SHEILA SCOTT MACINTYRE

M. L. CARTWRIGHT

Sheila Scott Macintyre, who died in Cincinnati on 21 March, 1960, was born in Edinburgh in 1910. Her father, James Alexander Scott, of Banchory, a graduate of Aberdeen, was Rector of Trinity Academy, Edinburgh, from 1925 to 1942, and her mother, Helen Myers Meldrum, of Kilmuir Easter, in the County of Ross, was the authoress of two books. Sheila Scott was at school at Trinity Academy and later at Edinburgh Ladies' College (now the Mary Erskine School), of which she was Dux in 1928. At the University of Edinburgh Sheila gained numerous distinctions and took her M.A. with First Class Honours in Mathematics and Natural Philosophy. After two years at Girton College, Cambridge, she was a Wrangler in the Mathematical Tripos in 1934 and did a year's research under my supervision which resulted in her first published paper, on asymptotic periods. She then taught in succession at St. Leonards School, James Allen's School for Girls, and Stowe School. In December 1940 she married A. J. Macintyre, then a lecturer in the Department of Mathematics in the University of Aberdeen. She was appointed almost immediately to the teaching staff of the same department in a temporary capacity. She continued to teach in the department in a nominally temporary capacity, and with periods of leave to have her family, until 1949, when she was elected lecturer. The latter post she held until, in 1959, she resigned to accept a visiting professorship at the University of Cincinnati, whither her husband had gone the year before as professor.

In 1947 Sheila Macintyre began research again and took a Ph.D. under the nominal supervision of Professor E. M. Wright. The ideas of her thesis were entirely her own; starting from a paper by Wright† on functional inequalities she pursued the problems involved into the field of interpolation series in which her husband was also interested, and some of her later papers were published in collaboration with him. Professor R. C. Buck writes: "Her first publications dealt with the interesting problem of determining bounds for the Whittaker constant W. If f is entire and of exponential type less than W, and each derivative of f vanishes somewhere in $|z| \leqslant 1$, then f must vanish identically. Previous work by Ibragimov, Levinson and Boas had found successively narrower upper and lower bounds for W. In two papers [2, 4] Sheila Macintyre sharpened their methods to yield the bounds $\cdot7259 < W < \cdot7378$, which

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† See E. M. Wright, *Journal London Math. Soc.*, 22 (1947), 205–210, and [3].

remains the best current estimate. Parenthetically, one may note that the conjecture of E. S. Pondiczery that $W = 2/e$ is still admissible.

"Most of Mrs. Macintyre's other work dealt with the detailed study of certain interpolation series of the form $\Sigma c_n p_n(z)$, where the coefficients c_n are obtained in a specified way from a given function f. The basic tool is a representation formula of Pólya, extended by A. J. Macintyre† and later generalized by Mrs. Macintyre [9, 12].

"In her study of these series expansions, Sheila Macintyre discovered a number of interesting phenomena that had not been observed previously. For many of these series, it was known that if it converged (even at one point, in some cases) then the convergence must be everywhere, and the sum entire. Examining the familiar Lidstone series, she showed that even when the series diverged, a sequence of partial sums of the series could in fact converge, and the limit function need not be entire; in her paper [5] she gave characterizations for a class of these limiting functions.

"In a joint paper with her husband [7], another quite interesting aspect of interpolation series was considered. If one starts with a function F that is not entire, and constructs the appropriate interpolation series, it may in fact converge to an entire function f. It is then natural to study the relationship between f and F. In this, they were quite successful, showing that f and F were asymptotically equivalent in a very precise way.

"In several other papers [6, 8], Mrs. Macintyre continued to study the conditions under which certain specific expansions converge, and the nature of the limiting function; in these, she used techniques which enabled her to go beyond what had been achieved previously, allowing more delicate estimates which in some cases led to best possible results.

"In her chosen area of analysis, she introduced powerful refinements of techniques, and what is much harder, new and original problems for investigation."

She also collaborated with Mrs. Edith Witte in producing a very useful German-English Mathematical Vocabulary.

She was a member of the Edinburgh Mathematical Society and of the Mathematical Association (but not of the London Mathematical Society), and in 1958 she was elected a Fellow of the Royal Society of Edinburgh.

She is remembered as an exceptionally clear lecturer, and an excellent teacher with a warm-hearted but realistic interest in each of her students and also as a charming and helpful and often amusing colleague.

She had two sons and a daughter, but one son died suddenly at the age of two. Some years ago she had the first attack of the disease which eventually killed her and, in spite of a successful operation, she was well aware of the dangers of a recurrence. But her courage and sense of duty

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† A. J. Macintyre, *Proc. London Math. Soc.* (2), 45 (1939), 1–20.

allowed neither of these troubles to affect the quality of her work or to make her a less valuable member of the Department. It was typical of her that she was teaching in her new University up to three weeks before her death.

Publications.

1. (Published under the name S. Scott) " On the asymptotic periods of integral functions ", *Proc. Cambridge Phil. Soc.*, 31 (1935), 543–554.

2. "An upper bound for the Whittaker constant W ", *Journal London Math. Soc.*, 22 (1947), 305–311.

3. " A functional inequality ", *Journal London Math. Soc.*, 23 (1948), 202–209.

4. " On the zeros of successive derivatives of integral functions ", *Trans. Amer. Math. Soc.*, 67 (1949), 241–251.

5. " Overconvergence properties of some interpolation series ", *Quart. J. of Math.* (Oxford Series) (2), 2 (1951), 109–120.

6. " Some generalizations of two-point expansions ", *Proc. Cambridge Phil. Soc.*, 48 (1952), 583–586.

7. (With A. J. Macintyre) " Theorems on the convergence and asymptotic validity of Abel's series ", *Proc. Roy. Soc. Edinburgh* A, 63 (1952), 222–231.

8. " An interpolation series for integral functions ", *Proc. Edinburgh Math. Soc.* (2), 9 (1953), 1–6.

9. " Transform theory and Newton's interpolation series ", *Proc. London Math. Soc.* (3), 4 (1954), 385–401.

10. " On a problem of Ramanujan ", *Journal London Math. Soc.*, 30 (1955), 310–314.

11. (With E. Witte) *Mathematical vocabulary (German-English)* (Edinburgh, 1955).

12. " μ-transforms and interpolation series : Abel's series ", *Proc. London Math. Soc.* (3), 8 (1958), 481–498.