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INTERRELATIONSHIPS WITHIN THE VICTORIAN "X CLUB"

Scientists, like those in other scholarly fields, have been stimulated and aided in a host of significant ways by their close associates. Their private lives and their public professional contributions have been shaped and marked by those with whom they shared their lives most intimately. This paper will discuss one highly interesting and significant group of late nineteenth-century British scientists who formed a club which came to exert an immense amount of influence on its members and on the scientific world.

The setting was London. The date of birth was 1864, just a century after the formation of "The Club", which came to include so many political and literary giants. Across the Atlantic, Lincoln was getting elected for his second term and Sherman was marching through Georgia. In a hotel not far from Piccadilly Circus, a few eminent scientists, who had long been intimate friends, formed a dining club in order to prevent their drifting apart to their various duties, and in order to further the cause of science. One of the group, Thomas Archer Hirst, a leading English mathematician, recorded in his journal:

Thursday evening, Nov. 3, an event, probably of some importance, occurred at St. George's Hotel, Albemarle Street. A new club was formed of eight members; viz: Tyndall, Hooker, Huxley, Busk, Frankland, Spencer, Lubbock, and myself. Besides personal friendship, the bond that united us was devotion to science, pure and free, untrammelled by religious dogmas. Amongst ourselves there is perfect outspokenness, and no doubt opportunities will arise when concerted action on our part may be of service. . . . We agreed to meet on the first Thursday in every month [except July, August, and September]. . . . There is no knowing into what this club, which counts amongst its members some of the best workers of the day, may grow, and therefore I record its foundation.¹

At the time of this birth of the X Club, George Busk (1807-1887), the

oldest member and retired from his naval surgeon duties at Greenwich, was engrossed in his many scientific interests. Joseph D. Hooker (1817-1911) was, under his father, Assistant Director of the Royal Botanic Gardens at Kew. Herbert Spencer (1820-1903) had already published many works. John Tyndall (1820-1893) was Professor of Natural Philosophy at the Royal Institution of Great Britain, where Edward Frankland (1825-1899) was Professor of Chemistry. Thomas Henry Huxley (1825-1895) was Professor of Natural History at the Government School of Mines in Jermyn Street and had already made his mark as Darwin's "bulldog". William Spottiswoode (1825-1883), who became the ninth member of the X Club at its second meeting, was pursuing his mathematical explorations while serving as the Queen's Printer. Thomas Archer Hirst (1830-1892) was mathematics master at University College School. The youngest of the group, John Lubbock (1834-1913), had done private study with Darwin, his neighbor at Down, and had made significant contributions in archaeology.

The club occasionally discussed adding new members, especially when vacancies were created by deaths, but no new members were ever added. Spencer explained it this way: ". . . no one was found who fulfilled the two requirements—that he should be of adequate mental calibre and that he should be on terms of intimacy with the existing members."²

The title of "X Club" was arrived at only after seven months of indecision. The best account is given in Spencer's *Autobiography*:

So long did our anonymous character continue, that at length it was remarked (I believe by the wife of one of the members, Mr. Busk) that we might as well name ourselves after the unknown quantity. The suggestion was approved, and we became the X Club. Beyond the advantage that it committed us to nothing, this name had the further advantage that it made possible a brief, and, to a stranger, an enigmatical, notice of our meetings.³

The X Club continued to dine at the St. George's Hotel, but occasionally used the Almond Hotel or the St. James Hotel. But the main alternative to the St. George's came to be the exclusive Athenaeum Club on the corner of Pall Mall and Waterloo Place. In the 1880s the Athenaeum became the regular meeting place, as it was much easier for the aging and ailing members to stay and play billiards or read or visit with other friends and not make an additional trip there following dinner at some hotel. The Athenaeum was a second home for the bachelor Spencer and widower Hirst, and the others also used the club facilities frequently.

The X Club dined at 6 or 6:30 p.m., usually as a prelude to other evening

activities. The most common evening function was the sessions of The Royal Society, which took place at Burlington House, two blocks from the St. George's Hotel. Members also attended the meetings of the Mathematical Society, the Linnean Society, and other scholarly societies to which they belonged, most of which also were located at Burlington House. Sometimes a night at the theatre, or billiards and relaxation at the Athenaeum followed the dinner.

The intimacy and small size of the club would suggest that a minimum of rules and regulations would exist, and this was indeed the case, which was a welcome relief from the elaborate and somewhat pompous regulations of some other clubs to which the men belonged. Huxley wrote late in life: "the . . . proposal of some genius among us, that we should have no rules, save the unwritten law not to have any, was carried by acclamation."⁴

The perfunctory function of presiding was performed by a different member each time, in alphabetical rotation. Hirst was the Treasurer the first three years, after which the job was passed among the other members until 1888 when Hooker became the final and perpetual Treasurer. The duties of the Treasurer were to make arrangements for the dinners, handle the club's finances, send out notices of each meeting, and keep at least sketchy minutes of the meetings. A few days prior to each meeting the Treasurer sent a notice to each member, usually expressed in the form of an algebraic equation, such as " $x = 3$ ", which meant that the next meeting was to be on the 3rd of the month. These were sometimes imbedded in a letter or in a postscript to a letter, but most often were sent on post cards, so that, as Spencer expressed it, "Doubtless many speculations and many absurd conclusions were caused in the minds of servants who took in [the] post-cards."⁵ Upon receipt of the notice, each member was supposed to notify immediately the Treasurer as to whether or not he would attend, and if he planned to be absent he should give some news about himself which the Treasurer would then share with the club. Understandably, but unfortunately, the records are fragmentary and unsystematic, with only a list of those attending, the bill of the dinner, and occasionally rough notes of what was discussed being the sum of the minutes. The whole life of the club is included in two small notebooks, whose existence was unknown until recently discovered by Professor Roy MacLeod among the Hirst and Tyndall papers in the Royal Institution.⁶ Some excerpts from those minutes have been published in past volumes.⁷ Of the 240 meetings of the club, each member attended the following number: Frankland 186, Spencer 173, Huxley 171, Hirst 170, Hooker 169, Spottiswoode 160, Tyndall 147, Busk 143, and Lubbock 131.⁸ Some of the greatest names in science and literature,

not only of Britain but also of the continent and the United States, were included in the list of guests, who totalled over thirty.

For the first decade, toward the end of June the club climaxed each season with a weekend excursion into the country with their wives, which would bring the size of the group to fifteen if all were present (Spencer, Tyndall, and Hirst being unattached). This outing became known as the "XX" and the proper algebraic equation announcing its meeting was, for example, "x's + yv's = 24." On the designated Saturday afternoon the group would go by train usually to Maidenhead, but occasionally stopping at Windsor or going all the way to Oxford, and their activities included boating on the Thames, picnicking, and dining.⁹

The X Club played a highly significant role in the lives of its members by being a ready reservoir of good fellowship. Although these men were known to the general public largely as stern, serious individuals, quite a different side of their characters was able to manifest itself in the intimate X Club meetings where they could with complete abandon engage in light-hearted dinnertime banter. Frequent comments in members' journals and letters mention the "jolly," "pleasant," "jovial," or "merry" time which was had at the meetings. As Frankland expressed it: "There was always a judicious admixture of ordinary dinner-table talk, with a by no means sparse sprinkling of witticisms, good stories, and, perhaps occasionally, though very rarely, a little scandal."¹⁰ Lubbock had a storehouse of anecdotes, and the Irishman Tyndall was a vivacious conversationalist who, according to Huxley, "assuredly . . . did not usually help us to be serious."¹¹ Quite the opposite was Spencer, who complained that despite his efforts to discuss serious subjects, "Time was spent chiefly in lively talk, of which *badinage* formed a considerable element."¹² Huxley once teasingly wrote to Spencer: ". . . in your absence, I am afraid we inclined to frivolity."¹³ The two following terse statements in Hirst's journal have an implied cause and effect relationship: ". . . all present but Spencer. A very merry meeting indeed."¹⁴ It was like a monthly sauna bath where their overburdened spirits could be cleansed and refreshed.

But the good fellowship was not limited to the meetings of the club, for the members and their families socialized in a number of other contexts as well. They spent Sundays or weekends at each other's homes, dined frequently at each other's homes, or dined out together. A letter from Spencer to his father on Friday, April 7, 1865, illustrates this frequent contact: ". . . returned on Monday from the Lubbocks with whom I had been spending five days . . . (last night was the X Club). . . . To-night I dine with Huxley."¹⁵

The Lubbocks' home was the centre of many social gatherings at which one or more members of the club were frequently present, and the Spottiswoodes also entertained often. Huxley's frequently held a high tea on late Sunday afternoons to which at least some X Club members (especially Spencer) came regularly, and New Year's Day dinners were traditional at the Huxley's, with Tyndall, Spencer, and Hirst often present. The non-family men entertained at the Athenaeum Club. The X Club members were at the centre of wedding festivities of their fraternity brothers: in 1876 Tyndall got married at the tender age of 56, and Frankland remarried in 1875, Hooker in 1876, and Lubbock in 1884, after their first wives had died. Weddings of their children, birthday dinners, and other such family occasions brought many of the club members together. Spencer tapped the club for someone to play billiards or racquets with him, and Tyndall secured mountain-climbing companions. Some of the members went on hiking expeditions together in the Lake Country, in Wales, on the Isle of Wight or on the continent. In short, the fellowship was an all-inclusive one, taking in the families and continuing between meetings of the club.

More specifically, the X Club was a reservoir of good will and assistance during times of sorrow and need. At the death of a member, his wife, or other member of the immediate family, the bereaved family received much warm sympathy and appropriate aid from the other X Club members and their families. When a club member was ill, the other families visited him and were solicitous about his welfare. Spencer was a hopeless hypochondriac and Hirst, Huxley and Tyndall also spent much of their life in search of health and a good night's sleep. As all grew older, health became a major concern, and they drew much comfort knowing that the brotherhood was concerned and ready to help. When Huxley's health broke down, his X Club brothers helped to raise money which enabled him to travel to Egypt in search of better health. Financial aid was also forthcoming from one or more of the brotherhood when someone had difficulty getting works published or when someone was venturing into some big expense, such as purchasing land or a house. The club thus served as a source and an outlet for aid and compassion. The public knew these men as being all head and no heart, but their intimate friends knew better.

The X Club was also a forum for exchanging information about, and advice on, personal affairs. It was common practice at their meetings to discuss their current experiments, scientific observations, and recent travels. Members particularly looked forward to the October meetings when they could be brought up to date on each other's experiences during the summer months.

They helped to counsel each other when new job opportunities became available. For instance, they discussed "the advisability of Tyndall's acceptance of the Professorship of Physics at Oxford,"¹⁶ and Tyndall was directly influential in convincing Hirst not to apply for the post of Professor of Mathematics in Queen's College in Ireland.¹⁷ No doubt the very existence of the X Club was a major factor in keeping these distinguished individuals in the London area. Their encouragement helped to launch Lubbock on what became a lengthy career in Parliament. As the minutes record it: "[We] decided to give him our support by expressing our unanimous opinion that scientific men would regard him as a most appropriate representative in Parliament."¹⁸

The X Club served as a forum for exchanging expert criticism of each other's work, and as a source of general intellectual stimulation. They relied heavily on each other to evaluate preliminary drafts of their books, articles and lectures. Praise from the brotherhood was more meaningful and significant to them (so they claimed anyway) than praise or condemnation from other quarters. The club constituted a sort of board of standards, a source of expert criticism, freely, fully, and privately given, which no doubt raised the quality of the published product and gave the author professional and personal satisfaction regardless of the howling of unfavorable public criticism from other sources. Although the members did occasionally adversely criticize publicly some material of their fraternity brothers, such criticism was no doubt reduced sharply in quantity and intensity from what it otherwise would have been if no X Club had existed. After all, they were friends, and they did have to face each other once a month! Likewise, they no doubt came to each other's defense in public more quickly and with more forcefulness than would have otherwise been the case, for they were defending the club as well as the individual. It takes high-powered individuals to stimulate high-powered individuals, and the X Club provided such an opportunity. Their conversations and fellowship surely widened their horizons, made them increasingly interdisciplinary, crystallized and refined their ideas, influenced each other's views, and kept their mental and rhetorical faculties razor sharp.

Serving as a stepping stone for various preferments for its members, the X Club fulfilled a function familiar to most fraternities. The club was a source of nominators and supporters, who helped each other up various ladders of success. Obviously the cause-and-effect relationships are often difficult if not impossible to establish with complete finality, but enough evidence exists to suggest rather clearly that they aided each other considerably. Understandably, this support might have occurred if the X Club had not existed, but surely

not in all instances and not to the same degree. It should be remembered, of course, that it was not a case of pushing unqualified and undeserving people into responsible posts or into the limelight of recognition. Hirst wrote in his journal that at the last X Club meeting

Spottiswoode told me he proposed to name me for the post of Registrar General, Earl Beaconsfield [Disraeli] having asked him in his capacity of Pres. of R[oyal] S[ociety] for advice on the matter. I allowed him to do so but reserved my acceptance, should an offer be made, for further consideration.¹⁹

Spottiswoode and Huxley played leading roles in getting Hirst selected as the first director of naval studies at the newly established Royal Naval College at Greenwich,²⁰ and Huxley helped Lubbock to become the first President of the Anthropological Institute.²¹ The rise of X Club members to positions of leadership in the Royal Society, in the British Association for the Advancement of Science, and in the Victorian scientific world in general, has been discussed elsewhere.²² Lubbock was chairman of the Committee of the Society of Authors who nominated Spencer for the Nobel Prize for Literature in 1902,²³ and Hooker proposed Tyndall and Lubbock for membership in the prestigious "The Club."²⁴ When Spottiswoode died, some X Club members requested the Dean of Westminster to have him buried in Westminster Abbey, which was where he was laid to rest.²⁵ Eloquent biographical tributes to a departed X Club member, such as Huxley's on Tyndall in *The Nineteenth Century*, helped to give posthumous praise. In life and in death the fraternity took care of its own.

The friendship among X Club members deepened through the decades. The oldest relationship was the friendship of the trio, Tyndall, Hirst, and Frankland. In 1846 the 26-year-old Tyndall and the 16-year-old Hirst worked together in a surveyor's office in Halifax, Yorkshire, and in 1847 Tyndall was teaching mathematics and Frankland chemistry at Queenwood College, Hampshire. The three of them studied in Germany, all getting their Ph.D.'s from Marburg University, and when Tyndall left Queenwood in 1853 to go to the Royal Institution, Hirst succeeded him. After Hirst's three years of marriage left him a widower in 1857, he and the bachelor Tyndall were drawn even closer together, and the X Club cemented that relationship. Hirst was the first person whom Tyndall notified of his plans to marry and was his "best man" at the ceremony,²⁶ and Tyndall was the logical person to select to give the toast when Hirst received the Royal Medal at the Royal Society Anniversary Dinner in November, 1883. When Hirst died, Tyndall wrote to Huxley:

. . . the loss to all of us is great—to me specially great. We have been intimate with each other for more than five and forty years, without a moment's chill to our affection. . . . His perfect rectitude and tenderness of heart were known to nobody so well as to me.²⁷

In later years Hirst and Hooker became increasingly close, which Hooker makes clear in a number of letters. Immediately after Hirst's death, Hooker wrote to Tyndall:

I cannot get over the loss of Hirst. We had been of late so much to one another; in respect of the X meetings especially we were the most constant of all attendants, and hence looked most to meeting each the other.²⁸

Hooker, Tyndall and Huxley were an especially close trio through the years. They first met at the meeting of the British Association for the Advancement of Science at Ipswich in 1851; each of the young scientists had just returned from foreign accomplishments: Tyndall from Germany, Huxley from Australia, and Hooker from Nepal. A year after Tyndall came to the Royal Institution in Albemarle Street, Huxley (in 1854) began his lectureship a few blocks away in Jermyn Street at the Government School of Mines. After Huxley got married in 1855, Tyndall became one of the first and most intimate friends of the family. Huxley is "Hal" to only his wife and Tyndall, and Tyndall addressed Mrs. Huxley as "Dear True Sister," and she addressed him as "Dear Brother John."²⁹ In 1861 Hooker fulfilled the role of godfather at the christening of Huxley's son. In 1888 Huxley wrote to Hooker: ". . . considering with what a very considerable dose of tenacity, vivacity, and that glorious firmness (which the beasts who don't like us call obstinacy) we are both endowed, the fact that we have never had the shadow of a shade of a quarrel"³⁰ was to their credit. When Hooker decided to re-marry in 1876 he wanted Tyndall to be the first to know.³¹ Lubbock and Spencer were somewhat on the periphery of deep friendship linkages in the club, the former in part because of his youth and his many social, political, and business associations, and obligations, and Spencer in part because of his difficult personality.

No matter how firm and tested the bonds of friendship, however, any group of mortals is bound to experience occasional tension and ill-will over a long period of time. In 1883 Huxley wrote to Hooker:

It has long been too obvious to me that the relations of some of us at the x are getting very strained. Strong men as they get old seem to me to acquire very much the nature of . . . elephants - - - and tend to . . . run amuck at everything

that does not quite suit their fancy. I am conscious of the tendency myself and it is hateful to me. . . . I put it down at all cost.³²

The only serious instance in which ill will actually threatened the stability of the X Club was the rift between Spencer and Huxley which erupted late in 1889. The two men had frequently crossed swords on many issues during their lifetime, but now the ill and hypersensitive Spencer could not absorb the Huxley barbs. On November 12th, Huxley's letter to *The Times* took issue with Spencer's absolute political ethics, and a battle between the two men raged in that newspaper with a letter by Spencer on the 15th, by Huxley on the 18th, and by Spencer on the 19th and 27th. Hooker and other X Club members attempted to reconcile the two antagonists. On December 5th, the day of the X Club meeting, Spencer wrote to Hooker, complaining: "Huxley, besides causing me a serious relapse has done me irreparable damage by making me look like a fool to a hundred thousand readers."³³ Spencer went on to say he was thus resigning his membership in the X Club. "I shall greatly regret," he wrote, "to miss the occasions for pleasant meetings but I do not see that there is any alternative."³⁴ The next day Hooker wrote to Tyndall:

You have no doubt heard from Huxley of Spencer's contemplated withdrawal from the [X Club] and his reasons for it; your absence last night was greatly deplored as Spencer's action in the matter of withdrawal did not meet with approval by Hirst, Frankland and myself, the only members present, Huxley having withdrawn.

The upshot of a conversation preliminary to the proposed communication of Spencer's letter of withdrawal was, that it should not be communicated, and that he should be informed that the members present viewed with much regret even the contemplated withdrawal of a member with or without sufficient grounds, that the reading of his letter was postponed in the hope that time would modify his feelings.

It was further considered that there was no need at all for Spencer's making a club matter of it, requiring as this would, an entry in the club minutes, and more or less discussion on the merits of the case. He had nothing to do but to stop away and inform the members privately of his motive. Is this your opinion?

Spencer could not have considered the painful position in which his withdrawal would place any member who happened to be asked, 'Of whom does your club now consist?' To me and to Hirst especially the subject is most distressing. Here we are seven septuagenarians (or all but) who have met in friendship and harmony for five and twenty years, to be disunited at last, and the disunion to be impossible of concealment, if Spencer persists.³⁵

On December 11th Hooker was able to write to Tyndall that Spencer "has withdrawn his resignation."³⁶ But the Huxley-Spencer duel continued in the pages of *The Nineteenth Century* and the *Daily Telegraph* in January and February, 1890, after which the tension simmered until reconciliation finally came three years later. On October 24, 1893, Huxley wrote to Spencer:

We are old men and ought to be old friends. Our estrangement has always been painful to me. Let there be an end to it. For my part, I am sorry if anything I have said or done has been or has seemed, unjust.³⁷

Two days later Spencer replied:

Your sympathetic letter received this morning has given me great satisfaction. We are both of us approaching our last days, . . . and to which ever of us survived it would have been a sad thought had forty years of friendship ended in a permanent estrangement. Happily by your kind expressions that danger is now finally averted and cordial relations re-established.³⁸

The most serious gash in the X Club had finally been sutured.³⁹

Throughout the years Spencer had been something of an ugly duckling in the group and was rather frequently at odds with someone. The friction arose not only from personality clashes, for deeper differences lay in scholarly presuppositions and procedures, in investigative and communicative habits. Spencer preferred serious, abstract, philosophical discussion compared to the other members' predilection for more concrete, specific subjects springing from experiments or experiences. In a sense, it was a clash between the lover of *a priori* reasoning, and the adherents of induction. Huxley used to tease Spencer by saying that the latter would define a tragedy as the slaying of a beautiful deduction by an ugly fact. Spencer's working habits, which consisted of very little reading, much conversation,⁴⁰ limited experiences, dictating to a secretary at approximately twenty-minute intervals sometimes alternating with walking, rowing, billiards, or racquets, and revising very little, somewhat appalled and amused the other members. They depended on incredibly wide reading, varied experiences, detailed experimentation and observation; and they wrote careful, tedious, multi-drafts before their final written version reached the world.

It is not difficult to guess how much more frequent and how much more intense outbursts among these nine eminent individuals would have been if it had not been "for the sake of the club" to calm them down. Certainly they kept their animosities as low-keyed and as private as possible in order not to reflect adversely on the whole fraternity.

During the late 1880s the club was beginning to weaken, due to ill health, deaths, retirements, and migrations from London. In 1883 Spottiswoode had died and Hirst retired because of ill health. In 1885 Huxley, Frankland, and Hooker retired; and in 1887 Tyndall retired and Busk died. Frankland moved to Reigate, Hooker to Sunningdale, Tyndall to Haslemere, and Huxley down to Eastbourne. Lubbock was at High Elms, Kent, and in 1898 Spencer moved to Brighton. The death of Hirst in February, 1892, was a major blow to the continuance of regular X Club meetings, as he was one of its most devoted members. In December, 1892, Hooker wrote to Tyndall:

I have not seen a fraction of an X since last summer, and the dear old club is so far defunct that I see no prospect of its continuance except by a summer gathering. Huxley lives too far off, ditto Frankland, Lubbock and other gods; Spencer has been so unwell that he could not have attended this winter if he would, and I am warned by a tendency to bronchitis to avoid night air. . . . Hirst's decease was the death-blow.⁴¹

But Hooker, the last Treasurer of the club, valiantly attempted for the next decade to get the survivors together occasionally, but not with much success.⁴² Huxley died in 1895 and Frankland in 1899, so only three survivors saw the dawn of the twentieth century: Spencer, Hooker, and Lubbock. In 1903, shortly before Spencer's death, Hooker wrote to him:

The dear old X Club is rapidly, with us, I fear, approaching the vanishing point. How curious it seems, that we who were, I think, considerably the oldest members, should be amongst the three survivors.⁴³

During the first decade of the twentieth century, Lubbock, now Lord Avebury, made almost annual visits to Hooker's home in Sunningdale, usually in October or November, and these visits were looked on by the two as X Club meetings where over lunch they would reminisce of the past.⁴⁴ In June, 1911, Lubbock again visited Hooker at Sunningdale and wrote in his journal: "Found him very well, but he will be 93 in a few days. I fear it may be the last meeting of the X Club."⁴⁵ The remark was prophetic, for six months later Lubbock recorded in his journal: "December 10th. Hooker died. A wonderful man and a most kind friend. The last of our little group."⁴⁶

Secondary accounts dealing with the lives of these nine scientists assert or imply that the X Club died abruptly and with finality in 1892 or 1893. But the letters and memoirs of the survivors make it clear that the X Club lived on in spirit if not in actual meetings. The X Club did not die, it just faded away.

Thus, to summarize, in 1864 nine busy, eminent British scientists, who

had long been intimate friends, formed a dining club in order to prevent their drifting apart and in order to further the cause of science. The club, which acquired the title of X Club, held monthly meetings from October through June, and was extremely active for two decades, but then gradually lessened in vitality. With a minimum of rules and formalities, this small cohesive group played a significant role in the lives of its members in many ways. It was an abundant reservoir of good fellowship, a ready source of aid in time of need, a significant forum for exchanging information about, and criticism of, each other's work, a source of intellectual stimulation, and a handy stepping stone for various preferments. The club deepened friendships and kept any animosity at a minimum and away from the public eye. That the club played a very important role in the scientific life of the late Victorian period has been discussed in another article, but suffice it to say here that the scientific world of that time, as well as the lives of the nine individuals involved, would have been significantly different without the existence of the X Club.

NOTES

1. *Journals of Thomas Archer Hirst* (hereafter cited as *Hirst Journals*) (Royal Institution, London), vol. iv., fol. 1702. I wish to express my thanks to the authorities of the Royal Institution for permission to consult and quote from materials in their possession, and to the Librarians, Mr. Stallybrass and Mr. Weston, and the archivist, Prof. Stoddard, for their very helpful cooperation. See also Hirst's minutes of the meeting in *X Club Notebooks* (Royal Institution), vol. i, p. 1; Sir Edward Frankland, *Sketches from the Life of Edward Frankland* (London, 1902), p. 150. Research for this study of the X Club was greatly facilitated by financial assistance from the Graduate School and the McMillan Fund of the University of Minnesota.
2. Herbert Spencer, *An Autobiography* (New York, 1904), II, 134. See also Frankland, *op. cit.*, pp. 161-2; T. H. Huxley, "Tyndall," *The Nineteenth Century*, XXXV (Jan., 1894), 10; Leonard Huxley, *Life and Letters of T. H. Huxley* (New York, 1916), I, 281-2; *Huxley Papers* (Imperial College, London), vol. iii, fol. 320; vol. xvi, fol. 268. I wish to thank the Governors of the Imperial College of Science and Technology for permission to consult and quote materials in the Huxley collection, and Mrs. Jeanne Pingree, the College Archivist, for her very kind cooperation.
3. Spencer, *Autobiography*, II, 134. See also *ibid.*, 132; *Hirst Journals*, vol. iv, fols. 1702, 1735; Huxley, "Tyndall," *The Nineteenth Century*, XXXV (Jan., 1894), 10.
4. "Tyndall," *The Nineteenth Century*, XXXV (Jan., 1894), 10. See also Spencer, *Autobiography*, II, 135.
5. *Autobiography*, II, 134.

6. In 1970 I had these two notebooks microfilmed; a copy is in my possession and the negative remains in the Royal Institution.
7. See Leonard Huxley, *Life and Letters of Sir Joseph Dalton Hooker* (London, 1918), I, 541-44; Frankland, *op. cit.*, 150-161.
8. *X Club Notebooks*, vol. i, fol. 1; Frankland, *op. cit.*, p. 162.
9. For some interesting discussions of these XX excursions, see *Hirst Journals*, vol. iv, fols. 1735, 1786, 2000; *X Club Notebooks*, vol. i, p. 8 *et passim*; *Huxley Papers*, vol. viii, fol. 168; vol. lxx, item 16; Spencer *Autobiography*, II, 136; Frankland, *op. cit.*, p. 150.
10. *Op. cit.*, p. 161.
11. "Tyndall," *The Nineteenth Century*, XXXV (Jan., 1894), 10-11.
12. *Autobiography*, II, 135.
13. Dec. 4, 1885, David Duncan, *Life and Letters of Herbert Spencer* (New York, 1908), I, 333.
14. *Hirst Journals*, vol. iv, fol. 1842.
15. *Autobiography*, II, 132.
16. *X Club Notebooks*, vol. i, p. 11.
17. *Hirst Journals*, vol. iv, fols. 1712, 1713, 1734.
18. *X Club Notebooks*, vol. i, p. 27. See also *ibid.*, p. 44.
19. *Hirst Journals*, vol. iv, fol. 2092.
20. L. Huxley, *Life and Letters of Huxley*, I, 419.
21. Horatio Gordon Hutchinson, *Life of Sir John Lubbock, Lord Avebury* (London, 1914), I, 117-8.
22. J. Vernon Jensen, "The X Club: Fraternity of Victorian Scientists," *The British Journal for the History of Science*, III (June, 1970), 63-72. See also Roy M. MacLeod, "The X-Club: A Social Network of Science in Late-Victorian England," *Notes and Records of the Royal Society of London*, XXIV (April, 1970), 305-322.
23. Duncan, *op. cit.*, II, 200; Hutchinson, *op. cit.*, II, 164-6.
24. *Huxley Papers*, vol. viii, fol. 388; Hutchinson, *op. cit.*, I, 325.
25. *Hirst Journals*, vol. iv, fol. 2130; *Huxley Papers*, vol. xxvi, fol. 209; vol. xxvii, fol. 95; Hutchinson, *op. cit.*, I, 197.
26. *Hirst Journals*, vol. iv., fols. 2023, 2026, 2030.
27. *Huxley Papers*, vol. viii, fol. 276. See also Huxley, "Tyndall," *The Nineteenth Century*, XXXV (Jan., 1894), 7.
28. *Huxley Papers*, vol. viii, fol. 437. See also *ibid.*, fols. 430, 438, 443.
29. *Ibid.*, vol. ix, fol. 2983A; *Tyndall Correspondence* (Royal Institution), vol. ix, fols. 2918, 2944, 2945, 2950, 2951, 3026.
30. L. Huxley, *Life and Letters of Huxley*, II, 225.
31. *Huxley Papers*, vol. viii, fols. 359-62, 365, 369.
32. *Ibid.*, vol. ii, fol. 250.

33. *Ibid.*, vol. vii, fol. 243.
34. *Ibid.*
35. *Ibid.*, vol. viii, fol. 420. See also Hooker's lengthy letter to Huxley on the same day, *ibid.*, vol. iii, fols. 352, 353.
36. *Ibid.*, vol. viii, fol. 421.
37. Duncan, *op cit.*, II, 37.
38. *Ibid.*
39. For those interested in delving into the details of the Huxley-Spencer rift, see: *Huxley Papers*, vol. iii, fol. 360; vol. vii, fols. 242, 244; vol. viii, fol. 422; vol. xii, fols. 285-87; vol. xviii, fol. 123; L. Huxley, *Life and Letters of Huxley*, II, 258-9, 264; Duncan, *op cit.*, I, 197-8, 359-61, 369-71; II, 26-27. For other tensions between Spencer and other X Club members, see *Huxley Papers*, vol. iii, fols. 343, 360; vol. viii, fol. 413; Duncan, *op. cit.*, I, 220.
40. Commenting on how Spencer depended on X Club conversations for securing information, William Irvine (*Apes, Angels, and Victorians* [New York, 1955], p. 236) asserts, in Churchillian fashion: "No modern thinker has read so little in order to write so much."
41. *Huxley Papers*, vol. viii, fol. 441.
42. For information on the declining years of the X Club, see: L. Huxley, *Life and Letters of Huxley*, II, 128, 209, 353; L. Huxley, *Life and Letters of Hooker*, II, 350, 358; *Huxley Papers*, vol. ii, fol. 409; vol. iii, fols. 283, 320, 325, 379, 384, 389, 391, 394, 400, 431; vol. viii, fols. 275, 437, 438, 439, 442, 443, 445; vol. ix, fols. 229, 231, 236; Hutchinson, *op. cit.*, I, 258-9, 325; II, 269, Duncan *op. cit.*, II, 23; Frankland, *op. cit.*, pp. 161-2.
43. Duncan, *op. cit.*, II, 219.
44. Hutchinson, *op. cit.*, II, 204, 215, 284.
45. As quoted in *ibid.*, 298.
46. As quoted in *ibid.*, 303.