

produce local fusion. The adjustment is necessarily slow, which may explain why the compensation below wide-spread inequalities, though nearly complete, is not perfect. Further, there seems no reason to believe that the asthenosphere is sufficiently soft to need to be treated as other than perfectly elastic in the theories of the variation of latitude and the tides.

The papers constitute a most important contribution to our knowledge of the physical conditions within the Earth. In view of their special interest in geophysics, it would be very beneficial if they could subsequently be collected and published in book form.

H. JEFFREYS.

George Stickland Criswick—Some Memories.

A GAP has been made in the small knot of professional Astronomers by the passing away, full of years and honours, of George Stickland Criswick, who first crossed the threshold of the Royal Observatory in August 1852, and was last seen within its walls at the Visitation in June 1915. Although he retired from active service before the end of the last century, yet his strong interest in all that pertained to the Science of Astronomy in general (and the progress and welfare of the Royal Observatory in particular) brought him constantly in contact with the younger generation of Astronomers, and he was always to be found at any public function at the Royal Observatory, and at the meetings of the Royal Astronomical Society, of which he was a Fellow for nearly 50 years. Of an exceedingly modest and retiring disposition, he was always more ready to efface than to assert himself, and those who met him only casually could form but a faint idea of the extent of his knowledge and acquirements, both in science and literature.

George Stickland Criswick was born near Sherborne, Dorset, on 31st January, 1836, of good old Dorset county stock. In due course he was sent to King's School, Sherborne—founded in 1550 by Edward VI. and fairly well endowed. The education was mainly classical, and here the young pupil acquired a taste for classical literature which clung to him all his life, and often he beguiled the weary hours, which have to be passed in the cold dark intervals of idleness enforced by overcast heavens, by reciting passages from Virgil or Xenophon, from Horace and Homer. His career at King's School was creditable without being brilliant—a good all-round boy, a first-class cricketer, an excellent swimmer. His future was so planned by his father that he was to go from school to University, from Cambridge to the London Bar under the ægis of his maternal uncle and godfather, George Stickland, Esq., a member of one (I forget which) of the Inns of Court. But misfortune overtook the family before

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George Stickland Criswick.

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George had completed his school course; his father died when the boy was barely 15, and the executor and widow's trustee proved unfaithful and fled to America, leaving Mrs. Criswick and her four children in very poor circumstances.

But though frail in body—dear, sweet, gentle little woman, how I loved her for her goodness and kindness to me, a stripling just younger than her younger son!—she was strong and energetic in mind. She removed her two boys from King's School, and worked up her friends till she got George a nomination as Computer at the Royal Observatory, Greenwich. In her letter to the Rev. Robert Main, Mrs. Criswick, though showing considerable eagerness, is very restrained in her commendation of her son: "He has received a good classical education, and has studied mathematics, &c.,—his age is 16." The result was that on August 25, 1852, George began, as Computer at the Royal Observatory at the munificent salary of £3 10s. per month!—his life-labour, as it proved to be. It was not a living wage, even the prospect in the far beyond was not enticing; it was not the future which had been intended for him and for which his very soul cried out; but it was a first step towards independence, and, single-minded and purposeful, the dextrous hand having found something to do, set to and did it with all its might. The flowery paths among the "humanities" along which he had picked a few of the early blooms, the quiet study in the "language of learning" on the banks of the Cam, with the hope and expectation of a fellowship which would enable him to enjoy a future of learned leisure; all these alluring visions were swept on one side and were replaced by Todd's Algebra and Goodwin's course of mathematics. His heart was not in them, but his brain assimilated a great deal and his future was secure as far as education could secure it.

In April 1854, Prof. Challis, Plumian Professor of Astronomy and Director of the Cambridge Observatory, applied to the Astronomer Royal, Mr. Airy, for a young man competent to fill the position of Junior Assistant at his Observatory, and the Astronomer Royal at once nominated young Criswick, who entered on his new duties on May 1st. In the course of the same year his services were "borrowed" by Mr. Airy to help him in carrying out the pendulum experiments in the deepest shaft in England at that time, in Harton Colliery, Derbyshire; and in point of fact G. C.—as he was always affectionately called by his old friends—did very little more work at the University Observatory, being offered, at the end of February 1855, a position as Assistant on the Staff at the Royal Observatory. This he accepted, and entered upon his new duties on the 26th March, 1855.

On the self-same day I began my labours as Computer, and for the first time met Criswick, who was then a young man a few years older than myself. He was of medium height, of sturdy but not heavy build, with round shoulders, which gave him the

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air of stooping. His complexion was fair, of a pink and white so delicate that any young girl might have envied him. His features were refined, his teeth the most perfect in shape and colour I have ever seen in a man, his eyes grey-blue, his hair a most uncompromising red—deep and rich. His expression in repose was composed and serious, but neither stern nor sad, and easily relaxed to a pleasant smile when he was in conversation.

The new Junior Assistant took up the various branches of work, which were from time to time allotted to him, with steady industry and calm judgment. Punctual and methodical, the Astronomer Royal found that whatever work he was set to do was sure to be well done. A careful and accurate observer, each of the principal instruments was in turn committed to his charge, and with them the best results obtainable were sure to be turned out. Nothing was scamped, nothing was hurried, and nothing was forgotten. In the desk-work, on the reductions he was an accurate and careful, neat and methodical calculator. Whether in charge of Time which gave Greenwich mean time to a great part of the world, or the chronometers on which the certainty of movement and safety of all ships of the Royal Navy depended, or of the galvano-electric system on which depended the transmission of time, the dropping of the Time-ball at the Royal Observatory and at Deal, and the control of many public and all main-line railway clocks, as librarian, as book-keeper, as photographer, in each and all spheres of labour he proved himself equally reliable. In stellar photography he worked with exquisite care, precision, and neatness, as the beautiful star-photographs shown at the Visitation of the Royal Observatory from year to year amply proved.

In 1862 Mr. Dunkin and Mr. Criswick were selected by the Astronomer Royal to go to Valentia, and carry on a series of observations, in conjunction with Mr. Ellis and another observer at the Royal Observatory, to determine the longitude of that place, the westernmost point in Ireland and, consequently, of the British Isles.

In 1871 he was advanced into the 2nd class, and in 1880 into the 1st class of Assistants, and on 1896 January 31, the 60th anniversary of his birth, he ended a strenuous and useful career of over $42\frac{1}{2}$ years service at the Royal Observatory.

In 1868 Mr. James Whitaker, the well-known London publisher, brought out his *Whitaker's Almanac*, and he had the good fortune to find Mr. Criswick ready to undertake the Astronomical Section. This at once assumed large proportions, and has long been second only in importance to the official *Nautical Almanac*. This work he carried on year by year without intermission, and he had the calculations for 1917 in hand at the time of his death—another fifty years of no mean labour!

So far I have traced Criswick's public career from start to

finish, but concerning the best part of his history—the description of his private life, the *real man*—I should like to speak, as I alone survive of his early intimates, and to me he was the “friend who sticketh closer than a brother” for 61 years. He was a lad of just over 19 when I made his acquaintance as already described: he had passed his 80th year the day before we laid him to rest in the Royal Naval Cemetery at Greenwich.

Henry Criswick, George’s younger brother, was also employed at the Royal Observatory as computer in the M. and M. department, and lived with his brother in lodgings; I lived in the same way, and we three became inseparable friends, and were always together, and when about Christmas 1855 Mrs. Criswick and her two daughters came to Greenwich and took a house in Circus Street, where the family lived together, it was always as open to me as if I were one of the family, and the sisters were as dear sisters to me. The elder, ten years older than her brother, married later on one of the best men it has ever been my privilege to know—Albert Escott, Head Master at the Royal Naval School, whose mother, a very old family friend of Mrs. Criswick’s, I also knew very well. Mrs. Albert Escott is still with us, and at 90 years of age came up from Clevedon, Somerset—where she lives with a niece to keep her company,—in January, to see her brother, and after his death returned to her home without suffering from the effects.

The younger sister remained unmarried, and died last autumn from the effects of an accident, the two sisters having been knocked down by a motor cyclist. Mrs. Escott, though much bruised and shaken, has quite recovered.

How happy we were in those far-off days! There was a wholesomeness in the refinement and culture of both mother and sisters that made for goodness and purity, brightness and charm, and withal such a simplicity and naturalness in manner and life that we three young men always found our greatest happiness by the family fireside.

George and I had many interests, many tastes in common, one of these was for oratorio and opera. The Messiah, The Creation, Israel in Egypt, and many other masterpieces we heard from the back seats in Exeter Hall, and from the front seat in the gallery of Covent Garden before it was burnt down, which we made a point of securing by early attendance and long waiting, we listened to Sonambula, Norma, Aïda, Fra Diavolo, Der Freischütz, Masaniello, and many other poems in liquid sound, which are but little known nowadays.

But the theatrical stage was after all what we loved best.

In 1856 Charles Kean was bringing out his famous Shakesperian Revivals, and they, to us, were a perfect dream of delight. We would make an arrangement for a night when we were both off duty, and at 4 P.M. on the day I would rush from the Royal Observatory to the railway station and meeting G. C. there we

would take the earliest train to London Bridge, at that time the terminus of our line—there were no railways crossing the Thames in those days. From there we would walk to the Princesses' Theatre, near Oxford Circus. The Pit door of the theatre was in a side street just off Oxford Street, and opposite was a little coffee-house, at a window of which we would have our tea and watch till about a half-dozen people took their stand; then we would sally out and take up our position and wait for an hour or more till the doors were opened and we would get in the front row of the Pit. As there were only two rows of Stalls between us and the Orchestra we really occupied the best seats in the house both for hearing and seeing. At 7 o'clock the curtain would rise on a farce, followed by, say *Henry VIII.*, unabridged, and after Shakespeare followed another farce, or playlet, and the fall of the curtain about midnight—five solid hours of enjoyment!—and then, as the last train had left London Bridge at about half-past ten, we walked contentedly home to Greenwich, sometimes in bright and warm moonlit summer nights, sometimes in cold pelting rain, or through blinding snow, driven in our faces by the fierce east wind; and we laughed and chatted and pegged along gay and debonair, and it never even occurred to us to be sorry for ourselves! There was an omnibus which left Charing Cross at 12.30 A.M. for Greenwich, and sometimes—on leaving the Lyceum, for instance—we tried to get a seat in or on it; not always successfully, and then we had so much further to walk.

This happy careless life was changed all too soon. Henry Criswick left the Royal Observatory in 1856 to pursue other avocations, married a very handsome young girl, whose father I knew before their marriage, became the father of several fine children, all now alive and mostly married, and died in 1894 I think, whilst I was in S. Africa. I remained two years at the Royal Observatory, where Mr. Airy eventually created for me the courtesy title of "Supernumerary Assistant," and paid me at a rate never dreamed of before! Later on, in 1861, I think, the Astronomer Royal wrote and offered me a position as Junior Assistant on the staff, which I gratefully declined.

In 1857 April I went to the Cambridge Observatory, where I remained till the end of 1862, and for forty years thereafter never resided for any length of time near my friend, but the warmth of his affection never suffered diminution. He was to me the best, the kindest, the noblest friend a man could have, and of the 61 years of our intimacy not one day was ever obscured by a cloud of discord.

In 1875, I think—it was whilst I was abroad,—G. C. married an amiable and accomplished lady, a musician and a vocalist of no mean power, and their home became the centre of a musical and literary coterie, of which Mrs. Criswick was for years the presiding genius, and by whom I was always most kindly and hospitably received during my occasional visits to London.

My story must close, not for want of matter, but want of time and space. Like Lear "I am a very foolish fond old man," and all unused to put pen to paper, so have missed much that would have been informing about my friend. I should love to convey to those who knew him less well than I did the length and breadth and depth of his learning, in Science, in Arts, and in Literature. His modesty even to shyness (I have never seen a girl blush more hotly than he would, upon occasion, when he was young) prompted him to silence, but when occasion called for it there was neither timidity nor hesitation in his conversation or speech. He spoke confidently, robustly, because he knew what he was talking about, and his views were clear-cut and definite. But his vision was by no means blinded by his confidence in himself, and when it was made clear to him that he was wrong he admitted his error with a frankness and fullness such as can only be yielded by a loyal and strong nature.

Of his personal charm of manner and speech I need not speak. All who knew him must have come under its spell, and, moreover, it is a quality impossible of definition; but, in few words, this is the conclusion of the whole matter:—All who met him were attracted towards him and wished to know him better; those who knew him well loved him the better the more they knew of him; and to me who knew him well during all his adult life, to my eyes and heart he was—incomparable.

A. BOWDEN.

CORRESPONDENCE.

To the Editors of 'The Observatory.'

Distribution of the Perihelia of Minor Planets, Comets, &c.

GENTLEMEN,—

In *Popular Astronomy*, vol. xxiii. no. 6 (June–July 1915) Miss Elva G. Utzinger discusses the orbits of 808 minor planets discovered up to the year 1915. And the curious fact comes out that the majority of the perihelia lie on the same side of the Sun as the perihelia of the comets of short period. The figures are:—

Longitude of Perihelia between	Number.
290° to 110°.....	535 planetoids.
110 to 290	273 „

Thus there are very nearly double the number between 290°–110° that we find between 110°–290°.

For 34 members of the Jovian family of comets I analysed