TABLE II—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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mental life of the composer. Indeed, he himself (according to *Mein Leben*) had earlier composed the prelude to *Rheingold* in a twilight state of drowsy somnolence.

I am aware that scientists, too, dream creatively. No one had been successful in analysing the chemical structure of benzene until 1865, when the clue was discovered by Kekule in a fantastic dream. He saw the molecules dancing before him. Suddenly they formed themselves into a whirling snake biting its own tail. Kekule awoke, and his hexagon formula of interlocking molecules was the outcome. "Let us learn to dream, gentlemen," declared Kekule when announcing his discovery.

Freud used to call the dream "the royal road to the unconscious." It is not the only road to that subterranean world, of course, and Freud quickly applied his general theory of the mind (as disclosed in the later editions of the *Interpretation of Dreams*) to the entire domain of the psychopathology of everyday life (jokes, slips of the tongue, forgetting)—a world behind the world, where men are robbed of free will, where thought and deed are "motivated," where Id prevails. Within Freud's own lifetime, an entire literature sprang up around his work which still dominates art criticism. His pioneering, psychoanalytical study of Leonardo, for example, which generated a vast progeny in painting, taught us to look at that master in a new way, to look not merely at the canvas, but, as it were, behind it as well, because all those visual fingerprints which run across so much of his work and unify it are, in reality, the unconscious expression of infantile memories. Art had become autobiographical.

It was the same in literature and drama. Motivation became the watchword. A character who was not drawn from life lacked verisimilitude in art. In biography, especially, psychoanalysis became a self-fulfilling prophecy. The hero was publicly dissected, his inner life exposed, the infantile antecedents of his conduct laid bare (even though this frequently meant posthumous humiliation) in an effort to know not merely what he did but why he did it.

And what of music? Freud neglected it. He was probably right to do so, because he himself was not very musical. At any rate, the *Interpretation of Dreams*, so rich in its references to the other arts, records only one case of dream music (Tartini's, pushed into a footnote); and Freud's later work contained but one reference to the psychopathology of a musician—an example I shall come to shortly.

Does music, like the other arts, have an unconscious content? Can it, too, symbolise and sublimate infantile memories? Is there such a thing as a musical underground, controlling events on the surface of the music? These are difficult questions. After all, psychologists are rarely musicians; musicians are rarely psychologists. Then there is the abstract, non-conceptual nature of music itself. The other arts—painting, literature, and sculpture—incorporate the world of phenomena, the world of concrete objects; it is relatively easy to see what they are "about." A house, a bowl of fruit, or a bicycle may all turn up in a painting, a play, or a book. Indeed, they may be essential to our understanding of the work. But music is self-contained, it is non-pictorial. There is, in short, no equivalent in our art to Ernest Jones's psychoanalytical study of *Hamlet*. You cannot handle music like that. Who can say what Mozart's *Jupiter* symphony is really "about"? The links between life and music, unlike the links between life and other arts, are virtually impossible to establish.

A power within us

None the less, we musicians can provide the psychological investigator with some intriguing testimony suggesting the existence of unconscious processes in our art. We believe, with Voltaire, that "there is a power that works within us without consulting us." (Voltaire, incidentally, composed poetry during his sleep.) Schumann was expressing the same idea when he exclaimed: "It is extraordinary how I write everything in canon, only detecting the imitation afterwards, and then find

inversions, rhythms in contrary motion, complex counterpoint, etc." Composers frequently sleepwalk their way through music, and, having safely reached the other side, turn round to observe with astonishment the many obstacles they negotiated to get there.

A classical example of unconscious motivation has been recorded by Schoenberg. During the composition of his First Chamber Symphony (opus 9) he was so worried by the lack of any apparent connection between the two main themes of the work that he seriously contemplated rewriting the second of them, but then decided to stand by his initial inspiration. "About twenty years later," he wrote, "I saw the true relationship. It is of such a complicated nature that I doubt whether any composer would have cared deliberately to construct a theme in this way; but our subconscious does it involuntarily."⁴ The connection is a serial one, though at the time of the Chamber Symphony Schoenberg had not yet evolved 12-tone technique, whose official discovery still lay 20 years in the future. It was as if Schoenberg's central musical discovery was always present within him, merely waiting to be disclosed. One recalls Pascal's brilliant phrase: "You would not have sought me unless you had already found me."

Haydn reported a charming case of unconscious motivation.⁵ The King of Prussia (Frederick William II) once gave him a signet ring, as a reward for his musical services, which he always wore while composing. On one occasion he mislaid it. The flow of composition abruptly ceased. Only when the ring was found, and was once more safely back on Haydn's finger, did the musical ideas return to life.

Unconscious motivation

Unconscious motivation not only starts the composing process; it stops it too. In 1900, Rachmaninov experienced a "creative block." Depressed, and unable to compose, he became a patient of Dr Nikolai Dahl, a neighbour of his in Moscow, who was then having some success with the new technique of hypnotherapy. Every day Dr Dahl put Rachmaninov into a light trance and suggested to him that his depression would lift, that he would experience a sense of wellbeing, that his composing would flow. A short time later, Rachmaninov, in a sustained burst of creative effort, had composed his most successful work—the C minor Piano Concerto. Turn to the title page and you can read the inscription: "To Dr Dahl, in gratitude."

Psychopathological evidence of this kind offers us a tantalising glimpse into the composing process generally. Gustav Mahler, for example, once consulted Freud with a view to undergoing a course of psychoanalytical treatment. Nothing came of the idea, but Freud left a record of the interview.⁶ Apparently Mahler's father was a brutal person who subjected his wife to violent treatment. When Mahler was a child, he witnessed a particularly painful scene between them. It became quite unbearable to the small boy, who rushed away from the house. At that moment, a hurdy-gurdy in the street was grinding out the popular Viennese air *O, du lieber Augustin*. In Mahler's opinion, said Freud, the conjunction of high tragedy and light amusement was from then on inextricably fixed in his mind, the one mood inevitably bringing the other with it. The child is father to the man. The conjunction of high tragedy and light amusement, such a prominent feature of Mahler's style, is all contained within this single childhood memory.

None of this constitutes a psychoanalysis of music—a process I take to be meaningless. You can psychoanalyse a symphonist, but not a symphony. The difference is important.

It so happens that Freud had a great analytical contemporary in music. Heinrich Schenker introduced the idea of "deep structure" into music before the first world war. Schenker's theoretical picture of music, in fact, is very similar to Freud's theoretical picture of the dream. I find it remarkable that no one has drawn the parallel before. Behind music's foreground, argues Schenker, is a musical background. Behind all the

contrasting themes of a work, behind all its harmonies, rhythms, and tunes, behind everything we conventionally call the "piece," lies its *Ursatz* (background), a basic, all-embracing thought which unifies it and gives the total structure its integrity. The purpose of musical analysis is to move from foreground to background, from diversity to unity, to explain the one in terms of the other; in short, to disclose the *Ursatz*.

It is not hard to spot the model for this illuminating idea. According to Freud the dream, too, has a deep structure. Behind the manifest dream lies its latent content. The purpose of dream interpretation, simply expressed, is to work back from the surface of the dream, to explain the manifest in terms of the latent. Only then is the true meaning of the dream disclosed. Is this striking similarity of deep structure a mere coincidence? I do not think so, although I cannot prove it. Both Schenker and Freud lived in Vienna for more than 40 years. Schenker died there in 1935, aged 68. It is unthinkable that he could have remained unaware of Freud's work. His first analytical theories were published in 1906, six years after Freud's *chef d'oeuvre*, and at the very moment depth psychology was making its first impact in Vienna.⁷

To claim a correspondence between the surface of a dream and the surface of a symphony may seem foolish. Schenker himself would have abhorred the idea. And yet, had he ever analysed the dream music by Schumann, Tartini, and Stravinsky that I mentioned earlier, he would in fact have been analysing a dream. For the rest, I have often thought that the old-time theorists wrote truer than they knew when they described a sonata development as a "free-fantasia"—where themes and keys are thrown into the melting pot, where controlled musical turmoil takes over, where fantasy reigns.

Later theorists, in fact, in attempting to refine Schenker's model, have actually incorporated Freudian terminology into music. Thus concepts like condensation, overdetermination, displacement—all those unconscious processes that censor and disguise the meaning of the dream—are to be found regularly in the analytical writings of Hans Keller. I, myself, have devoted a large part of my professional activities⁸ towards trying to show that the background level of musical structure was truly unconscious. But the apparent absence of repression in music—a prerequisite to the notion of a dynamic unconscious, motivating the entire composition—admittedly makes such a view difficult to sustain. Music is an "innocent" art. What would repression be directed against? To reveal the latent content of a dream is difficult; resistance must be overcome, painful memories exposed. To reveal the *Ursatz* of a composition, however, is relatively easy. The chief requirement, albeit an important one, is a knowledge of the work. And when the *Ursatz* stands revealed, what then? A deeper insight into music has been obtained; nothing more, but nothing less either. There is no catharsis; there are no ramifications on the rest of one's mental life—as there might be in the successful analysis of a dream. We have simply disclosed the music behind the music. There is, indeed, nothing more to disclose. That is why I insist that psychoanalysis is for symphonists, not symphonies. The parallel between music and dream structure remains—a parallel.

But what of the *Ursatz* behind the *Ursatz*? Schenker denied its existence. For him, the *Ursatz* was irreducible. A background behind the background is, none the less, philosophically tenable. The Kantian "thing-in-itself," the Schopenhauerian "will," the Schoenbergian "grundgestalt"—all tell of things behind things. Perhaps Schenker was wrong. Perhaps the *Ursatz* is, after all, merely a symptom of something more profound. Perhaps the deepest level of musical structure is ultimately unknowable. Analysts are in danger of losing their sense of humour when confronted with such a sombre prospect. This nonsense rhyme by Hughes Mearns will help to cheer them up again.

As I was going up the stair,
I met a man who wasn't there.
He wasn't there again today,
I wish, I wish, he'd stay away.

Schenker, Reti, and Schoenberg have all, at various times and in various works, chased after the man who wasn't there. Occasionally, they have even claimed to have caught him. Invariably, the man who wasn't there turned out to be the man who was—not nearly so fascinating a witness.

Hearing without knowing

A different, and possibly more fruitful, aspect of the musical unconscious has to do with subliminal listening. Pierre Laplace, the French mathematician, described the case of a man who, for no apparent reason, started to hum a long-forgotten tune as he walked down La Rue St Germain.⁹ Two hundred yards farther on, and to his utter astonishment, he passed a street violinist playing this same tune. There are two explanations of this incident. Either it was a coincidence, or the tune (inaudible on the conscious level) was unconsciously perceived and remembered. Laplace favoured the latter explanation. He inferred that the man heard it without being aware of it, so that the tune came to him—in both senses of the phrase—out of the blue.

Our ability to hear beneath the surface has been documented in a remarkable story told by Manuel de Falla.¹⁰ The opening theme of his *Nights in the Gardens of Spain* apparently came to him quite spontaneously. Yet one day he met a fellow composer, Amadeo Vives, who told him that he had written a zarzuela which began in exactly the same way. This coincidence bothered Falla until he found the true explanation. Some time earlier, he and Vives had lived on two different floors of the same house in Madrid. On the pavement below, an aged blind violinist had daily played this opening phrase on a badly tuned violin. At the time, Falla and Vives scarcely noticed his presence. Without realising it, however, each composer later "remembered" the notes, and independently composed them as his own. They might well have paraphrased Freud's famous aphorism "We are lived," and exclaimed instead "We are composed." There is need of an inquiry into subliminal hearing. Sometimes it triggers the act of musical creation. Yet it remains ill documented.

The psychology of music and musicians is an altogether neglected study. In England the subject hardly exists. In North America the chill hand of Carl Seashore may still be felt. The Seashore tests of the 'twenties and 'thirties led the discipline into the cul-de-sac where it still languishes. It is useful, of course, to know how to measure the musician's response to pitch, duration, intensity, and timbre (and even to award him points on the results), but it is hardly imperative.

A true psychology of music will advance beyond such primitive "lab work" and take us into the very centre of the musician's workshop. It will address itself to the musical unconscious, to dreams, to inspirational sources, to methods of work, as well as to the psychopathology of music—to musical errors and their meaning. The topic is vast. Its further exploration, however, is a challenge which must be taken up.

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