

- (i) What do you find, when you add a number in the first row to the corresponding number in the digit-sum row? Can you explain this?
- (ii) What patterns do you find by obtaining the digit-sum row of (a) the third row, (b) the sixth row, (c) the second row, (d) the tenth row, (e) the fifth row, (f) the seventh row, (g) the fourth row of the Multiplication Square? (Note: in some cases alternate numbers show a simple pattern.)
- (iii) Find the digit-sum pattern for the 12th row: is it the same as for the 3rd row? If so, can you explain why?

It is sometimes useful to know a simple pattern method for constructing multiplication tables for numbers greater than 12, especially when long divisions by such numbers have to be performed frequently. For example, a teacher with a class of 31 children may need the average age of the class, the average of a set of marks, the average attendance, etc. To construct the table of multiples of 31, write down a column of the "3-times table" (giving the "tens" figures) and alongside the "1-times table":

3	1	1	9	2	9	The tables for 19, 29, etc. have patterns similar to that of the table for 9: regard 19 as 20 - 1, 29 as 30 - 1, etc.
6	2	3	8	5	8	
9	3	5	7	8	7	
12	4	7	6	11	6	
15	5	9	5	14	5	
etc		etc				

- (i) Use the pattern method to write down the multiplication tables for (a) 41, (b) 69, (c) 81, (d) 99, (e) 999. Check your results by finding the digit-sums.
- (ii) Devise your own methods for writing down the multiplication tables for (a) 18, (b) 17, (c) 13, (d) 48. Check your results.

Does an average child (or adult) get more satisfaction and insight into mathematics from finding the cost of a carpet 12'6" by 10'6" at 38/6 per sq. yd. or from discovering why a sum of money such as £7/7/7 (equal numbers of £, s, and d.) is always exactly divisible by 11 and 23? Opinions about the points raised in this letter will be very welcome.

Yours sincerely,
D. B. EPERSON

*Christ Church College,
Canterbury, Kent.*

OBITUARY

CHARLES ORPEN TUCKEY

I am glad to have this opportunity of paying tribute to the great services of Tuckey to Mathematical Education. He was a lifelong friend, as both of us went to Charterhouse in January 1899, one as a boy of 13, the other as a young master of 23, with an age gap of little

over 9 years between us. I should have gone a term earlier, but ill health had postponed my arrival.

My last letter to Tuckey was to congratulate him on his ninetieth birthday. I reminded him that our age difference now meant little, whereas in 1899 it meant a great deal! He replied humorously to the effect that this might be a good example for some "Theory of Differences!"

This appointment to Charterhouse was an opportunity, but a challenging one, for a man of such Mathematical ability. He was highly gifted, both intellectually and physically. Born in August 1874 he went to Shrewsbury, and, as head of the School, gained a major Scholarship at Trinity College, Cambridge. He became tenth Wrangler in 1897, and then proceeded to Part II in 1898 which, in those days was only taken by a handful of the best. He was there placed in the second division of the first class.

Charterhouse desperately needed such a man. Mathematical teaching was at a low level. That great Headmaster, Haig Brown, had moved the school from London in 1872, in spite of opposition, to its incomparable site overlooking Godalming, and had ruled the school for 34 years; largely on old-fashioned lines. The new Headmaster had been there for a year and, conscious that Mathematical Scholarship was meagre, must have felt that a good and young Mathematician was required on his staff. There was a strong Conservative body of older masters devoted to the classics, who had been ardent disciples of Haig Brown. At that time only 13% of the School were grudgingly excused Greek, and worked on a kind of modern side, though the name was not used. This compares with 40% non-Grecians at Rugby at that date, and similar percentages at other Schools such as Harrow which claimed to be one of the first to start a Modern Side under the illustrious E. E. Bowen. Further, old-fashioned Mathematics was still taught with Euclid predominant. I have a vivid recollection of "saying" a proposition of Euclid as a kind of repetition in that frigid hour before breakfast, each boy having to give a sentence with verbal accuracy. For instance a boy might well get into trouble if he failed, in the fourth proposition, to give the famous "each to each" which was regarded as essential. "If two sides of a triangle are equal to two sides of another, each to each."

Thus Tuckey was able to join in the reform movement which started at the beginning of this century culminating in the abolition of Euclid as a compulsory subject for entrance to the older Universities about 1903. This rendered reform possible.

He joined the Mathematical Association in 1902, four years before I did and, almost from the beginning, became a member of many of the Committees which produced books of advice to teachers, and have always been a feature of our Association. The journey to London was, for him, comparatively short and this helped his regular attendance. He continued to serve on such committees for well over fifty years. My own work has always been a considerable distance from London with a consequent inability to help in this way. Hence I have largely to depend on others in an attempt to evaluate his contribution.

He was on the Committee which produced a report on elementary Mathematics in 1905, and also on that large one in 1907 which dealt with Geometry teaching at Preparatory Schools, interesting to me because it completely upset the Board of Education report of a very few years earlier which had carefully laid down the amount of Euclid that could be done in such places. Further he was very active in the production of the best of the Geometry reports soon after the end of War I. This, so it was believed, was largely written by Percy Nunn and Neville who did so much for Mathematical education, and indeed for the Association. But it is impossible to enumerate all the committees he helped till extreme old age overcame him. It will be sufficient to add that he was for many years on the General Teaching Committee and Chairman for a large part of it.

One former President states categorically that he had a special talent for such work. He himself, having served in this way on many occasions, mentions that Tuckey was the best chairman he had known. He was very industrious, and always ready to produce memoranda. He gave each member the opportunity of stating his views but kept discussion in check. In later years when advanced reports were prepared, such as analysis for Sixth Forms, he was always prepared to admit his limitations, a good example of his remarkable humility.

Another ex-President states that he was always good at doing a necessary committee job and, above all, in stimulating others to do the same. He could produce a constructive draft quickly, or provide a comment on others. Perhaps he was impatient on "fine points," not because he failed to see the objection, but because he felt that too much might be made of it. Further he was better at seeing small neat dodges than at getting an overall picture of a topic. It might be said that he was more the labourer of the building than the architect. But once the plan was decided no one could work harder at it.

Another informant states that he was at first shy of Tuckey entirely because, as he afterwards discovered, Tuckey was shy of him! The latter was highly gifted, as has already been stated, but suffered himself from shyness and indeed diffidence. His audience did not always realize his great ability.

Something should be said of his classroom work. I recollect no personal contact during my first or even second year, though he certainly taught some lower sets. But during my last year or two I was allowed to drop classical compositions and learn some higher Mathematics, mainly with Tuckey. Thus our friendship became possible. I well remember how he produced a protractor about 1902. I had been brought up in the strictest Euclidean principles and viewed it with disfavour! Probably I had never seen one before, but clearly he regarded it as a forerunner of the new age. In quite early days, like many another entrant to the profession, he did his best work with University Scholarship candidates, and I may well have been his first. Later on he gained the necessary power and confidence to impress the lower forms.

I have the clearest recollection of his assertion that, to gain a Scholarship, certain books must be mastered. These included *Analytical* and

Geometrical Conics, both books by Charles Smith. Also Loney's *Higher Dynamics and Statics* and, of course, Edwards' *Calculus*. He also valued Chrystal's very ponderous *Algebra*, and above all a liking for his proof that every equation must have a root! This especially interested me because my brother-in-law, Professor W. N. Roseveare, once a well known member of the Association, produced about this time a new proof of his own! I suppose these books today are largely forgotten, but they played their part, and I have many random recollections of work with him in his classroom.

To change to a more personal note, it should be recorded that in 1906 he married Miss A. K. R. Daniell, a prominent Wimbledon tennis player, and in 1910 succeeded R. L. Slater, with whom he had originally lived in bachelor quarters, as housemaster of Laleham. This was started for boys waiting to go into a larger house and only operated for a short time. On its closure after a few years he continued to live there till his retirement in 1937, when he went to live at Bournemouth. His teaching years were not however at an end, as he spent three years at Winchester during War II, doing especially good work, as the then Senior Mathematical master tells me, with the sixth form. Indeed he claimed himself to have taught in all for 127 terms!

During his retirement he became an Examiner for the Certificate Examinations, especially those of London and Bristol Universities. This no doubt inspired him to take as a title in his Presidential address to our Association "Teachers and Examiners" which will be found today full of interest and humour. Further he produced a number of text books which were widely used. His work for our Association was recognized when he became our President in 1944 and, later, was given the distinction of Honorary life membership.

No account of his life would be complete without some allusion to his ability at Lawn Tennis and other games. He never played at Wimbledon because these championships occurred in term time, but won both the British Veterans Singles and Doubles Championship at Eastbourne on nine occasions each! I remember how he told me that, in his old age, he could still hit the ball with accuracy and vigour if he could get to it! His wife was also a tennis player of note, and on two separate occasions won the All England Ladies' Doubles at Wimbledon (1909) and the Mixed Doubles (1913). Playing together they were formidable opponents and were able to show visitors many trophies they had gained.

They handed on these gifts to their second son and their daughter. The former represented Great Britain in the Davis Cup for three successive years just prior to War II, and the latter also represented Great Britain in the Wightman Cup for three successive years after the war had ended.

Tuckey was also a fine player of Eton fives till well on in his fifties, and I often saw him playing. It became customary for him, with a colleague, to play the school pair annually and they generally won.

He might also have made his mark at cricket. He told me once of a partnership he had with Ranjitsinghi at Trinity though, with his usual modesty, he claimed this was accidental, and that really he was well below this standard. Indeed he would never admit his exceptional

athletic powers! I have a vivid recollection of seeing him, about 1902, make a spectacular catch at cover point when playing for a team of masters, and receive the public congratulations of Dames Longworth, a famous Charterhouse master and ex-racquets champion!

His physical vigour continued almost to the end as he bathed regularly at Bournemouth until he was almost 90, and did not give up his tennis until 84, after playing regularly for 72 years. He died in October 1967 at the age of 92. His widow survives him at the age of 91.

These short notes are intended to record the services to our Association of a man devoted to his craft and devoted to our Association. Mathematical teaching today has evolved through the assistance of hundreds of reformers but, over the years, Tuckey certainly played a considerable and indeed a remarkable part.

W. F. BUSHELL

“Colonsay”
10 *Talbot Road,*
Birkenhead.

Mathematics generally, and this Association in particular, have suffered severe losses recently, and friends have written notices which we hope to publish shortly.

The death of Mr. Rollett has come as a shock to his many friends throughout the country and beyond. It would be hard to name many who have done more for us; few have done as much. We have at least the satisfaction of having let him see our regard for him by his Election to the office of last year's President. Fuller tribute will be paid later.

E. A. M.