(A) QUICK REAPPRAISAL of PART 1 ("Roots in Antiquity")

What do we learn from this survey of the science and philosophy of Antiquity? This is of course a big topic on which everyone has their own opinions. What I think is most important to remember here is the following:

(i) The introduction of certain essential elements of what later became modern science first appeared in the Greek world. One of the most important of these was the creation of deductive mathematics, with the introduction of the remarkable axiomatic method, and very deep insights and inroads into both Euclidean geometry and number theory. However, apart from Archimedes, little attempt was made to apply this to the real world.

(ii) Another essential element introduced by the Greeks was the whole corpus of disinterested speculative philosophy that they created. It is impossible to separate this from the creation of mathematics and of other strains of thought relevant to science. What is most important in all of this is the kinds of questions they asked, and the view of how one should understand the world that they created. The influence of their very formulation of these questions, and the conceptual framework it led to, runs so deep in contemporary culture that it is hard to think outside it. The questions that were important to Greek philosophers, and which decisively influenced the subsequent evolution of human thought (particularly scientific thought) included:

- What is the nature of the "*ultimate reality*"? Is it manifest to us or is something beyond the sensible world? Is it eternal, unchanging? What kind of 'structure' does it have?
- What is the distinction between the Natural and Supernatural? Why is there such a distinction, and what is the essential nature of each? What is the 'stuff' making up the Natural world? What is the stuff (if any) from which the supernatural is made?
- Why is there order in the universe? What kinds of order are there, and what kind of fundamental principles underlie this? How can this order be described? Where does it come from, and what brought it about?
- What *drives* the universe- what causes change in the universe, and what is changing? And how is change related to the idea of an ultimate reality?
- How does one acquire knowledge and understanding of the world, particularly of the 'ultimate reality'? To what degree can we be sure of what we find? What is the structure of knowledge and of thought?

These questions are fundamental and they are heady stuff. By asking them, and providing interesting and sophisticated answers to them, the Greeks created the whole structure of subsequent enquiry. In short, they created the foundations and the language of what became modern science, and we have been building on these ever since. There have of course been important modifications on the way, but these have always been to the superstructure on top of the foundations- the foundations themselves have rested fairly secure.

(iii) The emphasis on rational thought, and the use of logical argument, was also crucial- despite the determined onslaught of faith and unreason in subsequent centuries, this tradition survived and eventually led Western thought back to science. The patterns and style of such argument are now in many ways very much more advanced, particularly with the rise of mathematics. But the original fusion, of rational thought and argument with mathematics, itself came from the Greeks.

(B) REFERENCES to PART 1

The major source of references for background reading in this course should be (i) references suggested to you by the few citations I give below, and (ii) references that can easily be found with a few minutes of web research. The citations I give here are only intended as a springboard to the larger literature (which is indeed vast).

Note that many of the subjects discussed in this section are under constant re-evaluation by historians, particularly as new evidence comes to light.

(1) General History references

History of the World, J.M. Roberts (O.U.P., 1993)
Europe- a History, N. Davies (Pimlico, London, 1997)

(2) General Philosophy References

The Encyclopedia of Philosophy, ed. P Edwards, in 8 volumes (Macmillan, NY, 1967)
A History of Western Philosophy, B. Russell (Allen & Unwin, London, 1946)

(3) Hellenistic History

Greece before History, C. Runnels, P.M. Murray (Stanford University Press, 2001)
Ancient Greece, W.H. Hale (ibooks, NY, 2001)
A History of Greek Philosophy, P. Levi (Viking, London, 1985)
The Greek World, 479-323 BC. S. Hornblower (Methuen, London, 1983)
The Histories, Herodotus (Penguin, London, 1954)
History of the Peloponnesian War, Thucydides (Penguin, London, 1954)

(4) Greek Philosophy

A History of Greek Philosophy, W.K.C. Guthrie, in 6 volumes (CUP)
Plato, the collected dialogues, ed. E. Hamilton, H. Cairns (Princeton University Press, 1961)
The basic works of Aristotle, ed. R. McKeon (Random House, NY, 1941)

(5) Mathematics & Astronomy of Antiquity

The World of Mathematics, vol 1, Ed. J. Newman (Dover, NY, 1956)
The History of Mathematics, W.W.Rouse Ball (Macmillan, London, 1912)
Number Theory and its history, O. Ore (McGraw Hill, London, 1948)
A History of Astronomy, A. Pannekoek (Allen & Unwin, London, 1961)
The Exact Sciences in Antiquity, O. Negebauer (Copenhagen, 1951)
A History of Greek Mathematics, T.L. Heath, in 2 volumes (Clarendon, Oxford, 1921)