JAN 1997

TWO HOURS

STRATIGRAPHY FINAL EXAM NAME.....

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TOT	

Congratulations! I though you'd like to know that this is the toughest final 214 paper I have ever set

Answer all FOUR sections: Read the questions carefully.

SECTION 1 15% of marks

True or false? Tick the appropriate box and if *FALSE* give a brief explanation why.
1.5 marks a question. Where statement is false marks will be deducted for an inaccurate correction.

		T	F
1.	Repeated Bouma sequences give asymmetrical cycles	☐	☐
2.	With very fine sands (below 0.5 mm) under rising energy levels ripples are overlain by upper flow regime plane bed sediments.	☐	☐
3.	Small grains undergo more rapid chemical weathering than do large grains.	☐	☐
4.	Tangential contact between the foresets and bottomsets is generally due to the presence of dissolved material being deposited.	☐	☐
5.	A grain twice the size of a 2 phi grain will be 3 phi.	☐	☐
6.	Rhombohedral packing reduces porosity to a minimum	☐	☐
7.	Interior basins are unlikely to be filled with coarse clastic material.	☐	☐
8.	Transgression generally causes a fining of sediments over the shelf.	☐	☐
9.	Concurrent range zones are based on two or more species whose time ranges must have overlapped.	☐	☐
10.	Lahars are common on the flanks of mafic volcanoes	☐	☐

SECTION 2. (20% of marks)

Answer briefly FIVE of the following in your answer books (4 marks each)

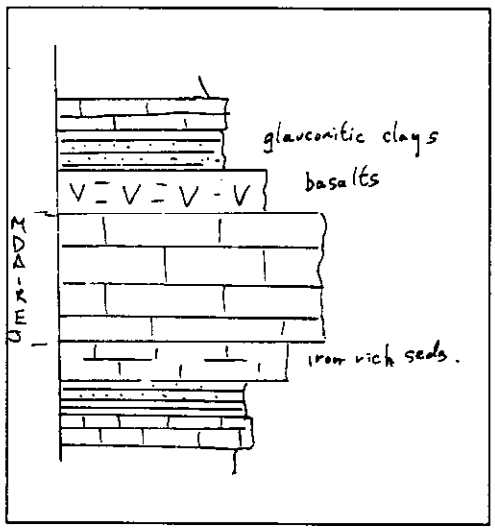
1) What fluids transport sediments in the natural world? Give the main differences between them.
2) What does a coarsening upwards sequence in terrigenous clastics mean? Why is it different in limestones?
3) What were the weaknesses in the geosynclinal view of basin formation?
4) Why can the end Jurassic have absolute ages of 134 and 144 ma according to different authors?

5) Why are there problems in comparing grain size distribution values based on sieving and on thin section measurement?
6) How can a limestone that is impermeable shortly after its formation gain porosity with time?
7) Why are erosive bedding features such as sole marks most commonly found on the base of the overlying sedimentary units?
8) Why is taking the mean of paleocurrent azimuths not a good idea?
9) Why is coring a well desirable? If so, why is it so little practiced?
10) Why are radiometric dates sometimes conflicting when there have been a number of periods of subsequent tectonism?

SECTION 3: 35% of marks

Answer all parts

1) The early Aptian Mdairej Limestone Formation is a major marker unit in Lebanon as it forms a prominent pale cliff with corals and rudist bivalves. Both the underlying and the overlying beds are clayey and sandy units with nearshore to deltaic faunas.

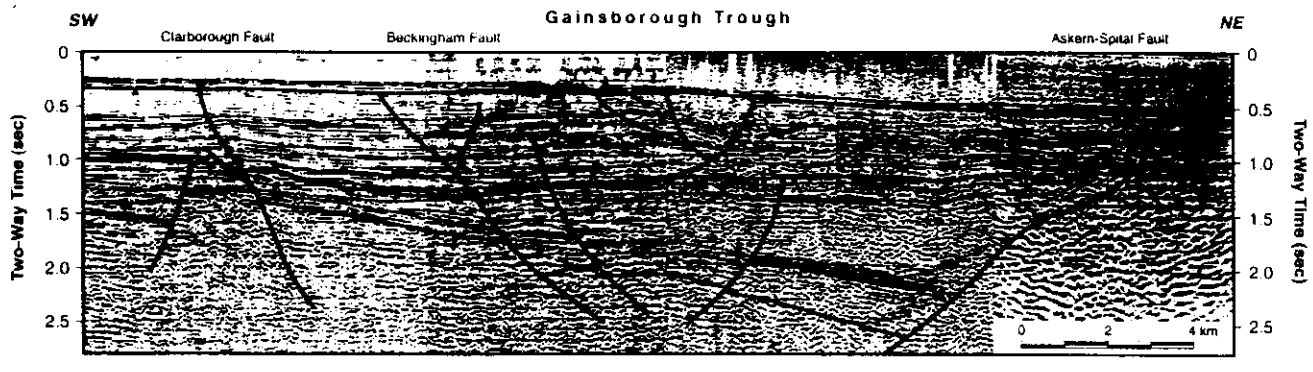


a) Explain why this unit is there. What does it represent? To what extent can we consider it to be isochronous?

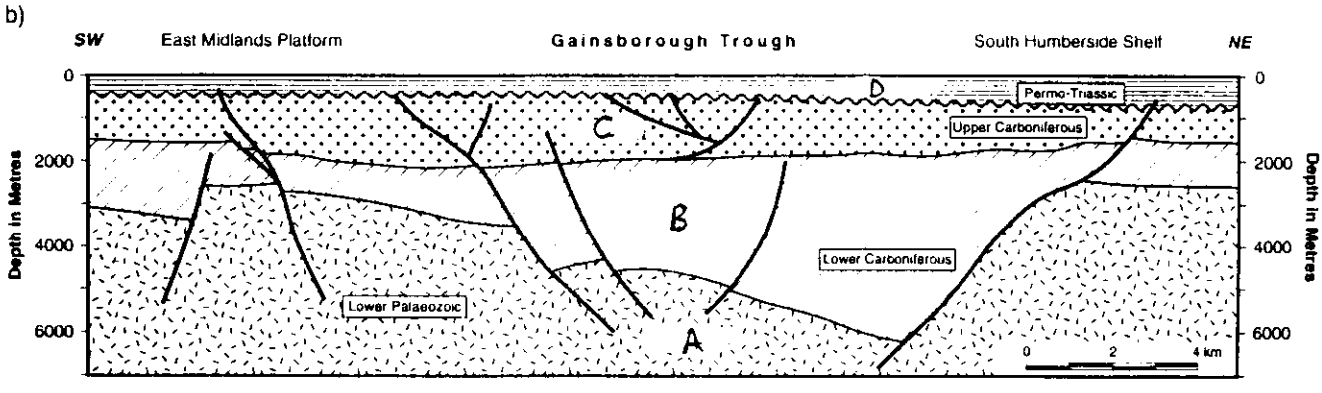
b) How might you try to identify whether or not it was isochronous? You should come up with a number of ways. Some help may be given by examination of the diagram.

c) There are similar units across North Africa and western Europe all of the same early Aptian age. What reasons can you suggest for this?

2) Examine the attached figure of part of onshore UK. .



b)



a) How was the top diagram obtained?

b) Why are the structures on the top diagram displaced when traced onto the bottom diagram?

c) How is the lower diagram produced?

d) Consider the depositional pattern of sequences A, B C and D. Give an outline history of what has happened in the area.

e) What has happened since the Permo-Triassic?

3) Examine the attached diagram. What does this tell us about the Boothia Uplift in the Devonian?

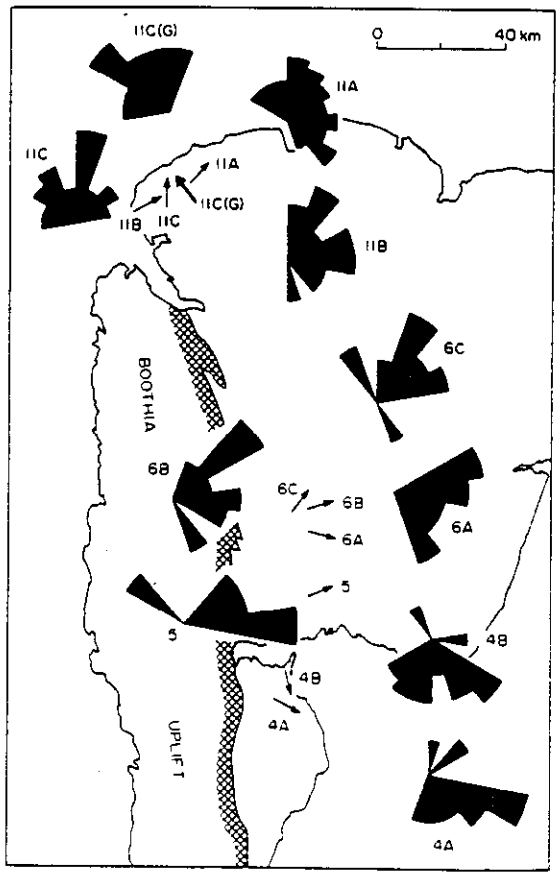


Fig. 5.53. Typical regional paleocurrent map, showing current rose diagrams and vector mean arrows for each of 10 outcrop areas, with station numbers. The map represents 165 field readings. Devonian fluvial sandstones, Somerset Island, Arctic Canada (Miall and Gibling, 1978).

SECTION 4 (30% of Marks)

Answer four questions (7.5 marks each)

1. List the similarities between trace fossils and a) fossils, b) sedimentary structures. Why is a study of both (if present) not a bad idea?

2. Imagine a book called the *The Stratigraphy of Lebanon.* What should it have in it?

3. Most basins form in the early part of the Wilson Cycle. A few form at the end. Give examples of both types. Why are red beds and evaporites common in both early and late Wilson Cycle basins?

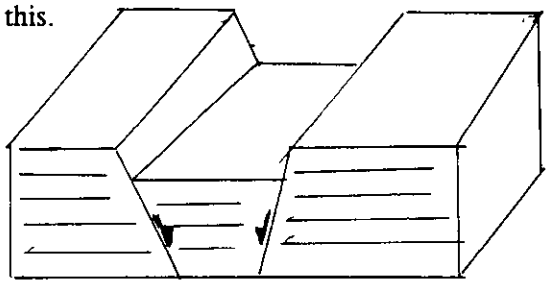
4. How do basins form in strike-slip regimes? What suggestions do you as to why few giant oil fields been found in such basin settings?

5. Colour is generally a useless property for minerals. How significant is it for sedimentary rocks? Give examples of its use as a paleoenvironmental indicator.

6. How has terrigenous clastic sedimentation has been modelled in the laboratory? How has our understanding been helped as a result? Why are carbonates much harder to treat in this way?

7. How would you go about producing isopachs for the Chouf Sandstone in Lebanon. What use might it be?

8. Older models of rifts looked like this. How do modern models differ?



9. How globally synchronous do you think 4th or 5th order cycles are? Does it matter?
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10. If an alien came to Earth and demanded to see the Jurassic System what would you show him/her/it?

Thanks

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