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RECONSTRUCTION OF THE FACIAL FEATURES OF GEORGE BUCHANAN: TUTOR OF JAMES VI AND FOUNDER OF THE 'TOUNIS COLLEGE OF EDINBURGH'

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George Buchanan was born near Stirling in 1506 and lived through a turbulent period in the history of Scotland. He was a humanist, historian, poet and scholar who during his life time was, still is, a controversial figure. He took a prominent part on the side of the reformers, often at considerable risk to life and limb. He spent much of his life on the continent, principally in France, lecturing and writing Latin poems, plays and treatises. He was said to be the best Latin scholar of his age, and his most important and influential political and historical works are *De jure regni* (1579) and *Rerum Scoticarum historia*. The latter is said to be his last and greatest work, and was published a few months after his death in 1582. He was appointed Principal of St Andrews University in 1568, and resigned in 1570 on his appointment as tutor to James VI, then in his 4th year. He was instrumental in encouraging the King to found the Tounis College of Edinburgh (the University of Edinburgh). It was granted its Royal Charter in 1582, and the first students were admitted in the following year.

There are known to be at least 14 'authenticated' portraits/engravings of Buchanan, some of which are believed to have been produced during his lifetime. Because these apparent likenesses vary so considerably, much effort has been expended over the years in attempting to establish which are true likenesses and which bear little resemblance to him either because of poor draughtsmanship on the part of the artist or an unacceptable degree of artistic licence.[1,2]

According to the Dictionary of National Biography (1959–60) 'Tradition dating from a short period after his death ascribes to him the skull preserved in the Anatomy Museum of the University (of Edinburgh), of which there is a print in Irving's life,[3] and which certainly resembles the best authenticated portraits of him which have been preserved, that by Boinard, engraved in Beza's *Icones*, and of which a copy is in the University of Edinburgh'.[4–6]

The availability of the skull of George Buchanan makes an appropriate attribution a realistic possibility, because the facial reconstruction technique used in the present study allows the reconstruction, for the first time, of a 3-dimensional likeness of his facial features. The skull has resided in the Anatomy Museum of the University of Edinburgh since 1817, until which time it had been preserved in the Library of the University of Edinburgh, accompanied by a copy of Adamson's Latin verses. While it is not entirely clear how, and exactly when, and even by whom, the skull was removed from the burial plot in the Greyfriars Kirkyard, the generally accepted version runs along the following lines.

Buchanan who died in poverty, had directed that what little money he had

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should be given to the poor, rather than spent on the erection of a tombstone. Whether a tombstone was erected at that time, or some years later, the cost being borne by his friends, or even by the university authorities, has yet to be established. The location of his burial plot was, however, known to the Rev John Adamson, Principal Regent (or 'Principal') of the University from 1623 to his death in 1653, and a great admirer of Buchanan.

It has been suggested that Adamson obtained the skull from either the sexton or possibly one of the grave-diggers at some time when they were involved in an interment close by. The skull was eventually found in Adamson's study after his death, inscribed with the name of Buchanan. In 1653, or shortly afterwards, the skull was transferred to a place of honour in the university library. Why it should have been relocated to the anatomy museum in 1817 has also yet to be established.

Little doubt has been expressed over the years concerning the authenticity of the skull, as it has always been assumed that the location of the plot must have been well known to many, including those that were involved in its purloining. Certainly, the features of the skull are consistent with the age of Buchanan at the time of his death, as it is the skull of a male of extreme age.

Much interest has been expressed over the years in determining which of the numerous available portraits and engravings of George Buchanan provide a true likeness of his facial features. One of the most comprehensive scientific attempts to undertake such an exercise was by Karl Pearson FRS* and described in detail in his lecture entitled *The Skull and Portraits of George Buchanan*, delivered in the department of anatomy in Edinburgh on June 4th 1926 for the William Ramsay Henderson Trust. This lecture was published privately by the Henderson Trustees,[7] and was subsequently published in a considerably expanded form in Biometrika.[8]

Craniometric analysis of the skull by Pearson[7] showed its relatively small cranial capacity, being 1,360 cm^3 by direct measurement, a figure obtained by packing it with mustard seed, and 1,375 cm^3 by calculation using a formula which involved the measurement of maximum length, parietal breadth and auricular height. The small cranial capacity was due to the fact that its length is remarkably small, being deficient in the occipital and cerebellar regions. Furthermore, analysis of the skull revealed that the owner must have had a flat bridge to his nose. The volume of the orbits was greater than normal, with the right orbit being slightly greater than the left. Possibly the most important feature to emerge from this analysis, however, was the fact that the skull cap was hemispherical, and that the forehead was only of average proportions.

Of all the portraits and likenesses that were analysed by Pearson, he was of the view that only two matched all of the features of the skull. One was the Royal Society picture, originally attributed to Porbus, a Flemish artist, but more

*Karl Pearson (1857–1936) was trained as a mathematician, but for a number of years practised at the bar. He was persuaded to abandon law for mathematics, and in 1884 he was appointed Professor of applied mathematics and mechanics at University College, London. In 1891 he moved to the Chair of geometry, and in 1892 published the influential *The Grammar of Science*. In 1911, he invented, or improved where applicable, the statistical approach now employed in all fields of scientific research, and notably that used in biology. He worked with Francis Galton, a cousin of Charles Darwin on hereditary and in 1911 was elected as the first Galton professor of eugenics at University College.

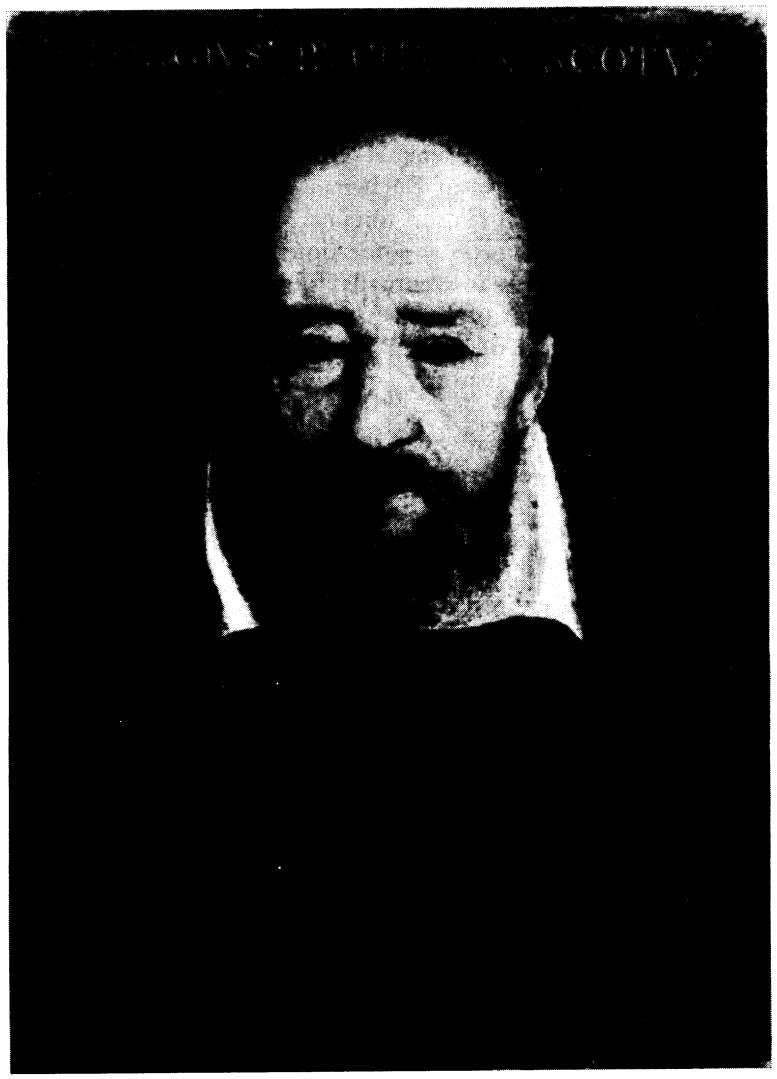

FIGURE 1

The Royal Society or 'Poemata' type of Buchanan portrait, formerly attributed to Porbus, but now believed to have been painted by Adrian Keij (from Pearson[7]).

recently attributed to another Flemish artist, Adrian Keij (Fig 1). It is entitled Georgius Buchanan Scotus, which Pearson chose to translate as George Buchanan, *the* Scot, rather than George Buchanan, *a* Scot. The former interpretation being the more likely, as it served to emphasize his eminence and importance. Pearson's superimposition of the cranial contour on the portrait in the Royal Society of London is shown in Fig 2.

General observations on methodology

Reconstruction from the skull of the head and facial features has become an increasingly exact science, and is frequently used in forensic practice as an aid to

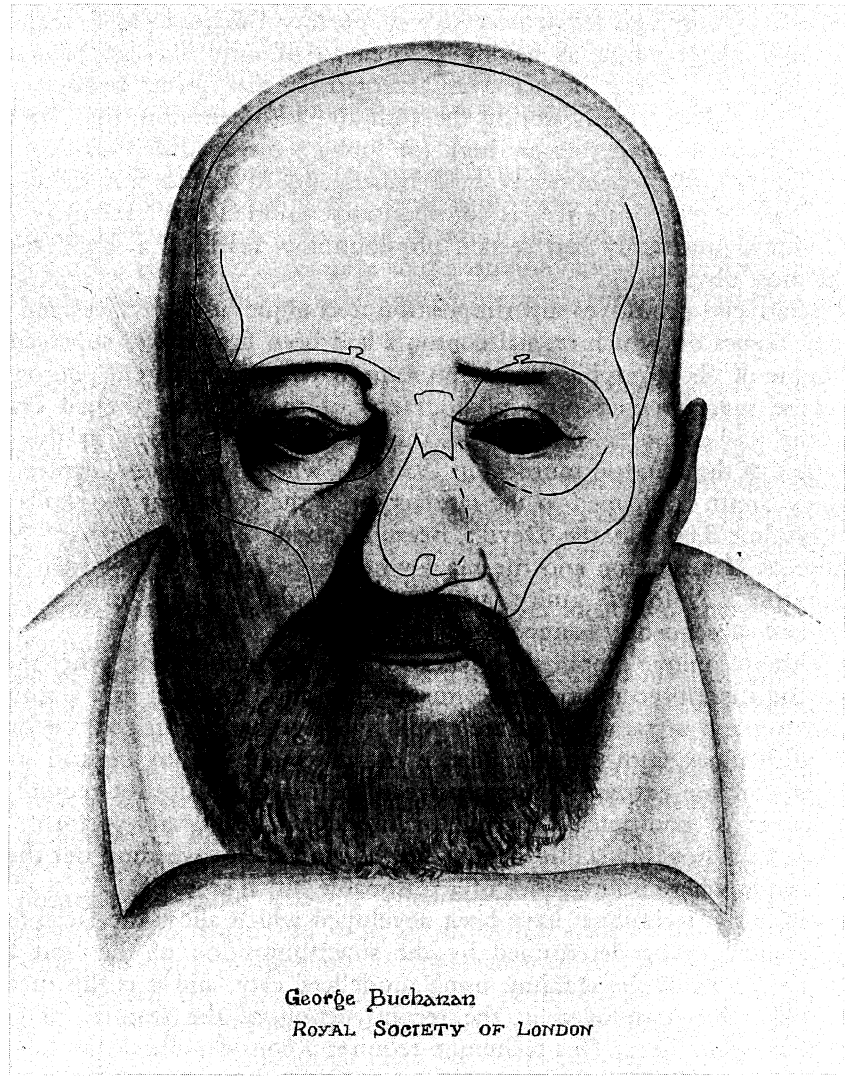

FIGURE 2

Superimposition of the frontal (norma facialis) cranial contour on the portrait in the Royal Society of London (from Pearson[7]).

the establishment of the name of a missing person where certain items of the skeleton, including the skull, are all that are available for analysis. The approach taken by Pearson was to superimpose an outline of the suitably orientated skull onto each of the various portraits of Buchanan. By this means, he was able to indicate which of the portraits, based on cranial dimensions and features alone, might or might not be worth further consideration as possible likenesses of Buchanan, as well as providing a means of excluding the most unlikely of the attributions.

Immediately apparent from this exercise, was that a number of the artists

working at that time had felt it necessary to portray Buchanan as a 'highbrow', rather than displaying him as having a forehead of only average proportions. Such a degree of artistic licence was accepted as the norm, because it was commonly believed, certainly during the 16th and 17th centuries, that a relationship existed between an extremely high (or 'noble') forehead and an exceptional intellect. This is still a commonly held belief, and it should not therefore be surprising that in past times it was automatically assumed that extremely intelligent individuals invariably had certain physiognomic features, a 'high' forehead being the most obvious.

The relatively primitive superimposition technique used by Pearson using transparent tissues on which cranial contours had been drawn was superceded by the technique of photographic superimposition in which transparent photographic images were superimposed onto photographs of the suitably aligned cranium. One of the earliest successful uses of this latter approach was in the police investigation of the Ruxton murders in 1935,[9,10] where Professors Glaister, Brash and Sydney Smith confirmed to the satisfaction of the court that the skulls found in Gardenholme Linn, in the Devil's Beeftub, about 2 miles north of Moffat, were those of Mrs Ruxton and the maid who looked after her children. Doctor Buck Ruxton was found guilty, principally on the strength of the forensic evidence, and subsequently hanged.

While the technique employed by Pearson, and by implication other methods in which the superimposition of one image onto another (such as a photograph onto a photograph or radiograph) are employed have been criticized[11] because of potential difficulties with correspondence of images, it has to be said in their favour that they are extremely inexpensive to perform and do not require either a high degree of computer expertise or modelling ability to perform. More particularly, in reasonably skilful hands, they are capable of weeding out the most extreme images where no evidence of a reasonable 'fit' is seen.

More recently, techniques have been developed which allow the facial features of an individual to be determined by the superimposition of the 'soft tissues' directly onto a cast of the cranium using modellers' clay, and it is this methodology that has been employed in the reconstruction of the features of George Buchanan described here. This technique requires a considerable degree of expertise on the part of the individual undertaking the reconstruction, who must have a sound knowledge of the relationship between the bony contours of the skull and the soft tissues that overlay them. The technique on which this method is based was first used towards the end of the 19th century[12,13] and on numerous occasions since,[11,14] when detailed measurements were made of soft tissue depth (i.e. tissue thickness) at well-defined sites on the head and face. Such values were obtained for males and females of different ages and racial groups, and for a range of physiognomical types.

The other approach that is becoming increasingly popular in forensic practice involves the use of computer-assisted facial reconstruction techniques, the end result of which is a simulated 3-dimensional image of the facial features of the subject. This approach is technically less demanding than the technique in which the facial contours are gradually built up to provide the definitive 'sculptured' form. Moreover, it has the great advantage that it can be undertaken by individuals with minimal anatomical knowledge and/or computer literacy. The final image can also be produced in a much shorter period of time. Furthermore,

the image can be amended with ease should additional information about the subject become available, such as hair colouring or style, or the presence of a facial scar or other disfigurement. The image can be stored on disc, and can be transmitted without delay from one police authority to another through appropriate computer link-ups.

While technical advances may be expected to occur in computer-assisted 3-dimensional graphics, possibly the most impressive results are achieved at the present time by the former technique in which the 'soft tissues' are superimposed directly onto a cast of the cranium and mandible using modellers' clay, and it was for this reason that this was the approach employed in the present study.

Specific methodology used to reconstruct the facial features of Buchanan

In the first instance, an exact replica cast of the cranium was prepared in the Prosthetics Department of the Edinburgh Dental Hospital, so that the original specimen would not be exposed to unnecessary handling. As the mandibular fossae of the temporal bones, where the head of the mandible articulates with the skull, were both intact, as was the premaxilla and alveolar processes of the maxillary bones, the absence of the original mandible proved to be only a minor inconvenience, as was the absence of the upper dentition, in relation to the reconstruction process.

A set of teeth of appropriate size was initially inserted into the upper jaw, and a cast of a lower jaw, with full dentition, selected (from the collection in the Edinburgh Dental Hospital) which exactly matched the bony contours and features of the upper jaw. The presence of the teeth allowed the normal lower jaw profile of Buchanan to be established with a considerable degree of accuracy. This component of the exercise was of critical importance, because a significant difference in jaw profile is observed between individuals with most or all of their teeth present, and those that are edentulous. The decision to work on the assumption that Buchanan had most or all of his teeth at the time of his death was justified on the grounds that the appearance of the premaxillary region and maxillae indicated that he almost certainly possessed teeth in the upper jaw, although the alveolar border had extensively receded. We believed that it was reasonable therefore to assume that teeth were also present in the lower jaw.

It was at this stage, that both the cast of the cranium and its matching mandible were dispatched to the Department of Medical Illustration in the Dental Hospital, Newcastle upon Tyne. The only instructions given to the modeller were that the individual was an elderly and balding male, who possessed a full beard. The soft tissues of the face were gradually superimposed on the cast of the skull and mandible, in order to produce the facial contours, using the tables of soft tissue depth at well-defined sites on the head and face as provided in the appropriate literature (see previously), combined with a knowledge of the anatomy of the facial musculature. A sequential series of photographs is provided in Fig 3 which gives an indication of the stages involved in the evolution of the definitive facial features (Fig 4).

A photograph of a frontal view of the reconstructed head (Fig 4) reveals an almost uncanny likeness to one of the portraits illustrated by Pearson,[7] namely the Royal Society picture that had previously been selected by him as the most accurate representation of Buchanan. This choice was even more evident when

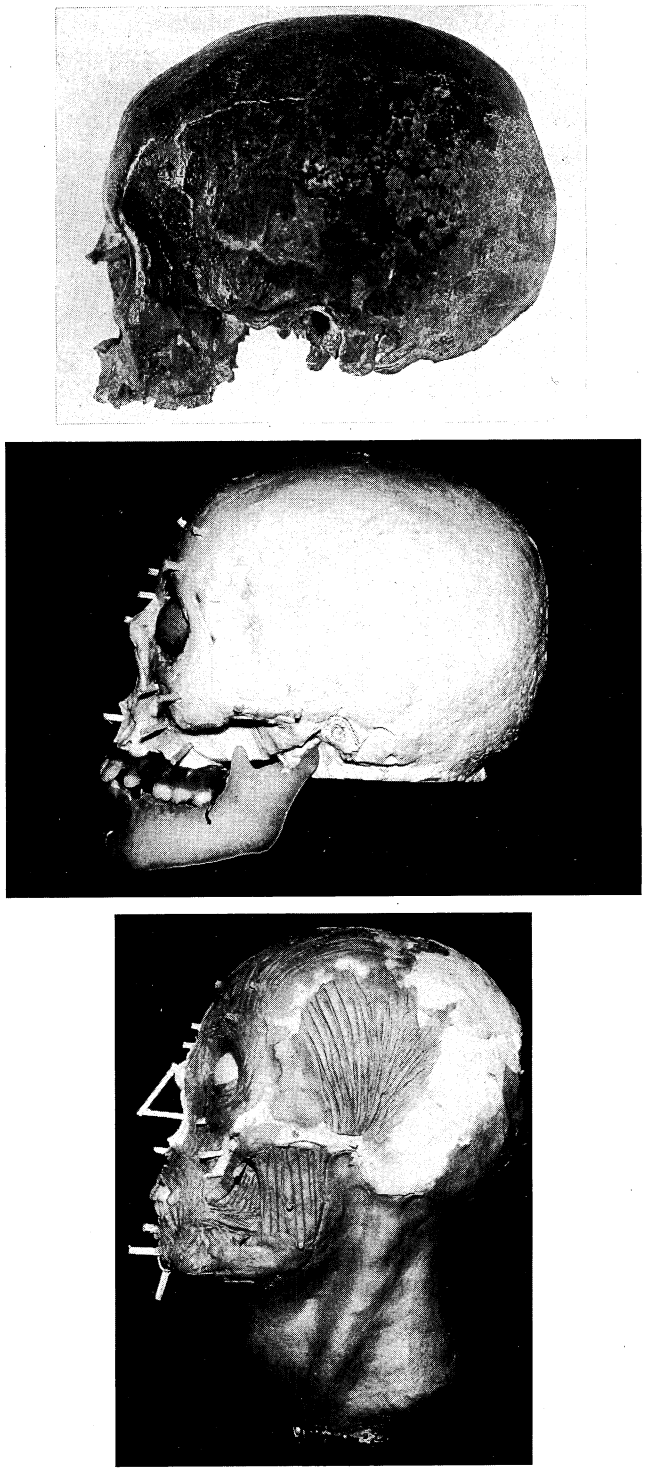

FIGURE 3

Photographs taken during the reconstruction process which show a lateral view of Buchanan's skull (a) and two of the stages involved (b, c) in the evolution of the definitive facial features.

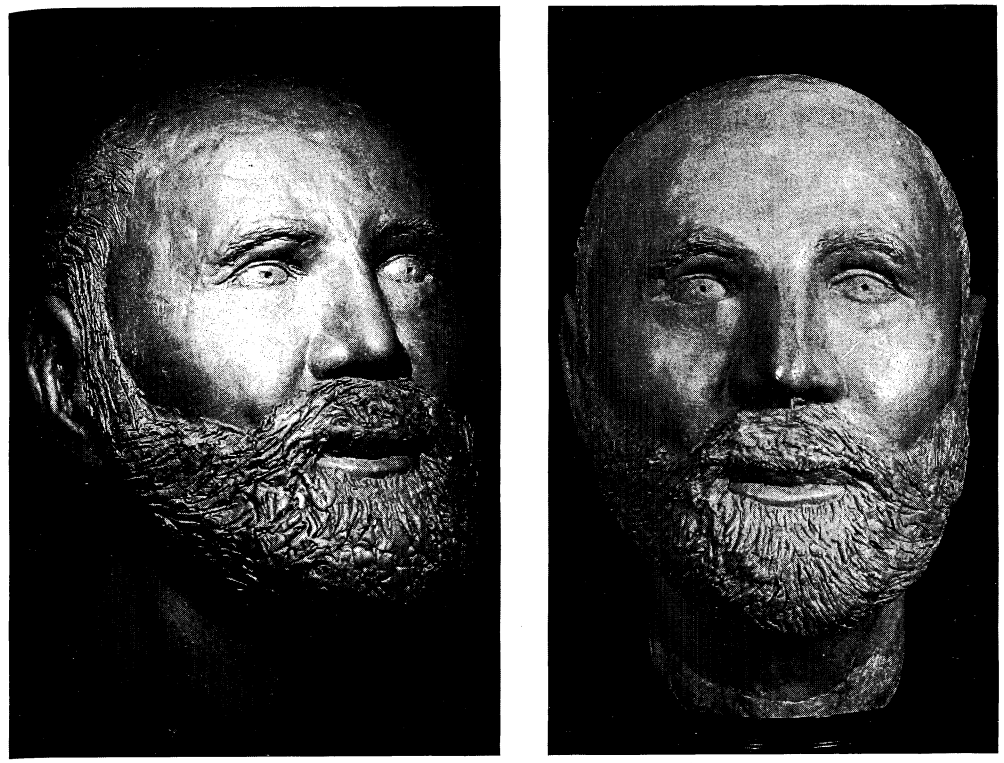

FIGURE 4

Fronto-lateral (a) and frontal (b) views of the clay model of the reconstructed head.

the plaster cast of the reconstruction of the head, modelled in clay, was available for inspection.

Findings and discussion

Our findings therefore confirm Pearson's selection of the Royal Society picture as the most accurate representation of Buchanan, based on the skeletal evidence available to us, and provide what we believe may be the definitive view on this contentious topic. While others may argue, on artistic or stylistic grounds, that another of the portraits/engravings more closely resembles the true likeness of Buchanan, we believe that it will in future be extremely difficult to argue with any degree of authority against the forensic evidence produced here.

While we would not pretend to be authorities on Buchanan, the man, nor would we dare to put him into his historical perspective both during his lifetime and particularly after his death he has remained a controversial character. 'While his title to learning is thus beyond dispute, the rest of his character has been the subject of vehement controversy'.[15] King James was certainly fulsome in his praise of the benefit he gained from Buchanan's tutelage. According to Dalzel[16] 'James' education had been so conducted by his chief preceptor, the celebrated George Buchanan, as to inspire him with a great respect and an uncommon passion for learning'. In his speech at Stirling to the University of Edinburgh,

according again to Dalzel[16] in response to one of the English Doctors having expressed a wonder at the King's fluency and elegance in the speaking of Latin, 'All the world', said his Majesty 'knew that my preceptor, George Buchanan, was a great master in that faculty. I follow his pronunciation both of the Latin and Greek, and am sorry that my people of England do not the like, for certainly their pronunciation utterly spoileth the grace of these two learned languages; but ye see that all the learned men of Scotland express the true and native pronunciation of both'.

For further details regarding the early history of the university and Buchanan's influence in its establishment in 1583, very shortly after his own death the year before, the interested reader should refer to Bower[17] and other appropriate texts.[16, 18, 19]

While it will clearly always be impossible to satisfy all scholars that the skull in the Department of Anatomy of the University of Edinburgh is that of George Buchanan (see, for example, McFarlane[6]), who states 'Given the dubious provenance of the skull ...'), the circumstantial evidence alluded to above would seem to indicate that there is a strong probability that it is indeed his.

If the skull is indeed that of Buchanan, then we are of the view that the objective nature of the forensic reconstruction presented here has served a particularly useful service in clearing up a mystery that has perplexed Buchanan scholars for at least three hundred years. This also provides an excellent example of how modern forensic techniques may be used to investigate otherwise intractable problems. It is also in our view altogether appropriate that a member of the University that Buchanan was indirectly instrumental in founding, via his pupil King James, should be involved in this exercise.

ACKNOWLEDGMENT

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