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Continuing complexity: The university careers of a scientific elite in relation to their class origins and schooling

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Abstract

We report on continuing research on the UK scientific elite, intended to illustrate a proposed new approach to elite studies and based on a prosopography of Fellows of the Royal Society born from 1900. We extend analyses previously reported of Fellows' social origins and secondary schooling to take in their university careers as under- and postgraduates. The composite term 'Oxbridge', as often applied in elite studies, is called into question, as members of the scientific elite prove to have been recruited more from Cambridge than from Oxford. Particular interest then attaches to the relation between Fellows' social origins and schooling and their attendance at Cambridge. Among Fellows whose university careers were made at Cambridge, those of more advantaged class origins and those with private schooling are over-represented, although in this, as in various other respects, including Fellows' field of study, family influences persist independently of schooling. One suggestive interaction effect exists in that being privately educated increases the probability of having been at Cambridge more for Fellows from managerial than from professional families. Private schooling leading on to both undergraduate and postgraduate study at Cambridge can be identified as the educational 'royal road' into the scientific elite; and Fellows

coming from higher professional and managerial families alike have the highest probability of having entered the elite in this way. But the most common route turns out in fact to be via state schooling and attendance at universities outside of 'the golden triangle' of Cambridge, Oxford and London; and this route is far more likely to have been followed by Fellows of all other class origins than higher professional. The relation between the degree of social skew in the recruitment of an elite and the degree of social homogeneity among its members can be more complex than has often been supposed.

KEYWORDS
education, elites, social mobility

1 | INTRODUCTION

In a previous paper (Bukodi & Goldthorpe, 2021) we have proposed an approach to the study of elites based on prosopographies—collective biographies—of their individual members. Such an approach has been widely used by historians in the study of elites and of other collectivities (see e.g., Keats-Rohan, 2007; Stone, 1971) but, until recently, far less often by sociologists who have tended to rely on data sources that cannot provide information of the full and detailed kind for which the approach calls.

We have further proposed that rather than elites being defined by 'reputational' measures or through reliance on general works of reference in which the criteria for elite status are often unclear, it is preferable that elites should be defined in relation to particular institutions or associations. Elite membership is thus determined in a way that is quite explicit, and subjective judgements on the part of researchers, or of others, are avoided. Also in this way, the listing of the names of those individuals who at any particular time constitute the elite—a crucial preliminary in the construction of a prosopography—is facilitated. The aim then is to provide detailed descriptive accounts of the social origins and educational careers of those listed, and of any other of their attributes that may be of interest, and on this basis to establish the routes that these individuals have followed into the elite or into its different divisions.

The results obtained are in turn of direct relevance to two centrally important questions in elite research: on the one hand, that of the degree *of social homogeneity* that exists in the composition of elites and its possible consequences and, on the other hand, that of the degree of *social skew* in the recruitment of elites. An approach via prosopographies can serve to bring out that these are two quite separate questions, and that it is not necessarily the case—as seems sometimes to have been supposed—that the greater the social homogeneity of an elite, the greater the skew in its recruitment or vice versa.

In a good deal of previous elite research, as we have documented (Bukodi & Goldthorpe, 2021), the necessary descriptive grounding that prosopographies can provide has not been present. In particular, information on the social origins of elite members has often been unduly crude or indeed lacking, and that on their education incomplete. But because educational information does tend to be the more readily available, this has led to the quite common practice of it being used, implicitly if not explicitly, as a proxy for social origins (for a notable example, see Social Mobility Commission, 2019), despite evidence—to which we will here add—that this may well be misleading (see e.g., Rubinstein, 1986).

As the first step in a programme of research that aims to cover a range of elites in the UK (or at least Britain) we have undertaken a study of the UK scientific elite. This appeared to provide a good testing-ground for our

methodological approach and we would in any event believe that in the context of global warming, pandemics and the threats as well as potential of AI, scientific elites require more attention than they have hitherto received, in view of the increasing socio-political role that they would seem destined to play.

We take the UK scientific elite to be represented, for the modern period, by Fellows of the Royal Society born since 1900, excluding Honorary and Royal Fellows, foreign Members and Fellows whose research careers appear to have been largely made abroad. The Royal Society was founded in 1662 and, at least from the later nineteenth century, has been generally regarded as the pre-eminent British scientific association, election to which—through elaborate and stringent procedures (Royal Society, 2023)—confers a high level of individual prestige and, potentially at least, considerable influence and power within the scientific community. The maximum number of Fellows to be elected annually was fixed at 17 in 1930 and, following regular increments reflecting the growing body of research scientists, now stands at 52. At the present time, the total membership of this elite is around 1700 but was smaller at all earlier periods.

Our target population, as defined above, amounted to 2112 Fellows—1957 men and 155 women; and we have been able to obtain full information relevant to our present interests for 1681 Fellows—1556 men and 125 women. That is, we have overall an almost 80% coverage. For deceased Fellows, our information comes from published sources, primarily from the Royal Society's *Memoirs* but also from the *Dictionary of National Biography* and from obituaries, interviews and other material available on the web. For the living, information comes primarily from a web-based questionnaire sent to all Fellows in our target population in late 2020, to which we received an almost 70% response; but, in the case of non-respondents, we resort to *Who's, Who*, Debrett's *People of Today* and again to web material. In Supporting Information S1: Appendix Table 1 we show the extent of the coverage we achieved on all variables that we use across seven birth cohorts.[1]

On the basis of the data in question, we have already reported (Bukodi et al., 2022) analyses of the social class origins and secondary schooling of Fellows in our target population, focussing at this stage of our research on questions of elite composition and social homogeneity.[2] In the present paper, we move on to consider the university careers of these Fellows in relation to their class origins and schooling and thus the differing routes they have taken into the scientific elite. Given the relevance of our earlier findings, we here briefly summarise them and the conclusions to which they point.

First, across each of the seven birth cohorts we distinguish, close to, or over, 30% of Fellows come from higher *professional* families; and this proportion rises to over 40% for the most recent cohort, those born after 1960. In contrast, the proportion of Fellows coming from higher *managerial* families is always substantially lower—not much above, or less than, 10% except for the oldest cohort, those born 1900-09.[3] Similarly, more Fellows have always come from lower professional than from lower managerial families. Thus, in the most recent cohort almost two-thirds of Fellows are from professional backgrounds of some kind as compared with only a fifth from managerial backgrounds. Further, there is also an increase, notably in the two most recent cohorts born after 1950, in the proportion of Fellows with at least one parent in an occupation, most often a professional one, involving some degree of scientific, technical, engineering or mathematical (STEM) knowledge or expertise. As regards Fellows of less advantaged class origins, over our three middle cohorts—Fellows born 1920–1949—the proportion who were the children of small employers, own-account workers or wage-earning working-class parents averages around a quarter—that is, a larger proportion than those coming from higher managerial families. However, recruitment from such less advantaged families thereafter sharply declines, falling to less than 9% in the most recent cohort, and with the proportion of Fellows of working-class origins being more or less negligible. As a result of these changes, together with changes in the societal class structure, the composition of the Fellowship, which was previously *less* homogenous in terms of class origins than the population at large, is now more homogenous.

Second, across all birth cohorts between 40% and 50% of Fellows attended private secondary schools although some shift is evident, especially among those with professional parents, away from private boarding to private day schools. However, the proportion of Fellows attending Clarendon schools,[4] consistently a little under 10%, would appear low as compared with that found with other elites, such as the military or the legal (cf. Reeves et al., 2017). As

would be expected, an association exists between Fellows' class origins and the type of their secondary schooling. Among Fellows of higher professional and managerial origins alike, the proportion who went to private schools is over two-thirds, while a majority of Fellows coming from other class backgrounds went to state schools—rising to over 85% of those of working-class origins.

Third, differences are revealed in the social origins of Fellows working in different research fields. Most notably, coming from *any other origins* than higher professional increases the relative probability of a Fellow being a chemist, while decreasing that of a Fellow working in a range of biological sciences, although this latter effect would appear to be weakening. The-type of a Fellow's schooling modifies social origin effects on field of research but only to a quite limited extent, thus suggesting that influences in some way associated with the class position of their families of origin are of independent importance in determining the choice of research field of individuals who come to attain scientific eminence.

The general conclusion that we draw from these results is that in the study of the formation and composition of elites, analyses of a more *detailed* and *disaggregated* kind are called for than have often been reported in past research. For example, it has been widely supposed that recruitment to elites is simply structured by hierarchical class divisions. But, at least with the UK scientific elite, this is not the case. What emerges, as in fact it did in earlier research into the US scientific elite (Cattell, 1915; Visher, 1947), is the importance of distinguishing *within* more advantaged social classes between their different occupational components. In the UK, as was found in the US, professional families have been clearly, and quite persistently, more productive of outstanding scientists than have managerial families. Again, although a majority of the UK scientific elite from higher professional or managerial families did attend private schools, a still far from negligible minority went to state schools, so that, as earlier noted, type of schooling can be a quite unreliable proxy for class origins. And further, the case of the UK scientific elite shows that attention has to be given to the possibility that across different divisions of an elite recruitment channels, and thus social composition, may significantly vary. In short, elites have to be treated as more complex social collectivities than has been commonly the case.

With the foregoing in mind, we now seek to complement what we have learnt about the social origins and schooling of Fellows of the Royal Society with analyses of their university careers. The questions on which we focus are the following. Which universities did Fellows attend at both undergraduate and postgraduate level? What association exists between their social class origins and their universities? How far and in what ways is this association mediated through their secondary schooling? How far do differences in these respects relate to the fields of research in which Fellows work? And, finally, what are the implications for the social composition of the UK scientific elite as we have sought to represent it?

2 | UNIVERSITY CAREERS

In Figure 1, we show the distribution of the Fellows in our target population by the universities they attended at both undergraduate and postgraduate levels, distinguishing between Cambridge, Oxford, University College and Imperial College, London (the two most represented London college), other London colleges, other Russell Group universities,[5] other UK universities and non-UK universities.

It can be seen, first of all, that the proportions of Fellows who attended non-UK universities are highest among those in the earliest cohort, born 1900-09, and in the two latest cohorts, born 1950-59 and 1960 onwards. What is chiefly reflected in the former case is the influx into the UK of often eminent scientists from Germany, Austria and elsewhere in Europe during the late 1930s and, in the latter case, the growing globalisation of science.

Turning to the majority of Fellows who attended UK universities, the patterns of attendance across the different universities or types of university that we distinguish prove to be very similar at both the undergraduate and postgraduate levels.[6] What is of greatest interest is the evident importance of Cambridge as a source of the scientific elite—and especially in comparison with Oxford. In all birth cohorts, some 24%–30% of Fellows were at Cambridge

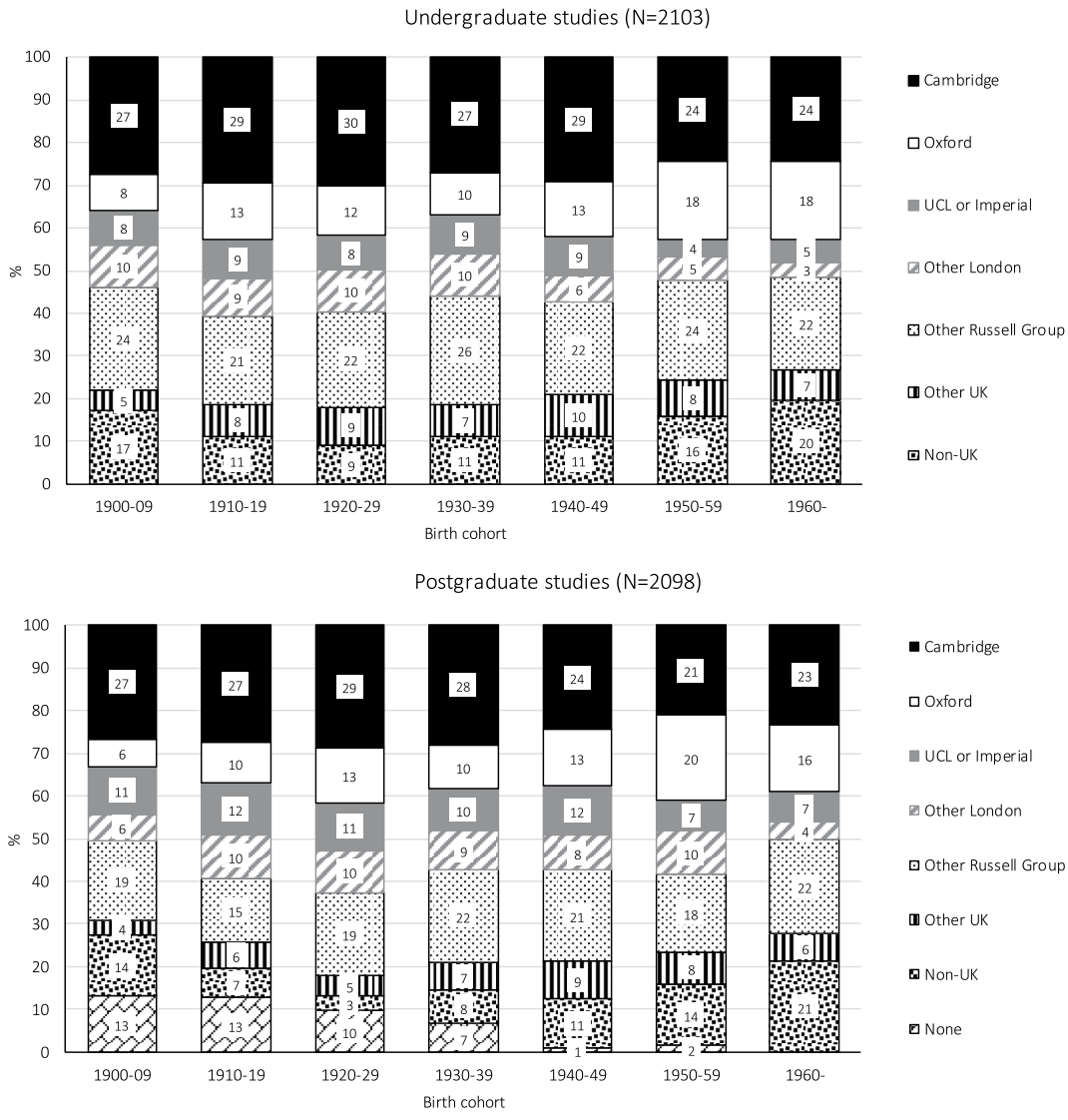

FIGURE 1 Distribution (%) of Fellows by university attended and birth cohort.

for their undergraduate and/or postgraduate education, while over the first five cohorts no more than 13% were at Oxford, with this proportion then rising to up to 20% in the two most recent cohorts. Further, in all but these two cohorts, the proportion of Fellows attending London was higher than the proportion at Oxford, though not at Cambridge, and the proportion attending other Russell group universities was in all cases but one (postgraduate education in the 1950-59 cohort) higher than the proportion at Oxford, though not at Cambridge.

We have here then an instance in which disaggregation proves important and, in particular, confirmation is provided of the observations of McKibbin, 1998 (249-50) to the effect that, in the context of elite studies, the composite term 'Oxbridge' needs to be used with greater caution than has often been the case. It should not be assumed that in the case of all elites alike Oxford and Cambridge are, together, the universities from which recruitment is most favoured.

In his history of science in Oxford over the inter-war years, Morrell, 1997 (381, 179, 186, 306) notes that while in physics the Cavendish Laboratory at Cambridge had been world-leading from the late nineteenth century, the

Clarendon Laboratory at Oxford was for long 'widely regarded as moribund' and took a good while to recover. And, although Oxford did eventually build up some reputation in physiology and biochemistry, it was still always in the shadow of Cambridge in these fields. Only in chemistry was Oxford able to 'feel superior' to Cambridge.

Indeed, in line with the old adage 'Cambridge for science, Oxford for the humanities', Halsey, 1994 (605-6) was still ready to comment, not entirely in jest, that Oxford could be thought of as 'the best liberal arts college outside or inside America'. To this, Soares, 1999 (109) has objected that in the two or three decades after World War II, Oxford transformed itself into 'a modern scientific university'. Over this period, Oxford was certainly very successful, and has continued to be successful, in raising its scientific standing to a high level, in contrast with the slow development of—and no little hostility towards—science that was previously in evidence. Nonetheless, whatever the future may hold, Oxford would still appear to lag clearly behind Cambridge as a recruiting ground of members of the present-day scientific elite.

3 | UNIVERSITIES, SOCIAL ORIGINS AND SCHOOLING

We now turn to the question of what association exists between Fellows' social origins and the universities they attended. As in our previous paper, we treat social origins in terms of the class positions of Fellows' parents, using for this purpose a modified version of the National Statistics Socio-Economic Classification (Office of National Statistics, 2005), as shown in Table 1.[7]

In Table 2, we show the distribution of university or type of university that Fellows attended by their parental social class, with all London colleges now being brought together. It can be seen that so far as the association with parental class is concerned, there is again little difference between undergraduate and postgraduate attendance, although the association appears generally somewhat weaker in the latter case. The most notable features to emerge from the table are the following.

Fellows coming from higher professional and managerial, NS-SEC Class 1, backgrounds, are clearly over-represented among those having attended Cambridge—though scarcely so among those having attended Oxford, with, perhaps, the

TABLE 1 Modified version of National Statistics Socio-Economic Classification (NS-SEC).

NS-SEC		Modified version and labelling used
1	Higher managers, large employers[(a)] and higher professionals	Higher professional[(b)]
		Higher managerial[(b)]
2	Lower managers, higher supervisors and lower professionals and higher technicians	Lower professional[(b)]
		Lower managerial[(b)]
3	Intermediate, clerical, etc. employees	Intermediate
5	Lower supervisors and technicians	
4	Small employers and own account workers	Self-employed
6	Semi-routine workers	Working class
7	Routine workers	

Note

(a) With more than 25 employees.

(b) We follow here the NS-SEC distinction between Class 1.2 and 1.1 and make a similar distinction within Class 2.

TABLE 2 Distribution (%) of Fellows by university attended and parental class.

Parental class	Cambridge	Oxford	London	Other Russell Group	Other UK	Non-UK	None	Total	N
Undergraduate									
Higher professional	37.5	15.4	13.2	13.2	3.8	16.9		100.0	552
STEM	37.2	12.2	11.9	13.1	5.3	20.3		100.0	320
Non-STEM	37.9	19.8	15.1	13.4	1.7	12.1		100.0	232
Higher managerial	36.5	11.9	12.3	16.0	3.7	19.6		100.0	219
Lower professional	30.1	13.8	13.0	22.0	9.4	11.8		100.0	245
Lower managerial	22.5	16.7	18.8	31.2	6.5	4.4		100.0	138
Intermediate	22.8	12.8	18.9	30.0	9.4	6.1		100.0	180
Self-employed	21.2	10.8	14.8	28.6	10.3	14.3		100.0	203
Working class	12.3	8.9	25.1	29.6	15.1	8.9		100.0	179
All	29.0	13.3	15.6	21.6	7.3	13.2		100.0	1717
Postgraduate									
Higher professional	31.8	13.6	19.6	12.0	2.7	14.2	6.2	100.0	551
STEM	33.2	11.9	18.5	12.9	3.5	15.7	4.4	100.0	319
Non-STEM	29.7	16.0	21.1	10.8	1.7	12.1	8.6	100.0	232
Higher managerial	29.7	12.3	17.8	14.2	3.2	15.1	7.8	100.0	219
Lower professional	30.0	16.1	16.5	18.1	5.8	9.1	4.5	100.0	243
Lower managerial	18.7	16.6	21.6	25.9	6.5	6.5	4.3	100.0	139
Intermediate	24.6	12.3	19.6	24.6	8.4	5.6	5.0	100.0	179
Self-employed	25.6	11.3	15.8	22.2	8.9	7.4	8.9	100.0	203
Working class	14.4	9.4	25.6	25.0	11.1	5.0	9.4	100.0	180
All	26.9	13.2	19.3	18.1	5.7	10.3	6.5	100.0	1714

exception of those coming from higher professional but non-STEM families.[8] And a point of further interest in this connection is that while in the case of attendance at Cambridge there is little difference in the percentage of Fellows coming from higher professional STEM and non-STEM families, in the case of attendance at Oxford the percentage of Fellows coming from STEM families is clearly *lower* than that coming from non-STEM families. STEM parents, it could be, have a greater awareness of Cambridge's scientific superiority vis-à-vis Oxford. Offsetting the over-representation of Fellows of Class 1 origins at Cambridge is their under-representation at other universities and especially at other Russell Group and other UK universities. And, conversely, it is Fellows of all other origins than NS-SEC Class 1, apart from those of lower professional origins, who are under-represented among those going to Cambridge and markedly so in the case of those of working-class origins, who are then over-represented at all universities other than Cambridge or Oxford.

We next ask how far an association also exists between the type of Fellows' secondary schooling and their university attendance. In this regard, Table 3 provides the basic information.

Given the association we have shown above between Fellows' class origins and their universities and, in our previous paper (Bukodi et al., 2022), the association also existing between their class origins and their type of secondary schooling, what emerges from Table 3 is overall much as might be expected. However, what in the present context is significant is that while Fellows who were privately schooled are over-represented, as undergraduates, at both Cambridge and Oxford, this is far more strongly the case with Cambridge—and especially so with Fellows who had been to Clarendon schools. This over-representation is offset by under-representation at London, at other Russell Group and other UK universities, while with Fellows who had attended state schools, essentially the reverse situation is found.

TABLE 3 Distribution (%) of Fellows by university and type of secondary school attended.

Type of secondary school	Cambridge	Oxford	London	Other Russell Group	Other UK	Non-UK	None	Total	N
Undergraduate									
Private	47.3	19.8	13.3	14.8	4.0	1.0		100.0	709
Clarendon	61.5	23.1	10.8	3.9	0.8			100.0	130
Other, boarding	49.9	19.7	13.9	11.1	3.9	1.7		100.0	361
Other, day	34.4	17.9	13.8	27.5	6.0	0.5		100.0	218
State	21.6	11.8	20.9	33.8	11.7	0.2		100.0	974
Grammar/Comprehensive	23.2	12.6	20.2	32.4	11.3	0.2		100.0	865
Technical, Central, etc.	8.3	5.5	26.6	45.0	14.7			100.0	109
Non-UK	3.1	1.2	5.1	2.7	2.7	85.2		100.0	257
All	28.5	13.3	16.0	22.7	7.7	11.8		100.0	1940
Postgraduate									
Private	35.4	17.1	19.8	11.7	3.3	4.4	8.4	100.0	707
Clarendon	32.0	15.6	25.0	5.5	3.1	7.0	11.7	100.0	128
Other, boarding	38.6	17.2	18.3	9.7	3.3	3.3	9.4	100.0	360
Other, day	32.0	17.8	19.2	18.7	3.2	4.6	4.6	100.0	219
State	21.1	11.4	21.1	28.3	9.4	2.2	6.5	100.0	970
Grammar/Comprehensive	21.5	12.3	21.3	26.9	9.4	2.2	6.4	100.0	860
Technical, Central, etc.	18.2	4.6	20.0	39.1	9.1	1.8	7.3	100.0	110
Non-UK	21.7	7.8	10.9	5.8	1.9	49.6	2.3	100.0	258
All	26.4	13.0	19.3	19.2	6.2	9.3	6.6	100.0	1935

At the postgraduate level, the association between Fellows' type of schooling and their universities is for the most part on a similar, if weaker, pattern, although privately schooled Fellows are no longer under-represented at London—an at least partial explanation for which finding is suggested below (n. 13).[9]

As well then as Fellows coming from higher professional and managerial, NS-SEC Class 1, backgrounds being over-represented among those attending Cambridge, so too are Fellows who were privately schooled. But, given that an association exists between class origins and type of secondary schooling, it is of evident interest to see how far class origin effects still show up in Fellows' university attendance once type of schooling is also taken into account.

In Table 4, we give results from two multinomial logit models showing the probabilities of Fellows having been undergraduates at Cambridge, Oxford, London or some other—UK and non-UK—university by parental class and type of secondary schooling, with birth cohort being also included. Model 1 serves chiefly to confirm and to quantify more precisely what is already evident from Table 2: that is, that the association between Fellows' parental class and the universities they attended is rather systematic and in some instances remarkably strong. For example, the probability of Fellows of working-class origins having been to Cambridge is almost 30% points lower than that of Fellows from higher professional backgrounds, while the probability of the former of having gone to a university outside of the golden triangle of Cambridge, Oxford and London is almost 30% points higher than that of the latter.

When in Model 2 the secondary schooling variable is introduced, the effects reported serve in turn to express more precisely what could be seen from Table 3: that is, that a systematic association exists between Fellows' type of secondary schooling and the universities they attended. However, our focus is then on what happens to the effects of parental class. These effects are, as might be expected, generally reduced but they often remain quite strong. For example, the probability of Fellows of working-class origins having attended Cambridge rather than any other university is still around 18%

TABLE 4 Probabilities of Fellows having attended different universities as undergraduates by parental class, type of secondary school and birth cohort, average marginal effects (%) from multinomial logit models.

	Cambridge		Oxford		London		Other UK		Non-UK	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Parental class										
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	−1.7	0.3	−3.1	−2.4	−2.7	−2.7	4.3	4.8	3.3	−0.9
Lower professional	−7.5	−1.9	−2.6	−1.6	−1.5	−1.8	14.9	6.2	−3.2	0.1
Lower managerial	−13.2	−11.4	−0.5	0.0	5.7	2.5	21.4	10.6	−14.4	−1.7
Intermediate	−14.1	−7.4	−2.6	−1.8	4.2	−0.5	22.5	8.3	−10.0	0.1
Self-employed	−17.3	−9.9	−4.3	−2.6	0.1	−2.4	22.3	13.7	−0.7	1.2
Working class	−29.3	−17.7	−5.2	−2.8	9.1	4.9	28.5	14.4	−3.1	1.1
Type of secondary school										
Clarendon		36.7		13.2		7.4		−32.6		−24.6
Other private, boarding		16.7		4.5		−5.5		−21.0		5.3
Other private, day		7.5		1.5		−6.1		−5.0		2.1
State (ref.)		0.0		0.0		0.0		0.0		0.0
Non-UK		−5.6		−6.5		5.2		−8.7		17.7
Cohort										
1900-29	−1.5	−0.6	−2.4	−1.9	1.7	1.9	1.7	1.2	0.5	−0.5
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	−7.1	−2.4	4.3	6.1	−6.9	−6.5	3.7	3.8	6.0	1.0
N = 1682										

points lower than this probability for Fellows of higher professional origins, while the probability of their having attended a university outside of the golden triangle is still 14% points higher. In other words, parental class has an association with university or type of university attended that is in some substantial degree *independent* of type of secondary schooling.

In Table 5, we repeat the analyses of Table 4 for university attended at postgraduate level but including, in Model 3, undergraduate university as a further variable. Under this model, a strong probability is shown for those Fellows who were undergraduates at Cambridge, especially, and also at Oxford or London to have remained at these same universities as postgraduates, and for those who were undergraduates at all other universities at least not to have moved on to Cambridge, Oxford or London. Thus, the effects of class origins on postgraduate university are mainly ones mediated via undergraduate university. Nonetheless, some further class origin effects do show up, especially as regards differences in the chances of having been a postgraduate at Cambridge rather than at a university outside of the golden triangle as between Fellows of higher professional and of working class origins.

One further question arises. Are the effects of parental class and schooling in relation to Fellows' university careers simply additive or does some interaction occur such that the effect of schooling is greater or less depending on parental class. To address this question, and concentrating now on Fellows who were undergraduates in the UK, we estimate probabilities of their being at different universities from a model which includes a term for the interaction of parental class (collapsed to five categories) and schooling (private vs. state) as well as terms for their main effects. The results are shown in Figure 2.

If no interaction were to occur then, for each university category, the differences in the probabilities of attendance as between Fellows privately and state educated should be the *same* across each of the parental classes that are distinguished. But, as can be seen, this is not the case. Differences do exist, and a notable regularity is present in that they tend to be wider with Fellows coming from higher or lower managerial families than with those coming

TABLE 5 Probabilities of Fellows having attended different universities as postgraduates by parental class, type of secondary school, undergraduate university and birth cohort, average marginal effects (%) from multinomial logit models.

	Cambridge			Oxford			London			Other UK			Non-UK		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
Parental class															
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	−2.3	−2.0	−2.5	−0.7	−0.4	1.1	−3.4	−2.7	−0.5	4.8	5.5	1.8	1.6	−0.4	0.0
Lower professional	−2.2	1.2	2.2	1.1	2.0	2.6	−5.1	−5.3	−2.2	10.3	3.0	−1.2	−4.2	−0.9	−1.5
Lower managerial	−13.6	−11.0	−4.4	1.3	1.6	1.4	1.8	0.4	−0.7	18.0	9.2	2.6	−7.5	−0.2	1.0
Intermediate	−7.5	−2.2	1.7	−1.8	−0.6	0.3	−1.5	−3.3	−2.5	19.1	7.2	1.6	−8.2	−1.1	−1.1
Self-employed	−7.4	−3.2	1.5	−1.7	−0.4	1.3	−5.5	−5.8	−2.4	19.1	11.7	2.4	−4.4	−2.3	−2.9
Working class	−19.6	−12.9	−3.6	−3.0	−0.9	2.0	5.7	4.7	1.1	23.8	12.1	3.5	−6.8	−3.0	−2.9
Type of secondary school															
Clarendon		8.6	−7.4		3.6	−1.0		6.2	8.5		−25.7	−4.2		7.4	4.1
Other private, boarding		14.7	3.9		5.4	2.7		−2.4	1.9		−19.1	−6.9		1.3	−1.6
Other private, day		7.1	2.7		2.5	1.7		−3.5	−0.5		−10.2	−6.7		4.2	2.8
State (ref.)		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Non-UK		7.9	7.2		−1.3	1.4		−5.1	−3.5		−23.6	−8.7		23.1	4.7
Undergraduate university															
Cambridge (ref.)			0.0			0.0			0.0			0.0			0.0
Oxford			−32.2			25.1			1.3			2.9			2.9
London			−33.4			1.1			30.0			4.7			−2.5
Other UK			−28.8			2.6			0.1			31.3			−5.1
Non-UK			−24.3			3.6			2.5			6.1			14.1
Cohort															
1900-29	2.6	2.9	3.8	−3.1	−2.8	−1.9	2.4	2.9	2.4	−1.7	−1.7	−3.3	−0.1	−1.4	−1.1
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	−6.9	−5.2	−3.2	4.8	5.9	2.0	−4.3	−3.3	0.5	−0.5	−0.3	−2.6	6.8	2.8	3.3
N = 1569															

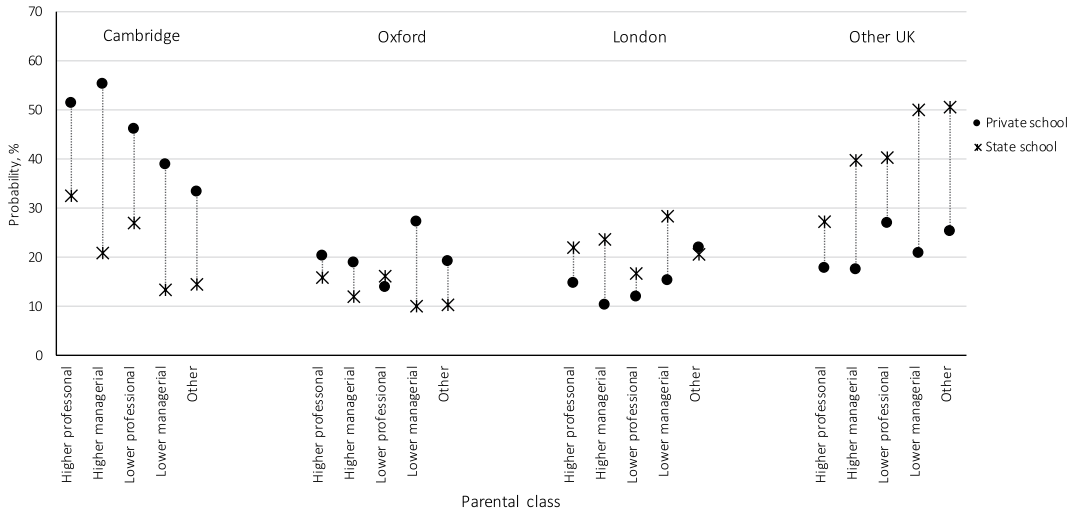

FIGURE 2 Estimated probabilities (%) of Fellows having attended different UK universities as undergraduates by parental class and type of secondary school (private vs. state), based on a multinomial logit model that includes parental class, type of secondary school and interactions between these variables, with birth cohort as control.

from higher or lower professional families. In particular, it can be seen that having been privately educated increases the probability of having been at Cambridge, and to a lesser degree at Oxford, more for Fellows from managerial backgrounds than for those from professional backgrounds, while also reducing the probability of their having been at London or any other UK university. And from Supporting Information S1: Appendix Figure 1, it would appear that there is no great change in this situation across birth cohorts, apart from the fact that in the case of London the interaction effects in question are not present with Fellows born after 1950.

As said, in our previous paper (Bukodi et al., 2022) we have shown that Fellows originating within Classes 1 and 2 are far more likely to come from professional than from managerial families—this reflecting, it was suggested, differences in parental cultural, including specifically educational and informational, resources. The present findings would then lead to the further suggestion that in the case of managerial parents, with perhaps cultural resources less relevant to supporting a child's scientific career, the use of their economic resources to provide private schooling may serve, if only unintentionally, as a means of compensation. That is, through their children's development of a 'taste for science'—leading on then, in the case of those who prove to be highly talented, to seeking entry to Cambridge.[10] What may also be of relevance in this connection is that, as was earlier noted (and see Bukodi et al., 2022), Fellows with managerial parents are more likely than those with professional parents to have attended private boarding rather than private day schools—that is, to have been exposed to greater school, relative to family, influence.

4 | SOCIAL BACKGROUND, UNIVERSITIES AND FIELDS OF RESEARCH

A further finding of interest that we reported in our previous paper (Bukodi et al., 2022) is that differences exist in the class origins of Fellows active in different fields of research—what the Royal Society classify as Subject Areas—and that these differences are only slightly modified when type of secondary schooling is also taken into account. We can now examine how far and in what ways Fellows' universities may be a further factor in this regard.

In Table 6, we show, first of all, results from a multinomial logit model of the probabilities of Fellows working in four different fields of research by different combinations of their undergraduate and postgraduate universities. In this case, 'other UK' covers all universities apart from Cambridge, Oxford and London. Birth cohort is also included in the model. Some strong effects become apparent. Fellows who were at Cambridge as both undergraduates and postgraduates are far more likely than Fellows with any other combination of universities to work in mathematics and the physical sciences.

TABLE 6 Probabilities of Fellows being found in four research fields by combinations of undergraduate and postgraduate universities, and birth cohort,[a] average marginal effects (%) from multinomial logit model.

	Maths, physical sciences[b]	Chemistry	Biochemistry, etc.[c]	Other biological sciences[d]
Undergraduate–Postgraduate combination				
Cambridge—Cambridge (ref.)	0.0	0.0	0.0	0.0
Oxford—Oxford	−17.1	11.8	−4.5	9.8
London—London	−23.7	5.3	1.9	16.6
All other UK—All other UK	−14.8	8.1	0.8	6.0
Non-UK—Non-UK	−9.5	−6.5	0.2	15.8
Cambridge—Oxford, Oxford—Cambridge	−19.1	−1.2	1.8	18.5
Oxbridge—London, London—Oxbridge	−27.6	−1.7	−2.9	32.3
Oxbridge—All other UK, all other UK—Oxbridge	−6.9	4.9	0.0	2.0
London—All other UK, all other UK—London	−31.5	6.1	1.0	24.4
Non-UK—Any UK, any UK—Non-UK	−12.1	−3.4	0.4	15.1
Cohort				
1900-29	2.0	3.4	−2.8	−2.6
1930-49 (ref.)	0.0	0.0	0.0	0.0
1950-	−0.1	−1.1	2.6	−1.4
N = 1569				

[a]Fellows who did not study at postgraduate level are excluded.

[b]Mathematics, computer science; Astronomy, physics; Engineering, technology; Earth sciences, environmental physical sciences.

[c]Biochemistry, structural biology, molecular cell biology.

[d]Developmental biology and genetics, immunology, microbiology; Anatomy, physiology, neuroscience; Organismal biology, evolutionary and ecological science; Health and human sciences.

Further, Fellows who were at Oxford as undergraduates and stayed on as postgraduates are more likely than others to be found in chemistry—as earlier observed, the one scientific field in which Oxford would claim a long-standing superiority over Cambridge—followed by Fellows whose university careers were made entirely outside of the golden triangle. There is less differentiation by university in the case of biochemistry etc., but it is Fellows who attended London, and especially in combination with Cambridge or Oxford who have the highest probability of being found in the other biological sciences, while Fellows who remained at Cambridge appear those least likely to work in these fields.

We then extend our modelling in order to see how far our earlier results on social background differences among Fellows in different research fields are affected when the universities they attended are also included in the analysis. In Table 7, we show under Model 1 what are essentially the same results as we previously reported (Bukodi et al., 2022: Table 8), with field of research being related to parental class and also to type of schooling.[11] In Model 2 the combinations of undergraduate and postgraduate universities from Table 7 are then introduced. What can be seen is that the effects of parental class and also of type of schooling differ very little from Model 1 to Model 2.

In other words, although differences in Fellows' fields of research are quite strongly associated with their university pathways, the further effects of parental class—as also of type of schooling—are in general rather little modified. And Supporting Information S1: Appendix Table 2 shows that in most cases there is no great change in this finding across birth cohorts. The influence of the long arm of family of origin in particular is again suggested: that is, in regard to field of research as well as to university attended. With the data presently at our disposal, it is not possible for us, as we have previously recognised (Bukodi et al., 2022) to investigate how in a general way this influence actually operates. But in the particularly interesting instance of chemists coming more often than Fellows in other fields from

TABLE 7 Probabilities of Fellows being found in four research fields by parental class, type of secondary school, combinations of undergraduate and postgraduate universities, and birth cohort,[a] average marginal effects (%) from multinomial logit models.

	Maths, Physical Sciences[b]		Chemistry		Biochemistry, etc.[c]		Other Biological Sciences[d]	
	M1	M2	M1	M2	M1	M2	M1	M2
Parental class								
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	−2.6	−2.7	5.0	4.9	−0.8	−0.9	−1.7	−1.3
Lower professional	0.3	−0.7	3.6	3.0	0.4	0.4	−4.4	−2.7
Lower managerial	0.7	2.0	2.1	1.0	0.9	0.6	−3.7	−3.6
Intermediate	−2.1	−1.4	3.3	2.7	2.6	2.5	−3.8	−3.8
Self-employed	−0.2	−0.1	6.5	5.2	1.4	1.2	−7.7	−6.4
Working class	4.2	4.7	7.1	6.0	6.5	6.1	−16.8	−16.8
Type of secondary school								
State (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private	−5.1	−8.5	−3.0	−2.1	1.6	2.1	6.4	8.5
Non-UK	1.2	−2.3	−10.6	−6.2	2.2	2.5	7.2	5.0
Undergraduate–Postgraduate combination								
Cambridge—Cambridge (ref.)		0.0		0.0		0.0		0.0
Oxford—Oxford		−18.1		11.4		−4.5		11.2
London—London		−26.8		4.3		1.3		21.2
All other UK—All other UK		−19.1		6.1		0.5		12.5
Non-UK—Non-UK		−11.3		−5.9		−1.2		16.4
Cambridge—Oxford, Oxford—Cambridge		−19.5		−1.3		2.3		18.6
Oxbridge—London, London—Oxbridge		−28.4		−1.7		−3.1		33.2
Oxbridge—All other UK, all other UK—Oxbridge		−8.4		4.2		−0.2		4.5
London—All other UK, all other UK—London		−34.5		4.9		0.7		29.0
Non-UK—Any UK, any UK—Non-UK		−13.3		−3.1		−0.5		15.9
Cohort								
1900-29	2.8	2.7	3.3	3.3	−2.6	−2.6	−3.6	−3.4
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	−0.3	0.1	−0.5	−0.6	3.0	3.2	−2.2	−2.7
N = 1569								

Note: (a) (b) (c) (d) See Table 6.

relatively disadvantaged class origins, we have made an attempt (Bukodi & Goldthorpe, forthcoming) to show the lines on which further research might proceed.

5 | CLASS ORIGINS, EDUCATIONAL CAREERS AND THE SOCIAL COMPOSITION OF THE SCIENTIFIC ELITE

We have made detailed analyses of the associations existing between Fellows' class origins, schooling and universities and the further associations that exist with their fields of research. Focussing now on the Fellows in our target

TABLE 8 Secondary school, undergraduate university, postgraduate university careers (% of all).[a]

		Postgraduate university			
Secondary school	Undergraduate university	Cambridge	Oxford	London	All other UK
Private	Cambridge	14	1	5	1
	Oxford	1	7	1	0
	London	0	0	5	1
	All other UK	2	1	0	6
State	Cambridge	9	1	1	1
	Oxford	1	5	1	0
	London	1	1	8	1
	All other UK	2	1	3	20

N = 1290

[a]Excluding Fellows who attended non-UK universities.

population as a whole, regardless of their subject areas, we wish to examine more directly how differences in their class origins and in their educational careers from school to university find expression in the social composition of the elite that they form.

To begin with, we consider differences among Fellows in their educational careers.[12] If we treat type of secondary schooling as simply binary—private versus state—and for both undergraduate and postgraduate study take the same fourfold categorisation of universities as used in Tables 6 and 7 —Cambridge, Oxford, London and others—we can distinguish 2 x 4 x 4 = 32 kinds of educational career. In Table 8, we show the distribution of Fellows over these careers. What is immediately apparent is that the distribution is very uneven. This largely results from the tendencies earlier noted for Fellows who were undergraduates at Cambridge, Oxford or London to stay on as postgraduates at these same universities, and for those who were undergraduates at other universities outside of the golden triangle not to move on at least to Cambridge, Oxford or London as postgraduates. In fact, Fellows falling in cells on the university 'diagonals', taking those privately and state schooled together, account for 74% of all.[13]

The two most numerous cases are of particular interest. In the top left cell of Table 8 we have a grouping of Fellows, 14% of the total, who have taken what might be thought of as the privileged, 'royal road', into the scientific elite: that of private schooling leading on to both undergraduate and postgraduate study at Cambridge, the scientifically pre-eminent university. In contrast, though, in the bottom right cell we have a grouping of Fellows, as many as 20% of all, who went to state schools and then on to study at both undergraduate and postgraduate levels at a university or universities other than Cambridge, Oxford or London.[14] It is, in other words, this latter, less privileged, educational route that is that most frequently taken into the scientific elite—although it has of course to be recognised that the Fellows following it come from a far larger base, or recruitment pool, than do those who have followed the royal road.

How, then, are the different educational careers represented in the predominantly important diagonal cells of Table 8 related to Fellows' class origins? In Table 9, we show results from a multinomial logit model that brings out the relevant probabilities, with birth cohort also being included. To maintain adequate numbers, NS-SEC classes 3–7 are collapsed.

First, it is evident that the probability of having followed the royal road into the scientific elite of private schooling and then a university education at Cambridge is highest for Fellows of higher professional and managerial origins, while being much lower for those of lower professional origins, and lower still for those of all other class origins. In contrast, the probability of having entered the elite via state schooling and university education outside of the golden triangle—the most common educational career of those in the elite—is lower for Fellows of higher professional origins *than for Fellows of all other class origins alike*. In other words, while higher professional families appear as the most important recruiting ground for members of the scientific elite, Fellows coming from such families show a clear probability of avoiding the most common route of entry. That is, by having had private schooling leading on to Cambridge or to Oxford or London universities or by still gaining access to these universities after state schooling.

TABLE 9 Probabilities of Fellows having followed eight secondary school and undergraduate and postgraduate university careers by parental class and birth cohort, average marginal effects (%) from multinomial logit model.

	Private schooling				State schooling			
	Cambridge ↓ Cambridge	Oxford ↓ Oxford	London ↓ London	Other ↓ Other	Cambridge ↓ Cambridge	Oxford ↓ Oxford	London ↓ London	Other ↓ Other
Parental class								
Higher professional (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Higher managerial	1.2	−0.4	−0.4	−0.2	−9.4	−10.6	−1.7	22.0
Lower professional	−10.2	−7.3	−7.8	−0.1	3.4	4.2	1.7	20.2
Lower managerial	2.6	5.2	1.8	3.9	1.3	2.2	11.4	36.2
Other	−20.6	−7.4	−2.1	−3.7	0.6	3.9	5.6	36.9
Cohort								
1900-29	2.3	−1.0	−0.5	−1.4	−3.1	−1.1	2.3	0.0
1930-49 (ref.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-	0.7	−0.8	−2.5	−1.0	−5.7	5.5	−3.4	0.7
N	187	80	60	63	111	68	108	250

With the other educational careers of Fellows that figure in Table 9—that is, where private schooling did not lead on to Cambridge, Oxford or London or where state schooling did lead on to these universities—differences in the probabilities of their having been followed by Fellows of different class origins are generally less marked. However, two schooling effects of interest may be noted that are in line with the results previously shown in Figure 2 (which related only to undergraduate university). First, among Fellows privately schooled, there is little difference between those of higher professional and higher managerial origins in the probabilities of their having followed the different university careers that are distinguished. But among Fellows who were state schooled, those of higher managerial origins have a clearly lower probability than those of higher professional origins of having been at Cambridge or Oxford, and are far more likely to have entered the scientific elite via other universities. Second, a similar kind of effect is apparent in the case of Fellows of lower managerial origins. Having been state rather than privately schooled clearly increased the relative probability of their having had to make their way into the elite without the benefit of a Cambridge or Oxford university education. Further support is thus provided for our earlier speculation that with Fellows whose family backgrounds were managerial rather than professional, private education may have played a compensatory role as regards the provision of cultural resources relevant at least to a highly successful scientific career.

Finally, the cohort effects reported in Table 9 should be noted. In general, these indicate rather little change over time. Those Fellows who started out from state schooling do show some tendency to have become more likely to go on to Oxford and less likely to London; but their main route into the elite, via universities outside of the golden triangle, seems of quite stable importance. And while some decline is apparent in the taking of the royal road as between the first and second cohorts, this is not maintained in the third.

In sum, the composition of the UK scientific elite, while evidently socially structured in various ways, does at the same time show quite high variation, on a generally persisting pattern, in terms of the educational careers that its members have followed and in the association of these careers with their class origins.

6 | CONCLUSIONS

In this paper, we have extended our earlier analyses of the social composition of the UK scientific elite, as represented by Fellows of the Royal Society born since 1900. Using the same prosopographical data as previously, we

move on from the details of Fellows' class origins and schooling to consider their university careers in relation to their class origins and schooling. In the light of our first paper, we were led to conclude that the example of the UK scientific elite lends support to the view that elites can be more complex collectivities than would seem often to have been supposed. The analyses reported in the present paper, still focussing on questions of the degree of social homogeneity of the scientific elite, provide, we believe, further confirmation of this view.

To begin with, we show that one university, Cambridge, is more important than any other, including Oxford, as a source of the scientific elite as we have defined it. In this connection, 'Oxbridge', though a term often used in the discussion of the education of UK elites, turns out to be too undiscriminating—and this could well prove to be the case with other of elites included in the wider research project in which we are engaged.[15]

In turning to the associations that exist between Fellows' class origins and schooling and their universities, how a link with Cambridge arises is therefore of particular interest. What we find is that Fellows of NS-SEC Class 1, higher professional and managerial, origins are substantially over-represented among those who attended Cambridge as undergraduates and/or postgraduates—though not among those who attended Oxford—while Fellows of less advantaged class origins, apart from lower professional, are under-represented at Cambridge. Similarly, Fellows who were privately schooled are over-represented among those who went to Cambridge—far more so than among those who went to Oxford—while Fellows who were state schooled are under-represented. However, further analysis indicates that even when type of schooling is taken into account, a strong association between attendance at Cambridge and parental class remains.

What we have called the influence of the long arm of family is also evident in several other more specific ways. For example, while the probability of Fellows of higher professional origins having been at Cambridge is much the same whether they came from STEM or non-STEM families, those from non-STEM families are clearly more likely to have gone to Oxford—suggesting some differing parental awareness of Cambridge's scientific standing. Again, we have shown that, when controlling for university as well as for type of schooling, an association still exists between Fellows' parental class and their fields of research. And further, one schooling effect for which we do find evidence—the greater importance of private schooling for university or type of university attended for Fellows of managerial than of professional parentage—is best understood, we have suggested, as compensating for a possible family cultural deficiency in relation to the making of a distinguished scientific career. In all of these respects, our earlier point is then reinforced that the frequent practice in elite studies of taking schooling as a proxy for information on social origins is likely to be in some degree misleading and, we can now add, also means missing out on possibly important interaction effects between social origins and schooling.

Finally, we have considered the implications of our analyses of the associations existing among Fellows' class origins, schooling and university careers for the social composition of the scientific elite that they represent. In our previous paper, we concluded that while this elite had once been more heterogeneous in terms of the class origins of its members than was the population at large, it had subsequently become less so. This mainly resulted from an increasing proportion of Fellows coming from higher professional—and increasingly STEM—families, which have grown in number in the population at large, while the proportion coming from working class families, which have declined in number, fell sharply away. At the same time, we noted that there was little change over the birth cohorts we distinguish in the substantial proportion of Fellows—upwards of two-fifths—who were privately schooled. These conclusions still stand. However, bringing university careers into the analysis leads to a yet more complex picture of the social composition of the scientific elite, and one which, we believe, would be difficult to bring out without analyses drawing on the degree of descriptive detail that our prosopographical approach provides.

Marked social skews are certainly indicated in the over-representation among Fellows who had gained access to Cambridge of those from more advantaged class origins and of those who were privately schooled, and Fellows who in this way have followed what we have called the royal road into the scientific elite then constitute a notable minority of its members. But a larger proportion is made up of Fellows who entered the elite following state schooling and without the benefit of university careers at Cambridge—or at Oxford or London. And having followed this latter route is clearly more probable for Fellows of all other social origins alike than for those coming from higher professional

families. In addition, there are other, non-negligible, routes into the elite that have been taken, in which private schooling did not lead on to Cambridge, or state schooling did lead on to universities within the golden triangle. And in these cases, associations with class origins are less marked. Finally, it is of significance that in all of the foregoing respects there is little evidence of any sustained directional change over the historical period that our prosopography covers—despite the expansion and the repeated reforms of both the secondary and tertiary educational systems and the growth of the Fellowship of the Royal Society itself.

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DATA AVAILABILITY STATEMENT

Data were collected by the authors solely for this project. The authors elect not to share data until the project finishes.

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ENDNOTES

[1] It is evident from the table that we have somewhat fuller information for the deceased than for the living—that is, for Fellows in earlier cohorts. However, tests we have carried out to see if differences occur in the information we obtain for deceased and living Fellows *within the same cohort* indicate that, if they exist at all, any such differences are very slight. We therefore feel able to take our data as providing the basis for a prosopography of the Fellows in our target population in regard to the attributes of interest to us that is free of any serious descriptive bias. Consequently, when we resort to the statistical modelling of our data, we do not apply tests of significance but focus on the size and pattern of the coefficients returned.

[2] We say little about homogeneity in terms of gender or ethnicity since the facts are already well-known. As the Royal Society itself recognises from its own diversity survey (Royal Society, 2019), women represent only around 10% of the present Fellowship and individuals from ethnic minorities only around 5%. Earlier, the representation of women and ethnic minorities was still smaller. In other words, Fellows of the Royal Society have always been, and remain, highly homogenous as male and white. To move on to questions of social skew in recruitment—that is, election—to the Royal Society can best be done, for reasons we have set out elsewhere (Bukodi, Goldthorpe, 2021), after further information has been collected on the social composition of the 'pool' of scientists from which elections are made.

[3] Included with higher managers are 'large employers'—that is, with more than 25 employees—who are, however, predominantly the owners of still relatively small, often family, concerns, in the management of which they are directly involved.

[4] The Clarendon schools are the nine 'public schools' whose finances and management were investigated by the Clarendon Commission, 1861-64, in view of what was taken to be their national importance: namely, Charterhouse, Harrow, Eton, Rugby, Merchant Taylors', St Paul's, Shrewsbury, Westminster and Winchester.

[5] The Russell Group universities are a self-selected group of 'leading research universities' in the UK, established in 1994, and now comprising 24 institutions. Cambridge and Oxford are included along with some but not all University of London colleges, many of which are now in effect independent universities in themselves. We treat Fellows as having attended Russell Group universities even if they did so before their designation as such in 1994.

[6] It can be seen that in the three earliest cohorts 10% or more of Fellows are recorded as not having undertaken graduate studies. This is largely to be explained in two ways. First, undergraduates at Cambridge and Oxford who had outstanding results in their final undergraduate examinations might immediately obtain College Fellowships, and for the cohorts in question a doctorate was not essential for a research career. In fact, the first PhD was only awarded at Oxford in 1919 and at Cambridge in 1921. Second, students graduating in engineering, even if wishing to pursue a research career, often moved directly into employment in engineering firms rather than staying on at university.

[7] Again as previously, where we have information—that is, on occupation and employment status—that allow us to establish the class positions of a Fellow's father and mother and these differ, we apply the 'dominance' method (Erikson, 1984). However, over the period covered, parental class does in the large majority of cases derive from father's class.

[8] STEM families are defined as those where at least one parent was in an occupation that involved some degree of scientific, technical, engineering or mathematical knowledge and expertise.

[9] As might be expected, Fellows whose secondary schooling was outside the UK are highly over-represented among those who went to non-UK universities, at undergraduate level in particular.

[10] The phrase a 'taste of for science' comes from Galton, 1874 (p. 255), who saw the Scottish educational system as doing far more to develop such a taste than the English public schools of his day, in which, under the influence of the clergy, a hostility to science prevailed. However, in the later twentieth century, leading private schools transformed their attitudes towards, and their teaching of, science and now generally provide facilities and staff-pupil ratios clearly superior to those found in state schools. See further Turner (2015).

[11] They somewhat differ since in the present analysis Fellows who did not undertake postgraduate work are excluded, while fellows who attended non-UK universities are included.

[12] Here we again focus on Fellows who had attended UK universities.

[13] As can be seen, the remaining cells, with one exception, are empty or contain only 1% of all Fellows. The exceptional case is the private schooling-Cambridge-London career. From our reading of the *Memoirs* of deceased Fellows, what, we believe, is chiefly reflected here is a tendency for privately schooled Cambridge graduates who wish to pursue medically related research to go on from Cambridge to do postgraduate work at one of the major London teaching hospitals.

[14] As previously noted, the small number of women Fellows means that detailed analyses by gender are not possible. But as regards women's educational careers, Supporting Information S1: Appendix Table 3 indicates that the most frequent was the same as with men: that is, state schooling followed by attendance at universities outside of the golden triangle. The main way in which women's careers differ from men's is that, whether privately or state schooled, they were more likely to have been both under- and postgraduates at London rather than at either Cambridge or Oxford.

[15] For example, since Oxford, as remarked in the text, has often been regarded as superior to Cambridge in the humanities, it will be of interest to see if it proves to be a more important source of the humanities division within the humanities and social sciences elite that we are also studying. And Oxford has of course been widely supposed to be more important than Cambridge as a source of the UK political elite—the extent to which this is in fact the case, we will also be able to establish in our wider research programme.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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