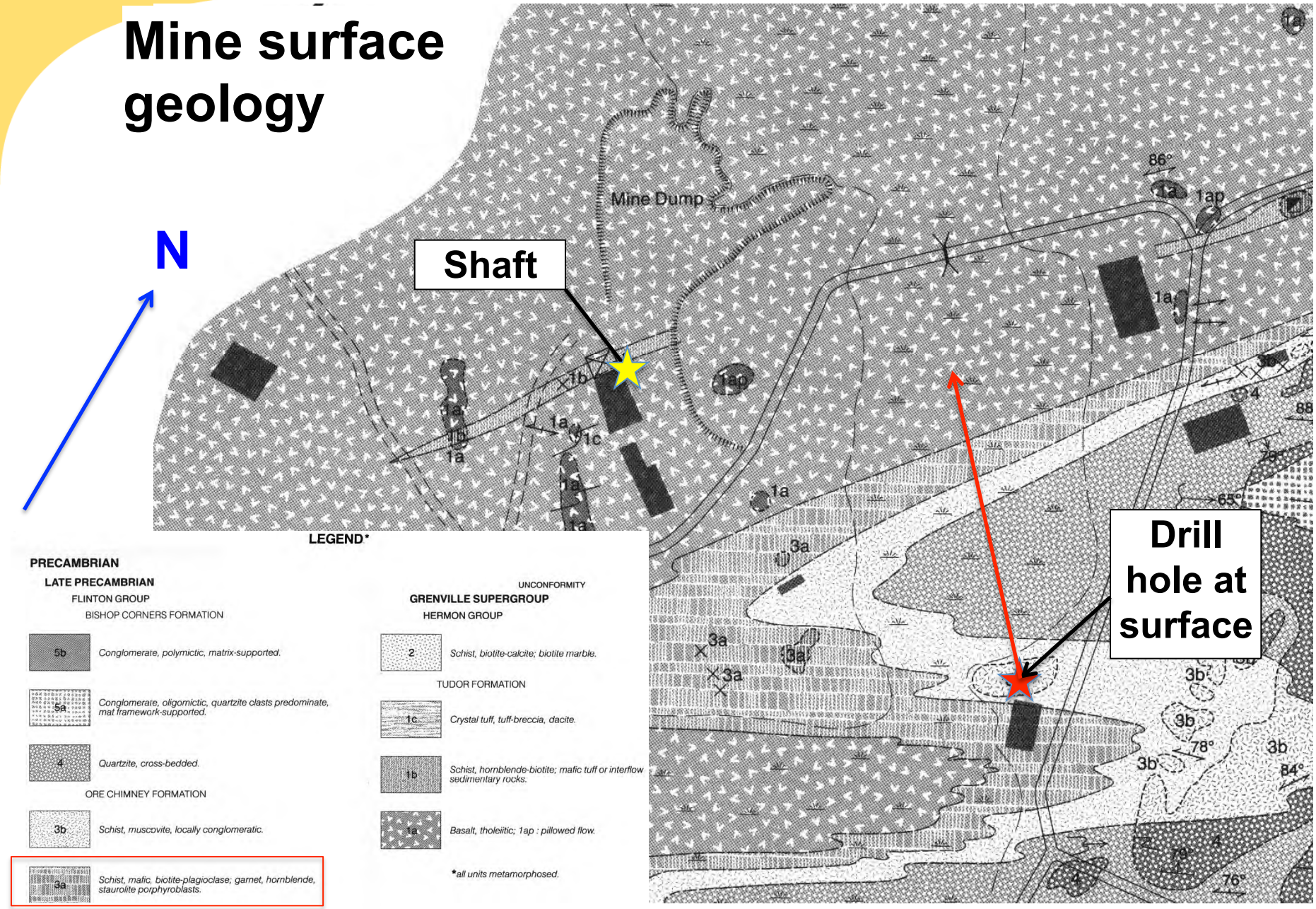
2a Andesite flows, flow breccia, autoclastic breccia.
2b Andesite tuff-breccia, lapilli-tuff; mass-flow deposits.
2c Andesite, andesite porphyry dikes, sills.
2d Andesite agglomerate, tuff-breccia.

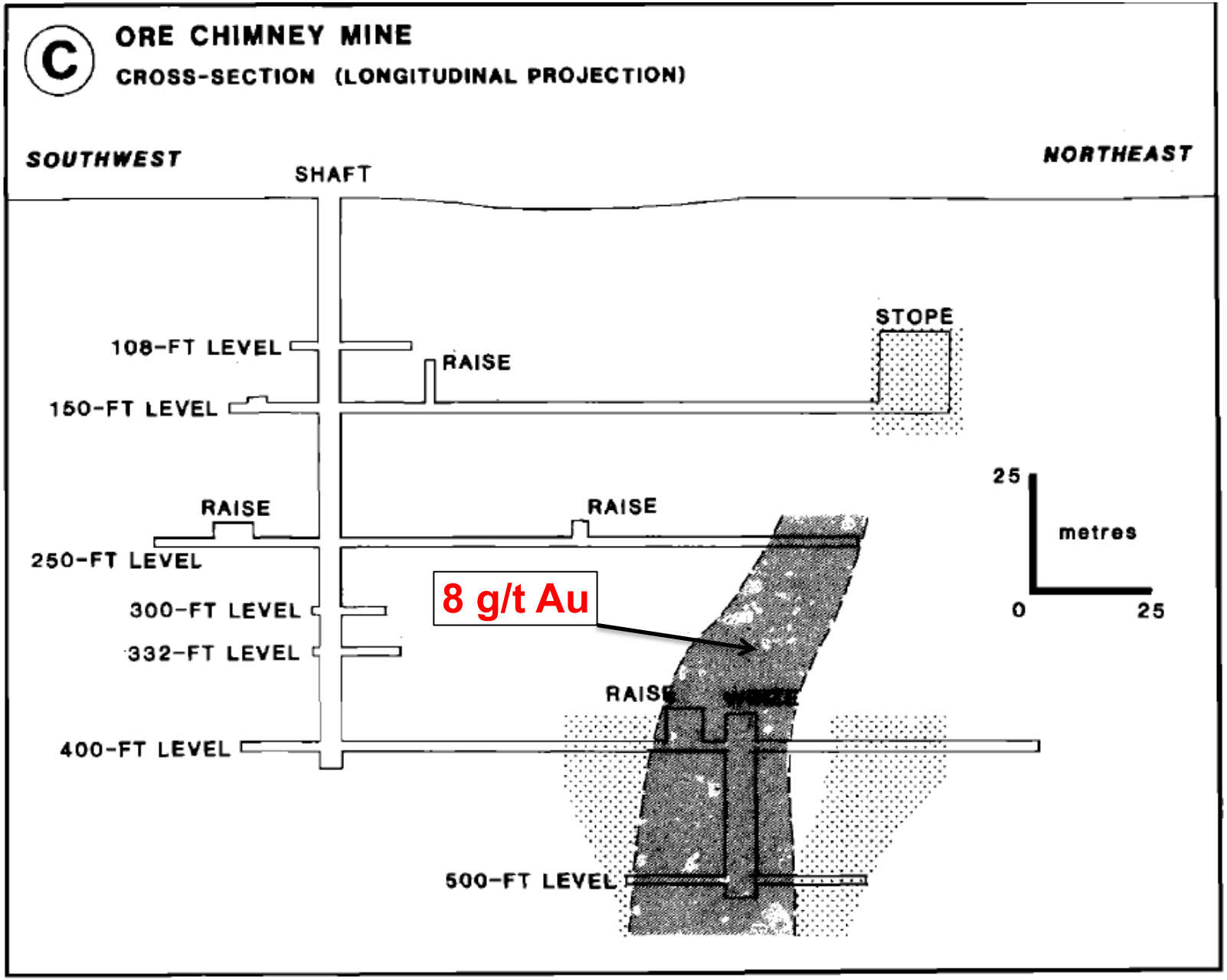
BASALTIC METAVOLCANICS

1a Basalt flows, pillow lavas, flow and pillow breccia, autoclastic breccia; amphibolite, hornblende schist.
1b Basalt, basaltic andesite flows, breccia, pillowed in part, typically plagioclase-phyric; amphibolite.
1c Diabase, amphibolite dikes and sills, small gabbroic intrusions.



Mine surface geology




C
ORE CHIMNEY MINE
CROSS-SECTION (LONGITUDINAL PROJECTION)
SOUTHWEST
NORTHEAST
SHAFT
STOPE
108-FT LEVEL
RAISE
150-FT LEVEL
RAISE
RAISE
250-FT LEVEL
300-FT LEVEL
332-FT LEVEL
8 g/t Au
RAISE
400-FT LEVEL
500-FT LEVEL
25
metres
0
25

Geology overview

Gold hosted by vein system that intrudes metamorphosed basaltic rocks of the Ore Chimney Formation

Underlain by the Tudor formation (mafic metavolcanic rocks)

Overlain by the unconformable Flinton group metaconglomerate

All units are steeply dipping to the north on the property (although nearly isoclinal folds occur regionally)

Ore minerals include pyrite, galena, sphalerite and chalcopyrite with gold, silver, lead and zinc mineralization

A standard drill log form

Ontario — Ministry of Northern Development and Mines / Ministère du Développement du Nord et des Mines

Drill Log
Journal de forage

Page _____ of / de _____

Under section 8 of *the Mining Act*, this information is used to maintain a public record. / Aux termes de l'article 8 de la *Loi sur les mines*, ces renseignements serviront à tenir à jour les dossiers publics.

Hole ID / Forage n°	Claim No. / N° de concession minière	Township/Area / Canton

Name of Land Holder / No. de	Azimuth °	Dip / Inclinaison °	End of Hole (m) / fin de forage (m)	Overburden Depth / profondeur des morts-terrains

Drilling Company / Compagnie de forage	Logged by *(print)* / Inscrit par *(écrire en lettres moulées)*	Core Size / Dimensions de la carotte	Collar Elevation / Elévation du collier

Date Hole Started *(yyyy/mm/dd)* / Date de commencement du forage *(aaaa/mm/j)*	Date Completed *(yyyy/mm/dd)* / Date d'achèvement *(aaaa/mm/j)*	Date Logged *(yyyy/mm/dd)* / Date d'inscription au journal *(aaaa/mm/j)*	Location of Core Storage / Endroit où la carotte est stockée

DRILL HOLE COLLAR LOCATION CO-ORDINATES / COORDONNÉES DU COLLIER DE TROU DE FORAGE

UTM / MTU

Datum: ☐ NAD 27 ☐ NAD 83
Zone: ☐ 15 ☐ 16 ☐ 17 ☐ 18
Northing / Ordonnée:
Easting / Abscisse:

Latitude / Longitude
degrees/minutes/seconds or decimal values
degrés/minutes/secondes ou valeurs décimales

Datum: ☐ NAD 27 ☐ NAD 83
Latitude:
Longitude:

Footage/Avancement From/De	Footage/Avancement To/À	Rock type / type de roche	Description (Colour, grain size, texture, minerals, alteration, etc.) / Description (Couleur, granulométrie, texture, minéraux, transformation, etc.)	Planar Feature Angle * / Angle des caractéristiques planes	Core Specimen Footage / Longueur en pieds des carottes prélevées	Your Sample No./ N° d'e hantillon du prospecteur	Sample Footage / Niveau de prélèvement de l'échantillon *(en pieds)* From/De	Sample Footage / Niveau de prélèvement de l'échantillon *(en pieds)* To/À	Sample Length / Longueur de l'échantillon	Assays / Analyses minéralurgiques	

*For features such as foliation, bedding, schistosity, measured from the long axis of the core. / *Exemples de caractéristiques : foliation, schistosité, stratification. L'angle est mesuré par rapport à l'axe longitudinal de la carotte.

Mining Lands Website: http://www.mndm.gov.on.ca/mndm/mines/lands/default_e.asp
Site Web de la Section des terrains miniers : http://www.mndm.gov.on.ca/mndm/mines/lands/default_f.asp

0204 (01/2006)

What to look for?

- Colour
- Mineralogy (ore and gangue)
- Rock types (changes are most important)
- Magnetic?
- Evidence of alteration
- Composition, thickness and proportion of vein material
- Planar fabrics (angle to core?)

Planar features in core

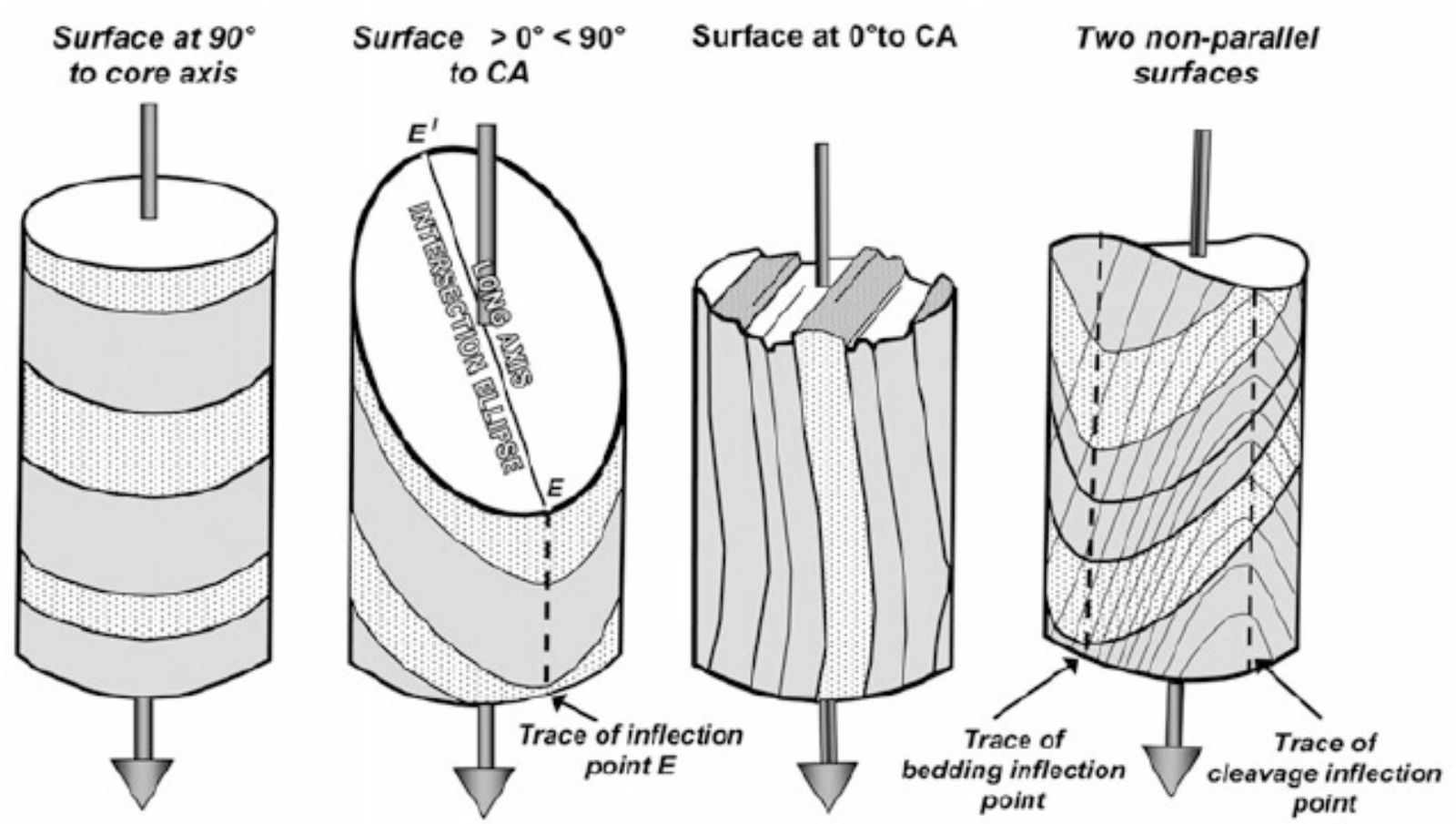


Fig. 7.3 How planar surfaces look in drill core

Linear features in core

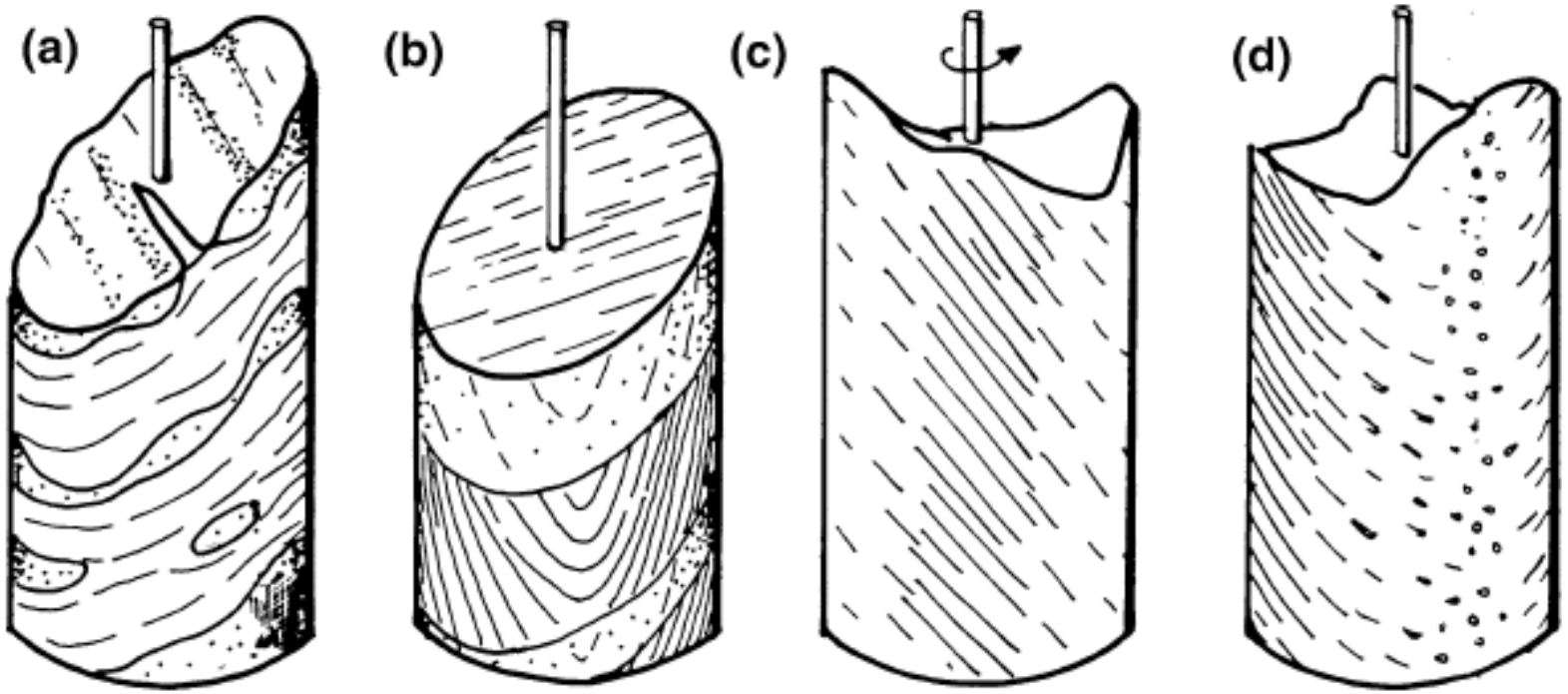


Fig. 7.5 How lineations look in drill core. At (a), tectonic flattening and stretching has produced *rodded shapes* (mullions) in a once-planar bed. At (b), lineation is defined by the intersection of bedding and cleavage and is exposed where the core has broken across a bedding surface. (c) and (d) illustrate a fine penetrative metamorphic mineral lineation. Note the different appearance of the lineation as the core is rotated about its long axis

Faults in core

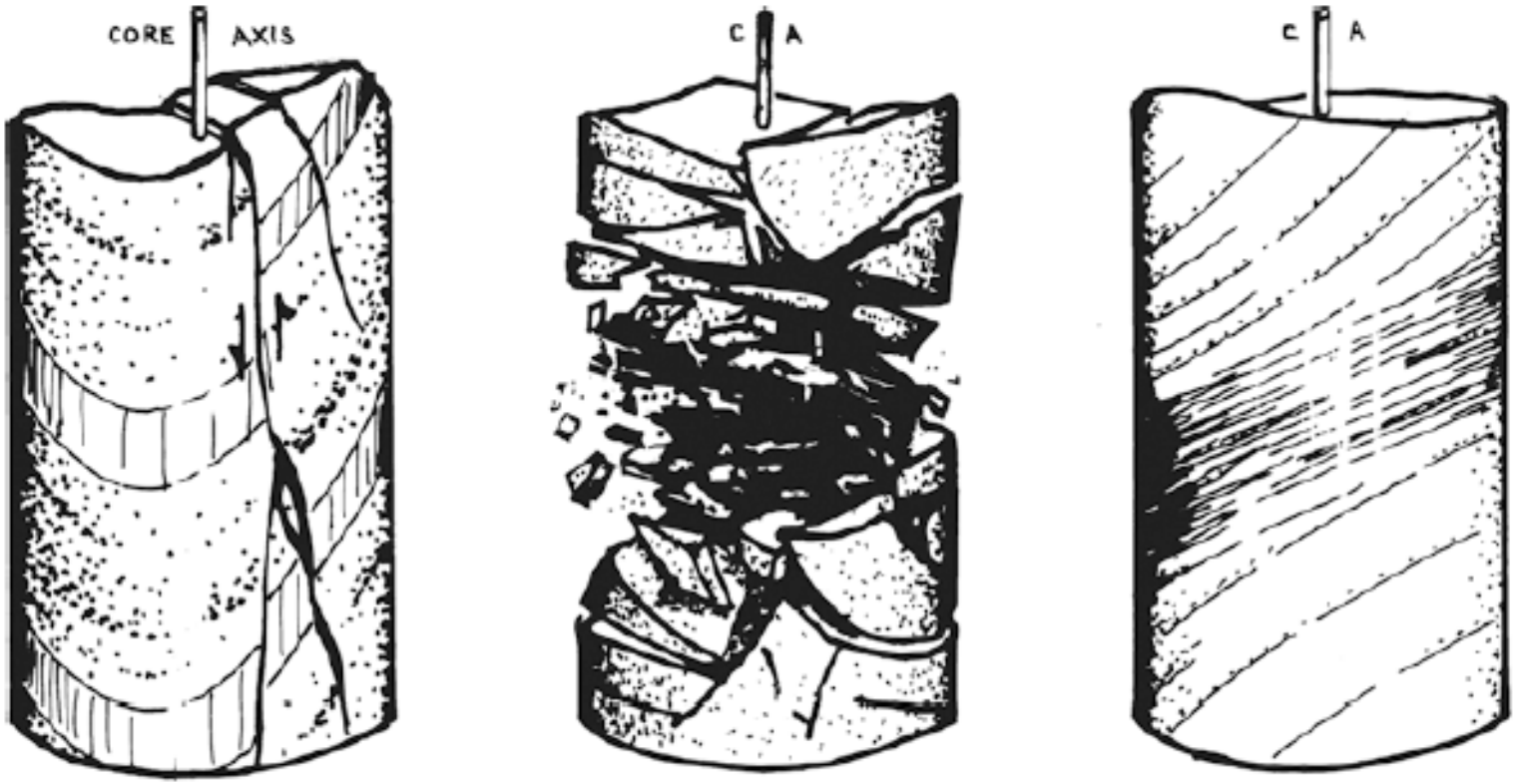


Fig. 7.4 How faults look in drill core. On the *left* is a small brittle fault. Large brittle faults (*centre*) produce broken disoriented core and their attitude cannot generally be measured. On the *right* is a small ductile fault. These are usually coherent structures that provide information on their attitude and, if you are lucky and the core is oriented, the sense of displacement across them

Always remember that a core is a small sample of the geology!!

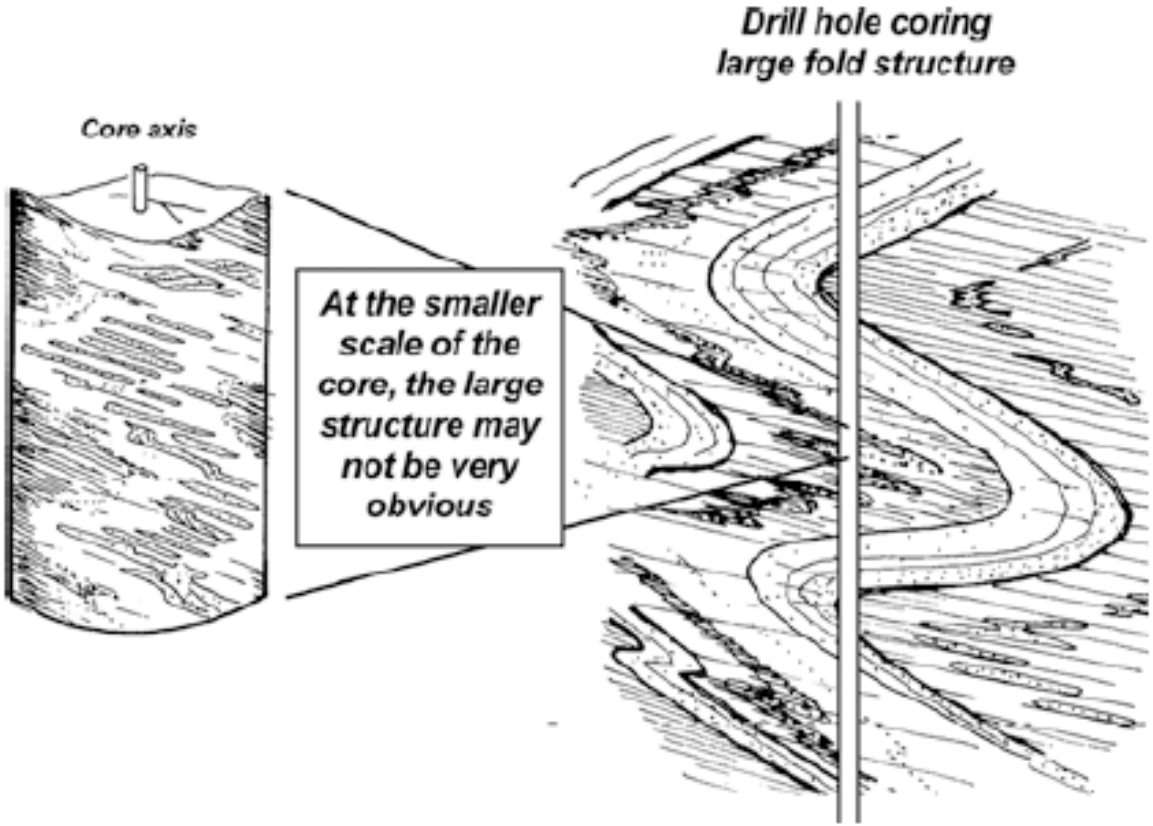


Fig. 7.9 Because of the small size of drill core, identifying large structures is difficult. Here a strong cleavage in a fold hinge obliterates earlier bedding surfaces in a small piece of core. Only by carefully observing progressive changes over a longer section of core can the true structure be identified