² Parlov, S M, and Puttersberg, R K, The Mandate for Internists to Broaden Their Care for the Dead, *Sem Death*, 1979, 1, 100.
³ Puttersberg, R K, Referral Patterns in Postmortem Medicine, *Sem Death*, 1979, 1, 120.
⁴ Puttersberg, R K, and Parlov, S M, Health Care Delivery to the Dead, *Rand J Financial Medicine*, 1972, 82, 184.
⁵ Parlov, S M, and Yankelowitz, B Y, Management of the Dead Patient Embalmed Prior to 1842, *Publications Unanimous*, 1648, 2, 15.
⁶ Yankelowitz, B Y, Outcome Assessment and Proven Evaluation in Postmortem Care Delivery, *Rand J Grant Med*, 1987, 8, 43.
⁷ Yankelowitz, B Y, A Randomised Double-Blind Trial of Formaldehyde versus Placebo in Third Party Olfactory Detection of the Dead Patient, *J Clin Invest Death*, 1979, 49, 862.
⁸ Yankelowitz, B Y, A Longitudinal Study of 357 Dead Patients, *Ethiop J Anat*, 1257 AD, 27, 4.
⁹ Puttersberg, R K, The Role of the Physician's Assistant in Caring for the Deceased—Letter, *Ann Int Death Med*, 2027 AD, 53, 60.
¹⁰ Parlov, S M, Federal Regulation of Rehabilitation of the Patient Embalmed with Multiple Chemical Agents, *Univ E Dak Newsletter*, p 1, 5 July, 1979.

Random assessment by projected examination scripts (RAPES): a new look at examination marking

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Introduction

An apocryphal story from Oxbridge concerns the technique of a don who was wont to throw examination papers down the stairs outside his room and allocate degree placings by the distance the papers travelled; scripts that fell the furthest away were awarded the higher placings. Despite the intense interest that has been shown in examination methodology in the undergraduate medical curriculum, this technique has not been properly evaluated. The purpose of our investigation was to rectify this omission by comparing the technique (RAPES) with a well-established but labour-intensive conventional method.

Materials and methods

- (1) Standard university exam scripts of eight pages were used. These measured 29.5 cm by 21 cm and a random sample of 10 scripts gave an average weight of 28.25 g (weighed on a Salter No 511 balance, weighing up to 900 g in 5 g stages).
- (2) One flight of steps were selected in a large lecture theatre at the Medical Sciences Institute, University of Dundee. These consisted of 20 steps each of 198 cm width with a vertical height varying between 19 and 20 cm, and an angle of elevation from horizontal of 44.73°. Steps were carpeted with a rough pile carpet and had metal edges.
- (3) Fifty exam scripts used were from a previous anatomy written paper. Each paper had consisted of four essay questions. Each question had been marked by a different individual and the allocated marks summated.
- (4) The lecture theatre used was at a constant temperature; the doors were closed; and wind speed was estimated at zero miles per hour.
- (5) Throwing technique: in each method listed below the papers were held in both hands and were projected forwards with an easy throwing motion, the eyes being kept shut to obviate any inclination to throw them towards any particular part of the experimental stairs.
- (i) Block of 50 papers, face up, and with staples pointing laterally.
- (ii) Block of 50 papers, face up, and with staples pointing away from the thrower.
- (iii) Block of 50 papers, face up, with staples pointing towards the thrower.

- (iv) as in (iii).
- (v) Block of 50 papers, face laterally, edge forward, with staples pointing towards the thrower.
- (vi) Block of 50 papers, face laterally, edge upward, with staples pointing downwards.
- (6) The stairs were divided into five segments of 20 marks each from 0 to 100 marks, and the papers which fell into each of these divisions were counted.

Observations and results

EXAMINATION OF THROWING TECHNIQUE

Pilot observations had indicated that the method of throwing the scripts was of importance in determining the final distribution of the scripts on the stairs. An initial experiment was undertaken to establish which of the throwing methods resulted in a distribution of scripts that did not differ appreciably from the distribution achieved by the conventional technique. The results are shown in Table I. Statistical analysis was carried out using the χ^2 test. Method VI was the only throwing technique in which the distribution of scripts (RAPES) was similar to that of the conventional method (CONVENT).

TABLE I—Tabulated results of expected marks by the conventional technique compared with observed marks by RAPES using techniques (i)–(vi)

	0-20	21-40	41-60	61-80	81-100
Conventional technique—expected mark	1	14	29	5	1
Throwing technique:					
(i) Observed mark	0	5	34	11	0
(ii) "	1	14	13	14	8
(iii) "	0	6	44	0	0
(iv) "	0	10	39	1	0
(v) "	3	19	28	0	0
(vi) "	3	10	34	3	0*

* $\chi^2 = 5.06$ $P < 0.01$

DIRECT COMPARISON OF RAPES AND CONVENT MARKS

Method VI was then used to compare directly the mark achieved under the RAPES system with the actual mark achieved by each candidate under the CONVENT method.

Two RAPES were made with the scripts arranged at random (as they are likely to be collected under examination conditions), and then with the scripts arranged alphabetically. In both instances after throwing the scripts the observed (RAPES) mark and the actual (CONVENT) mark obtained by each candidate were recorded. The results are given in Table II.

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TABLE 11—Marks obtained by RAPES (observed mark) and conventional examination systems (actual mark) for 50 candidates. (Only the results for random arrangement of scripts before throwing are given.)

Observed mark	Actual mark	Observed mark	Actual mark
1	3	2	2
1	3	2	2
1	3	3	3
2	2	3	3
2	3	3	3
2	2	3	2
2	3	3	4
2	3	3	2
2	4	3	3
2	1	3	4
2	3	3	3
2	2	3	3
2	3	3	2
2	3	3	3
2	1	3	3
2	3	3	3
2	3	3	4
2	3	3	5
2	3	3	3
2	3	3	2
2	3	3	3
2	3	3	3
2	2	3	2
2	2	3	2
2	4	3	2

$\chi^2 = 12.45$ P < 0.01 (no significant difference).

Alphabetical arrangement— $\chi^2 = 16.81$ P < 0.01 (no significant difference).

Discussion

The results presented in this paper confirm that the method of projecting examination scripts down flights of stairs is as effective an assessment method as the more conventional system of subjective marking of essay questions.

Critics might suggest that, by testing the RAPES method only once, the assessment of the technique was not scientifically valid. Nevertheless, conventional examination assessments include a one-off marking procedure and we feel that in our use of a *one-off application* of the RAPES technique we have ensured the validity of the comparison.

In several cases candidates who had achieved high marks under the conventional technique did poorly using the RAPES

method and vice versa. Even so, because the bulk of the candidates fared no better or no worse, it is thought that, despite the occasional anomalous result, the method offers an important addition to the armamentarium of examination techniques. If, as is usual, additional assessment methods—for example, viva voce or practical examination, or both—are used in conjunction with the present method, anomalies may be readily detected and corrected.

The prime advantages of the RAPES method are the remarkable saving in examiners' time and the elimination of any subjective bias on the part of the examiners.

The present results, however, have compared the RAPES method with only *one* conventional technique. Before a more comprehensive appraisal of its value can be made, comparisons with other examination techniques—for example, MCQ—may be necessary.

It was striking that the method of projecting the scripts down the experimental stairs was a critical factor in determining the distribution of papers and marks. Unfortunately, the aerodynamic characteristics of an examination script are not yet known. In addition, the conditions applicable in the present investigation, such as script size, weight, and stair configuration may vary greatly in different institutions. We suggest that potential examiners in other centres should repeat these experiments to determine the optimum conditions before using RAPES.

We realise that the introduction of such a novel and time-saving method may be resisted by conservative elements among medical educationalists, and also by undergraduates. We do not suggest that the RAPES system should replace existing methods but rather that it should be used in conjunction with at least one other technique. It could be of value in replacing present unpopular, labour-intensive methods which employ costly computer-assisted marking. The results of the present pilot study are sufficiently encouraging to warrant further investigation.

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Music and the unconscious

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On the night of 17 February 1854 Schumann had a dream. Angels appeared and dictated music to him. On waking, he got out of bed and copied the piece down from memory. The short 32-bar tune in E flat major was later used by Schumann as the basis of a set of variations which were published posthumously in 1939.¹

A no less striking example of "dream music" occurred in 1918 when Stravinsky was working on his score *L'histoire du soldat*. He tells us that not only did the music itself appear to him in a dream, but also the person playing it. A young gypsy was sitting by the edge of the road. She had a child on her lap, for whose entertainment she was playing a violin. The child showed his delight with the music by applauding enthusiastically.

Next morning, Stravinsky was able vividly to recall the scene, and included the gypsy's piece in the music of the *Petit Concert*.²

Perhaps the most famous of all musical dreams occurred to Tartini. He dreamt that he made a pact with the devil for his soul. Everything went at his command; his new servant anticipated every one of his wishes. Then he handed the devil his violin, to see what he might do with it. "Great was my astonishment," said Tartini, "when I heard him play a sonata of such exquisite beauty as surpassed the boldest flight of my imagination. I awoke, and seizing my violin, I tried to reproduce the sounds I had heard, but in vain. The sonata I then composed, although the best I ever wrote, was far below the one I heard in my dreams." Such was the origin of Tartini's *Devil's Trill* sonata.³

All musicians can testify to having composed, performed, or simply listened to music in their dreams. Dreaming about music, in fact, is a professional pastime. Even Walther's prize song, in *Meistersinger*, came to him in a dream—a sure sign that Wagner, too, understood the central part that dreams can play in the

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