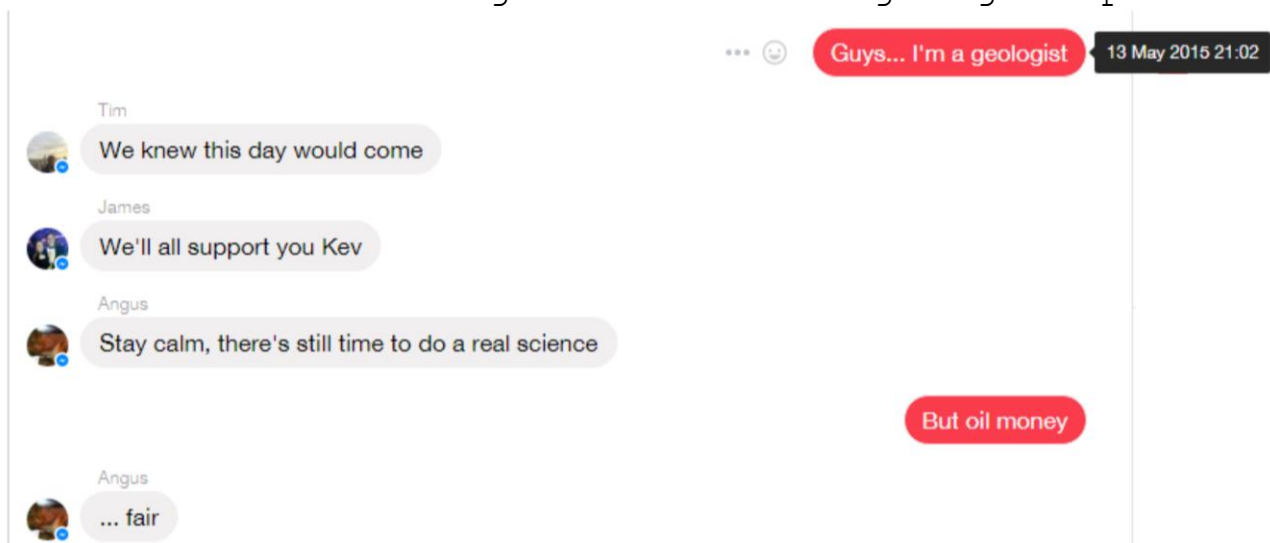


EARTH SCIENCES: An alternative path?

The Editor's thoughts on shifting degree plans.



The decision to change your plans at university should not be an easy one, but personal happiness should be valued above all else. That, and taking the piss out of your choices. Source: my Facebook conversations.

I'm gonna be honest with you. When I applied to read Natural Sciences at Corpus Christi College, Cambridge, I was set on becoming a chemist.

Many of you undergrads reading this will not have initially been geologists. In fact, you probably would not have considered Earth Sciences (ES) before joining Cambridge (shut up, Carrie). Chances are that you had a gap to fill as part of your 1A Natural Sciences course.

Sometime during Freshers' Week, you and the rest of the incoming 1A NatScis would have sat down in a room, where the DoSes came forward and make their subject's case to you. My DoS, Judith (who wrote an amazing piece for the TS last time, which you should check out if you haven't already) hurried in late from the rain. She put the case for ES in about three sentences. I wasn't overly impressed to be honest, but signed on anyway.

My definitive decision to switch came when I was revising for my exams in first year, having just returned from the Arran trip. It suddenly hit me that I just did not enjoy studying Chemistry anymore (and don't get me started on 1A Physics). ES was and is still a reasonably new subject, and that was what excited me the most about switching. At Part II one will be reading and

referencing literature that was only published in the past few years; some Part 1Bs will quite possibly be the first people to ever map their project area in detail.

My decision to do ES was one of my major life choices. Although I did announce it to my group of friends in a jokey manner (see above), it came with a feeling of starting from scratch. One quick email to my first-year Chemistry DoS (and one slightly passive-aggressive reply later), and I was an Earth Scientist.

However, what's always bothered me is why ES students mostly are former biologists, chemists, and physicists, and why we are so few compared to the other sciences. In this... 'thing' (as close to an opinion piece as *Thin Section* will ever get), I suggest a few reasons as to why this is the case.

'...a real science...'

Of course, tell a friend you're doing ES and they'll probably churn out the 'not a real science' line from *The Big Bang Theory*. Others may question how you're going to do with a degree based on the principle of 'you like rocks'. Inevitably, the question, 'what are you going to do with that' will be asked (in my case, by my first-year DoS).

Geology is not a real science, I'm afraid. Our field trips are us sat around campfires coming up with crazy ideas and telling spooky stories. Shell, BP, and the rest of 'em are giving us bucket-loads of cash to stare at shiny minerals for no purpose at all. Some say Dan McKenzie crafted the theory of plate tectonics with the intricate use of a Ouija board and half a bottle of whiskey (half of that statement is likely true, to be fair).

In all seriousness, Earth Scientists go through the procedure of crafting hypotheses, making observations, and then testing said hypotheses just like any other scientist. Geology is very much a science; the concept of 'real science' exists just for those in scientific circles with superiority complexes.

Some exposure ages can't be beryllium dated.

Why then are most of our cohorts crafted from former biologists, chemists, and physicists? Why are there so few organically-grown Earth Scientists in Cambridge?

It would be nice to put some actual numbers to this hypothesising, or at least get some estimates. So, with the help of Sarah Humbert and the ghost of Morag Hunter, I drew up the series of pie-charts shown below illustrating the rough numbers of students in each year group, and whether they continue taking ES for Part 1B and beyond. It seems that the limiting factor for Earth Scientists

in each year group is the number that take it as a 1A option. Those who take 1A ES are likely to remain in ES in 1B with a roughly 50% retainment rate, which is quite good for a 1A subject.

The number of 1As taking ES is hence limited by interest in geology before university, just like other NatSci subjects. Although Earth Science is offered at GCSE by WJEC¹, A level by WJEC and OCR, and as a Higher in Scotland, not all schools and sixth-form colleges offer Earth Science as an available course, unlike the 'big three'. Even the University acknowledges this; one does not need a background in Geology or ES specifically (just some out of the 'big three' are needed). A lot of people are not 'exposed' to geology, and may think of our subject as just rocks and oil. They may not realise that ES is the scientific mosaic that it is, and that geologists are not restricted to lives in the oil and gas sector.

Exposure therefore influences the NatScis taking ES in 1A and 1B. The number transitioning from Part 1B to II is also about 50:50 – this is probably due to those taking only single ES options then specialising in other branches in Part II and beyond. From Part II onward the retainment rate is expectedly high – those taking Part II generally continue to do Part III.

Quality or quantity?

"Geology... by the nature of the subject matter, ranks among the most 'descriptive', not the 'exact'"

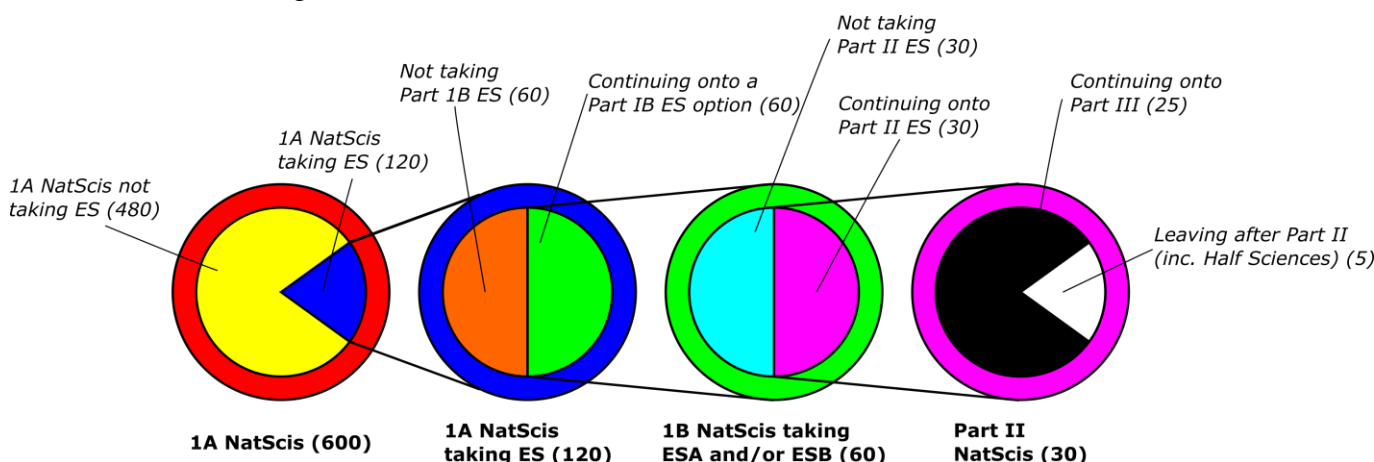


Diagram illustrating the number of NatScis in an average year group, and their likely progression through the NatSci course.

¹ WJEC is soon to be known as EDUQAS.

sciences. We are nevertheless free to inquire to what extent the quantitative element may legitimately enter to strengthen geological methods and add precision to the results."

Alfred Harker, 1927

A holistic view is taken when teaching ES in first year. The 'wide-but-shallow' nature of 1A could possibly put off some undergrads joining NatSci, as the qualitative nature of the 1A course means that it lacks complex maths that hardcore physicists enjoy tackling. Another direct factor of this is that written essays are used as a measure of understanding, rather than maths-based example sheets. Hence, 1A NatScis wanting a more mathematical approach to the Earth Sciences may be stuck writing essays until third- or fourth-year before diving into the maths.

Even then, the dark cloud of qualitative description can follow through into later years. ES can be immensely difficult to correctly quantify at times. The Earth, after all, is a large place, and processes can take millions and billions of years to occur. Geological properties are hard enough to estimate, let alone put a precise number to, and experimental tests for million-year processes come with immense uncertainty.

ES has always been forced to be grounded in reality rather than experiment as the Earth does not behave as a perfect system; there's no use making an intricate model if a fault doesn't appear where it should on a map. It's therefore not feasible to solve all Earth's problems with a few simple equations as would be possible perhaps in other scientific branches. It is this uncertainty that may deter some from going into ES.

Should I be a geologist?

A friend of mine once called me out for questioning why we, a bunch of geologists, were staring into a pond full of weeds on the South-West trip. "We're Natural Scientists," she replied. Thinking back on that, she was right – we all take

the same course in the end, so we shouldn't rate any one particular branch over the other.

However, sit through a course of ES and you'll realise why the University does not need a specific certification in Geology. ES effectively combines the 'big three' sciences in a way that allows them all to complement each other. As such, biologists, chemists, and physicists will all feel quite at home within some part of the ES family. ES is the crossroads of the natural sciences.

This is possibly why so many taking 1A ES as a side-subject end up taking it for 1B and beyond. It would be interesting to look at the relative proportion of self-declared biologists, chemists, and physicists who end up taking ES in 1A; however, this information is unlikely to exist, let alone be available. A variation in preference between the 'big three' sciences could perhaps confirm some of the suggestions I've put forward above as to why people do or don't take ES, such as how the non-mathematical nature of 1A ES compares to other 1A subjects.

With all this in mind, let's say you're in my boots this time two years ago, thinking to yourself, "should I do Earth Sciences? I'm not very good at it, and I've always been a chemist".

As with everything else in life, do what makes you happy. I'm just expressing my own views on why I switched; I don't intend to change yours. Whilst in 1A I got a higher mark in Chemistry than I did in Earth Sciences I just no longer had fun with it. At the end of the day, you, like I just did now, could draw up a list of reasons explaining to yourself why you should or shouldn't do what you want to do. But if you aren't having fun, or more importantly, aren't happy with the way your degree is going, then you should definitely work to change that.

And on the scale of millions of years, we can't spend too long sitting on the uncertainties in life.
