Newsletter of the Society for Applied Spectroscopy
A supplement to Applied Spectroscopy Vol. 54, No. 2

The Spectrum

February 2000
Volume 27, Issue 1

In this issue:

DC Arc Spectroscopy in the 1930's . . . . . page 2

Call for Governing Board Candidates . . . . . page 9

Documents from the October 1999 Governing Board Meeting

Minutes . . . . . page 10
Reports:
President . . . . . page 13
Treasurer . . . . . page 14
Exexcutive Administrator page 16
Journal Editor . . . . . page 16
Newsletter Editor . . page 17
Membership Education . . page 17
Awards . . . . . page 18
Constitution & Bylaws . . page 18
Tour Speakers . . . . . page 20
Meggers Award . . . . page 20
Strock Award . . . . . page 20
Lippincott Award . . page 20
Tellers . . . . . page 20
FACSS Delegate . . . . page 22
Chemical Heritage Foundation . . . . page 22

Vancouver's Steam Clock page 23

The oldest spectroscopy book? . . . . page 24

The Spectrum
Editorial Office
25 Maple Avenue, 3B
Hastings-on-Hudson, NY 10706
physchem@earthlink.net

My wife and I recently moved from the large house we bought in 1971, when we had four children at home, to an apartment that is better sized for our present needs, with the bonus of a view of the Hudson River and the Palisades. While packing, I found many things I had stored away in 1971 and then neglected, including a special issue of *Applied Spectroscopy* in 1970 that reprinted feature articles from the journal during the previous two years. The first article in that issue is reprinted in its orignial format, starting on the next page. It is a fascinating complement to the article by Brattain in the last issue of *The Spectrum.*

The author, Lester Strock, was an honorary member of SAS. He is memorialized in the SAS Strock Award, which is sponsored by the New England Section. Strock is shown second from the left in this photo from the SAS archives. The picture was taken by Carl Leistner at a reception at the First SAS National Meeting, College Park, MD, in 1962.

As did Brattain in his memoir, Strock describes events of an early period of applied spectroscopy from a personal vantage. The time when these events took place was soon after Meggers, Keiss, and Stimson developed the internal standard principle in its present form. Strock describes how the internal standard principle was introduced into the laboratory where Strock worked, to make the analyses more quantitative after an initial period from1930 to 1933 when the results were gleaned from visual estimates of line intensities on photographic plates.

My experience in spectroscopy began in 1950, well after the period that Strock describes, first by recording absorption spectra point-by-point on a Beckman DU for undergraduate research at Brooklyn Polytech, then as a graduuate student in Fassel's group at Iowa State. Fassel was using the dc arc extensively then, having himself begun work as a spectroscopist with the carrier distillation method of Scribner and Mullins (Strock's. ref. 32) to analyze uranium, and by 1950 for the analysis of rare-earths. But much of the use of emission spectroscopy in the US during World War II was for quality control in metal production by spark excitation. The photoelectric emission spectrometer was initially developed during the war years for that purpose. The best textbook emphasizing the dc arc, which became available in the 1950s, was by Ahrens and Taylor, South Africans whose work was on the analysis of minerals. The textbook for Fassel's course at Ames on emission spectroscopy was by Nachtrieb, and it reflected the US emphasis on spark excitation.

Future issues of *The Spectrum* will continue to explore the history of spectroscopy; see the back cover of this issue for a glimpse of what will come next. I would welcome contributions from spectroscopists who would like to share their personal memories of historic events in spectroscopy, or who have studied aspects of it.

Marvin Margoshes

Quantitative dc Arc Spectrochemical Analysis: History of its Development in the Decade 1930–40*

Lester W. Strock

Sylvania Lighting Center, Danvers, Massachusetts

(Received 10 February 1969; revision received 10 April 1969)

INDEX HEADINGS: dc arc; Emission spectroscopy; Analysis for trace elements in geochemical samples.

The sudden emergence of spectrochemical analysis in this country in the late 1930's and early 1940's cannot be said to have resulted from the discovery of any new basic principles, but was rather a response to needs for information on chemical composition down to lower concentrations in greatly increased numbers of samples.

In response to these needs there occurred what eventually amounted to a revolution in spectrographic and related instrumentation. The materials requirement of World War II and the new field of nuclear science and technology placed new demands on analysts for data regarding materials and elements with which they had never before dealt.

However, a less widespread, but similar demand for data on the composition of naturally occurring materials with respect to the less familar elements had been posed by geochemists for the prior two decades in Europe. Attempts to meet those demands were made initially by means of primary x-ray emission analysis; largely by Hadding in Sweden, by Goldschmidt and co-workers in Norway, and by von Hevesy in Germany. Continuing efforts by von Hevesy led to the development of x-ray fluorescence methods which have since been so elegantly refined and instrumented by others, particularly in the U. S. After leaving Oslo for Göttingen in 1929, Goldschmidt assembled a group of assistants and students which at once attempted to develop dc arc spectrography into a usable analytical method of sufficient reliability for the analytical demands of his geochemical program.

The purpose of this paper is to present a somewhat detailed historical account of the development of dc arc methods of spectrochemical analysis, in the decade 1930–40. For most of this period, the progress made in developing dc arc methods remained very inadequately known in this country. This is not to say that the subject of spectroscopy as a branch of physics was neglected in the U. S.; nor that some individual and isolated efforts were not made to apply optical spectroscopy as a means of identification, even with the dc arc. Early efforts of Burns, Meggers, and Nitchie, etc. are well known to spectrographers of this country.

By 1933, there was sufficient interest in the application of optical spectroscopy to the problems of chemical analysis in the USA, that a "Summer Conference on Spectroscopy and its Applications" was held at MIT under the stimulating direction of Professor G. R. Harrison. Ten consecutive conferences were held and constituted the major forum for spectrochemists of the 1933–42 decade. The final conference (victim of World War II) was held in July of 1942.

At the Fourth Conference in 1936, I reported on my own work of the previous two years at Göttingen University, on the photometry and internal standardization of dc arc spectra. For the most part, however, the extent to which the dc arc had been developed as a quantitative method remained unknown and ignored in this country. The situation was reflected in textbooks by U. S. authors[1] for the two decades following 1930. They made no mention of the methods, developments, and extensive applications by the Göttingen geochemists. Those texts emphasized the broader field of the physics of spectroscopy (origin of spectra, diffraction, and other instrumentation, etc.). The authors were not immersed in the diverse problems of materials analysis, nor concerned with extensive application to research projects as distinct from isolated industrial or production problems. Whatever the causes, dc arc methods were given short and completely inadequate coverage long after their capabilities were fully demonstrated and documented in the literature by 1936 as will be shown below. In retrospect, it seems that the burning issues between spectroscopists in this country, during the period of development (1933–45), were centered on instrumen-

* This is one of three papers presented at a symposium "Three Decades of Emissions Spectroscopy," 14 May 1968, at the 7th National SAS Meeting in Chicago.

tation and on alternate techniques of attacking an analytical problem. Thus we had long standing battles: arc vs spark users, prism vs grating diffracting unit advocates, solids vs solutions, even carbons vs graphite as electrode material. Frequently, an ardent backer of one technique was without experience in the alternate. These partisan battles undoubtedly diverted attention from the basic issue as to how, and to what extent optical spectra could be made the basis of a useful method of chemical analysis.

Trace element analysis is no longer the almost unique task of optical spectroscopy because more powerful methods have appeared. As a consequence, the former controversies no longer dominate assemblages of spectrochemists.

It is difficult to recall now that there were virtually no spectrochemical laboratories in the U. S. in 1930. The situation in Europe was somewhat better, and it was there as mentioned above, that spectrochemical methods were first developed and applied on a significant scale. I believe that it is fair to say that the main stream of developments in dc arc spectrochemical methods at this time flowed in Europe. This stream had a dual source: (1) the very professional attitude of the management of the optical instrument firm, Adam Hilger Ltd. in London, whose guiding spirit was Frank Twyman F.R.S., and (2) the sudden rebirth of interest in the subject of geochemistry particularly with respect to the desire for knowledge on minor and rare-element distribution in the earth's crust—largely on the part of Goldschmidt at Göttingen in Germany from 1929 to 1935.

The Hilger[2] firm, in addition to being the major producer of high quality spectrographs and other optical instruments, sponsored the publication of literature for the practical user of spectrographs, such as wave length tables, laboratory guides, and English translations of books.

Goldschmidt's interest in developing dc carbon arc methods derived from the observed fact that smaller amounts of minor constituents in nonconducting solids could be detected in their carbon arc spectra than experience had shown was the case for primary x-ray emission analysis methods used in Goldschmidt's initial work in Oslo in the 1920's. He had need for new analyses to lower concentration levels for smaller samples, and of quicker methods to illustrate and support his principles on the geochemical distribution of elements in the earth's crust developed in the 1922–29 period in Norway, largely from crystal chemistry studies.

The above statements, which refer primarily to dc carbon arc methods are not meant to ignore the fact that in 1925, Gerlach[3] in Munich had introduced his *internal standard* and *intensity ratio* principles as a foundation for quantitative methods, although not in the form used today. The means of calibrating intensities and monitoring the excitation process thus laid the foundations for quantitative methods especially in spark excitation, and they have since been carried over into arc excitation methods. The specification of "homologous" lines and "fixation" pairs, designed to keep a check on excitation conditions, is emphasized and illustrated in the three books of Gerlach.[4]

The book by Scheibe[5] (1933) was also published during the same early 1930 period, which illustrates his efforts to determine intensity ratios by differences in length of lines photographed by interposing a sector with a logarithmic cut at the spectrograph slit as described by Scheibe and Neuhausse[6] in 1928.

By 1930, therefore, the only book on the direct spectrographic analysis of solids was Gerlach's, and as already mentioned, this was largely for the benefit of spark excitation methods. Consequently, the Göttingen laboratory of Goldschmidt could not draw on much existing information regarding dc carbon arc methods.

I. SEMIQUANTITATIVE dc ARC APPLICATIONS IN GÖTTINGEN 1930–33

In December 1930, Goldschmidt presented to the Göttingen Academy of Science the first of a series of papers on experimental studies of the distribution of rarer elements, in which dc arc spectrochemical methods would be developed to an increasingly more quantitative level over the next five years. This was on the occurrence of germanium in coal and coal products.

Goldschmidt's prime interest was in the actual analytical results, and methods development was left to others. I happened to have been one of those present for the second half of the 1930–35 period, and so can report on progress and events from personal knowledge. The first paper (on Ge) merely stated that the spectrographic analyses were made by Dr. Cl. Peters. It was not until another paper[8] was presented to the Academy in February 1931, on the Geochemistry of Gallium, that the author-team Goldschmidt and Peters appeared in print. In the same paper, arc spectra and optical spectroscopy in connection with his work was first mentioned, and reference made to the paper "Über Quantitative Spektralanalyse mit Hilfe der Negativen Glimmschicht in Lichtbogen" by R. Mannkopff and Cl. Peters.[9]

This paper was a first report of the efforts by physicists to whom Goldschmidt brought the problem of developing more sensitive and scientifically grounded methods of dc carbon arc analysis.

Observations had shown that when present in small amounts, the lines of many elements are markedly concentrated near the cathode of a carbon arc. The cathode region was thus singled out for special study, and analyses made using the light originating in the cathode "Glimmschicht"—a word which I believe I was the first to render in English as *Cathode Layer*.

It must be remembered that at this time there were no commercial sources of carbons (or graphite) of spectrographic purity. Thus, decreasing the contamination of those available was part of an analysis

project. Goldschmidt and Peters heated their carbons for one hour at 2700°–2800°C before making Ga analyses in 1931.

These first analyses were made on the basis of a visual comparison of Ga lines in photographed spectra of samples with the same lines in photographed spectra of Ga_2O_3 in SiO_2 base standards. [All analytical results and compositions were expressed as wt%/oxides partly because this represented the state of synthetic standard components, but also because of the customary way of expressing mineral composition.] For this purpose, sample and standard plates were mechanically superimposed so that Ga lines of standard and sample were viewed simultaneously and their relative absolute intensities evaluated visually. Duplicate standards in an alkali–alumina rich base did not show any recognizable intensity differences relative to the SiO_2-base standards.

Now of course this procedure would not be called a quantitative analysis today, but since nothing was known of the distribution of gallium in materials of the earth's crust in 1931, the results obtained by this means served a useful geochemical purpose. Crucial in this first study was the effort to capitalize on the cathode layer where gallium could be detected down to lower concentration than by any other means then available.

The next paper (presented to the Academy in December 1931), was the geochemistry of scandium.[10] In this paper, there is evidence that an increased effort has been made to develop a more quantitative spectrochemical method. Chemists were by now called upon to assist in the preparation of standards for calibrating the dc carbon arc method. Initial standards of Sc_2O_3 in an SiO_2 base were checked by a second series using a Mg-orthosilicate base. The second series was synthesized from MgO and precipitated SiO_2 in a ratio 2:1, with Sc_2O_3 additions down to 0.0005%. These mixtures were then pressed into pellets at 5000 kg/cm² and sintered 26 h at 1000°C, in order to obtain the best possible uniform material which would behave in the arc carbons as nearly as possible like a natural magnesium silicate sample. A third series of standards used an Al_2O_3 base. In this Ga study, details such as operating current and sample size (1-mm diam and 1.5-mm deep crater) were clearly specified. Further recognition and use of fractional distillation for separating and enhancing of lines above background was described. Scandium lines were observed to be enhanced after the first two or three 20-sec fractions. Scandium could be detected down to 0.0005 wt% Sc_2O_3, and variations in matrix did not cause variations in line intensities to within the standard intervals.

Thus already by the end of 1931, efforts had been made in dc arc methods to use standards in a form as nearly as possible like samples to be analyzed. However, there was still absent an adequate means of comparing line intensities, nor was any use made of the internal standard principle described in the Gerlach and Schweitzer book published two years earlier. This was of course due to a desire to use the cathode layer and take advantage of its ability to reveal the presence of lowest concentration of metals. Thus for geochemical purposes, it was more important to make a semiquantitative analysis based on absolute intensities than to have no data at all.

Still another paper, on geochemistry of beryllium,[11] of the same semiquantitative nature followed on 27 May 1932. For this work, a crater 0.7×7.0 mm was found to give a more gradual supply of sample to the arc, and this small crater and sample size was subsequently used more and more to promote a smoothly burning arc. To clean the electrodes for the analysis, they were heated to 2800°C in a nitrogen–hydrogen mixture.

During the year prior to my arrival in Göttingen, two papers[12] on the geochemistry of boron were submitted to the Academy by Goldschmidt and Peters. The first on 22 July 1932 and another 28 October 1932. Here complications arose due to the fact that all carbon electrode material available contained large amounts of boron which could not be removed by the usual purification treatments. It was then found that copper electrodes (solid sample packed into a 2×1.5 mm crater of a 5-mm cathode) arced at 6–8 Å gave spectra usable for quantitative analyses. The method was based on two standard bases, involving additions of H_3BO_3 to both SiO_2 and Al_2O_3 which permitted determinations down to 0.0005% B_2O_3. Again a set of standards were synthesized to represent more closely the chemistry of the silicate minerals to be analyzed. For this purpose, H_3BO_3 was added to a base of $MgO+Fe_2O_3+SiO_2$ in ratio 3:2:5. Two of these mixtures were pressed and sintered for three days at 500°C and another day at 700°C. All of these standards gave spectra in which the intensity of the boron line remained within the rather wide interval of the separate SiO_2-base standard. An additional precaution was taken to assure that light emission of standards and sample could be reliably compared by an additional set of standards in which boron was carried as the mineral tourmaline.

In January of 1933, there followed a paper by Goldschmidt and Peters on the Geochemistry of Germanium,[13] again utilizing the enhanced emission of lines in the cathode layer. Because of the high volatibility of Ge, its lines were observed to be emitted during the initial 20-sec arcing period (from 0.7×7 mm craters); ahead of less volatile elements, and before a heavy background built up in an arc dominated by CN-band emission. Here again the influence of the matrix on line emission from GeO_2 was examined by multiple standardization. For this purpose, GeO_2 was added to SiO_2 in form of quartz, as well as to Fe-powder, and the mineral chromite ($FeCr_2O_4$). Increased sensitivity was achieved by using larger samples; 30 mg in 2×10-mm craters filled to ⅔ capacity. Due to the high volatility of Ge, it pretty much dominated the initial arc gas; and being present in small amounts, emission was strongly

enhanced in the cathode layer. Concentrations of 0.0001% GeO_2 were detectable; representing (for the 30-mg sample) 0.1-μg GeO_2.

The joint authorship of Goldschmidt and Peters ended with "Geochemistry of Arsenic"[14] submitted to the Academy in January 1934, being preceded by others on "Alkali Metals-I,"[15] meteorites,[17] and rare elements in coals.[18] No mention has been made of methods developed to a fine routine for determining precious metals.[19] Here these metals were preconcentrated in lead assay beads. Similarly no impression has been given of the tremendous numbers and varieties of geological materials analyzed in these great geochemical survey studies which kept a sizable staff of assistants and technicians busy preparing samples for analysis. No less important was the workshop with its superb mechanic master Albrecht and his seven apprentices who built instruments for the institute including about ten long-focus two-prism spectrographs used in the laboratory. These spectrographs were designed by Mannkopff to reduce the light scatter experienced in Littrow-mount spectrographs. Mannkopff[20] used separate collimator and camera lens and preserved the convenient 180° deviation construction by a mirror placed behind the exit prisms.

II. QUANTITATIVE dc ARC METHODS DEVELOPMENT IN GÖTTINGEN 1934–35

Parallel with the active use of the dc arc for semiquantitative analysis in the geochemical research work of Goldschmidt and Peters, research on arc physics was carried out by graduate students of Mannkopff[21]; namely, Hörmann[22] and Witte.[23] Thus, even though the great survey-type geochemical studies had no immediate need for quantitative refinements, a substantial base of knowledge was being developed regarding the dc carbon arc and its use for analytical purposes; The reason being that the natural spread in composition of the samples exceeded analytical errors resulting from visual matching of photographed line densities of samples and standards.

Other graduate students of more chemical inclinations, e.g., Bauer[24] and Englehardt, were studying the excitations process and problems connected with intensity calibration. It was during this period of extensive semiquantitative analysis, coupled with basic research on the dc-arc excitation process and early efforts to use it as the basis of a quantitative analytical method, that I arrived in Göttingen in early May 1933, as a post graduate guest research worker. Later the same year Peters left Göttingen and, as already mentioned, "Geochemistry of Arsenic" ended the semiquantitative analysis geochemical applications of Goldschmidt and Peters.

The first subsequent paper employed the quantitative refinements developed by graduate students, and thus represents the first example of quantitative dc arc spectrochemical analysis in Goldschmidt's geochemical program, and the first case of the use of such methods on an extensive scale as the essential experimental tool in a major research project. This was "Geochemistry of Alkali Metals-II" by Goldschmidt, Bauer, and Witte[25] reported to the Academy in July 1934. Visual intensity comparisons between samples and standards were no longer made, but emulsion calibrations and intensity ratios were determined by photographic photometry of internal standard lines using the principles outlined in the Gerlach and Schweitzer book five years earlier. Here the emulsion characteristic curve was determined for each plate, usually with two separate exposures to a continuous light source using both a stepped filter and rotating sector. The substance to be analyzed was combined with BaO as an intensity standard and NaCl to help break down silicate samples and regulate the arc temperature. The sample mixture was packed into a 0.8-mm-diam crater in a 5-mm carbon electrode machined down to 2.8 mm and arced as cathode. The mixture arced consisted of sample $+NaCl+BaO=50:45:5$ wt%. A translation of the several pages of methods development from this paper would sound modern indeed—in fact, little new has been added in the decades since then, except instrumentation.

In February 1935, "The Geochemistry of Selenium-II," by Goldschmidt and Strock[26] was submitted to the Academy—embodying my microchemical work on Se, which was the last of the famous Goldschmidt papers on geochemistry published by the Göttingen Academy of Science. The last of the series covering

FIG. 1. Prof. Victor Moritz Goldschmidt bids farewell to Dr. Lester William Strock at Göttingen Railway Station en route to Oslo in Oct. 1935. Dr. Strock departed for London one month later.

work done in his institute, my work on lithium,[27] was submitted in November 1935 after Goldschmidt (Fig. 1) had returned to Oslo as a result of the ever worsening political situation in Germany prior to World War II.

In developing a dc arc method for lithium, I was able to profit from the accumulated experience of the entire institute staff. It should be mentioned that methods for determining barium developed by Englehardt[28] followed closely the method of Bauer[24] for La_2O_3.

On the basis of my close familiarity with all spectrochemical work at the institute, there were a few further improvements which, it appeared to me, seemed possible and desirable. Although the earlier semiquantitative methods of analysis were based in part on fractionated spectra, the Rb and Cs determinations[25] were based entirely on a completely consumed sample. This insured that the last traces of BaO, used as the internal standard, and any residual melt bead from Al rich samples would be evaporated and excited. It is thus evident that a completely burned sample was no longer an innovation when described some five years later by others.

A decided aid to increased accuracy resulted when Bauer utilized a 3.5-mg sample for alkali analyses, only 50% of which represented the material to be analyzed. Since concentrations of 0.0005% could be determined, this meant the determination of only 0.01 μg of Rb or Cs.

One area where a procedural improvement seemed to me desirable was the convenience of calibrating the emulsion, which up to now was done in a manner intended to calibrate the emulsion over the entire wave length range. A separate density calibration strip was thus imposed on each plate or cut film strip. This was done as a separate operation, using continuous radiation which of course became undesirably weak at shorter wave lengths with lamps then available. Further, this technique used extra emulsion area and involved changing accessories and optics and lengthening the spectrograph slit. Moreover, my own measurements had shown a marked dissimilarity of characteristic curves made with continuous light vs line spectra which were to be converted to relative intensity values by the calibration operation.

It seemed to me that all this could be avoided if a stepped sector were placed at the slit and the light from each exposure photographed directly as a stepped spectrum. In this way, each line in the photographed spectrum of the sample would serve as its own density, intensity calibration. This would avoid disturbing the spectrograph illumination, eliminate any differences due to inequality of line vs continuous characteristic curves, and most important provide adequate calibration intensity for all lines in a spectrum.

In most of the studies made in the laboratory, it was evident that a tremendous amount of care was required to assure that samples were in reality completely consumed. Some samples tended to spray out like a sparkler during a large portion of their burning period, frequently leaving an empty crater, long before the crater walls were consumed. Other samples, which for most of their arcing period seemed to burn away quietly, along with the crater walls of the electrode, suddenly ejected small melt beads (metal or a hollow Al_2O_3 bubble) near the end of the arcing process leaving an empty hissing arc full of CN band emission. It seemed that incorporating carbon powder into the sample should depress the tendency of the sample to melt down into a melt bead, as well as retard the vaporization of sample into the arc. The reducing effect of the added carbon should assist in dissociating many samples into their metals; a prerequisite for excitation of atomic spectra. Experiments showed the expected improvements when these additions were made to the procedures already developed by Bauer for La, Rb, and Cs, and by von Englehardt for Ba.

It so happened that another spectrographer was working for several years in Jena to develop dc carbon arc methods for the analysis of Tektites who had ideas similar to mine in the above mentioned respects. It also happens that he arrived in Göttingen while I was applying these ideas in developing a very accurate method for lithium in geological materials. I do not now recall during what stage of my work Preuss arrived, but I was greatly stimulated by discussions with this early and devoted spectrographer. "Spectrographic Study of Tektites"[29] contains a 40-page account of his development of a spectrographic method—from details of qualitative study, search for lines, preparation of different standards, purifying electrodes, semiquantitative procedures, and the photometry for a final quantitative procedure. The work of Preuss is one more example to demonstrate that the period 1930–35 saw the establishment of quantitative dc arc methods. His paper is a classic of the period, and I fear unknown by spectrochemists outside Germany.

It must be remembered that this was three years before Hahn split the uranium atom, and about six years before the Manhattan Project created a massive demand for analytical facilities and methods for determining hitherto unrequired low concentrations in very small samples. dc arc methods, as developed by the geochemists, were capable of determining small fractions of microgram quantities of impurities in milligram samples. At that time, therefore, the dc arc represented the ultimate tool for trace analysis, especially of non-metallic substances. Activation analysis and other developments of the Nuclear Age were more than a decade in the future.

Now, as already pointed out, it is a curious fact that these dc arc method developments of the years 1930–35 made little, if any, impression on spectrochemical activities in the U. S. Authors of texts on applied spectroscopy of the period ignored this development of quantitative dc arc methods by the European geochemists. Part of this may have been due to a language barrier, perhaps more to the fact that

most of those developments were "buried" in geochemical literature but perhaps most of all due to the fact that the pertinent publications were in rather obscure local journals. The fact remains, however, that on leaving Göttingen in November, 1935, I was given an opportunity to spend four months at the optical firm of Adam Hilger in London en route back to the U. S. for the purpose of preparing an account in English of the spectrochemical methods developed at Göttingen which they would publish. This appeared as a 56-page booklet by Strock[30] under the title, *Spectrum Analysis with the Carbon Arc Cathode Layer* (*Glimmschicht*). However, at this time most interest in the U. S. was centered on the analysis of metallic samples where spark excitation was more appropriate. Consequently, this account of dc arc methods with its emphasis on the unambiguous use of photographic-line photometry, and in analyzing powdered nonconducting samples, seems to have had little effect in demonstrating the quantitative possibilities of dc arc methods, and the entire Göttingen activities described were ignored by textbooks for many years afterwards. In fact, the effect of this publication seems to have been the opposite of its goal; since it is often quoted in connection with the cathode-layer phenomenon as a qualitative feature of the carbon arc, rather than in connection with the dc arc as a light source capable of calibration and use in an analytical method.

For anyone wishing a comprehensive published account of the quantitative work done in Göttingen, including a continuation of similar developments in Oslo and Saratoga Springs, by me and by my associates as well as by his own laboratory and elsewhere, the monograph of Mitchell[31] should be consulted. There is no text book of comparable treatment. Mitchell first published his "Analyses of Soils by the Cathode-Layer Method" in 1940, and has been active in this field to this date.

Mention has been made of the impetus given spectrochemical analysis methods development in the U. S. by the advent of nuclear science and technology. The National Bureau of Standards and Oak Ridge facilities were very much in the center of those developments, as were the laboratories of the nuclear installations concerned. In tracing the history of dc arc methods this audience need scarcely be reminded of the use to which Scribner and Mullins[32] at a later date put the previously often observed phenomenon of fractional distillation from the arc for the purpose of determining impurities in uranium oxides. More recent developments by myself and others will be reserved for a second chapter in this historical account. (*Editors Note:* A second paper on this historical development will be presented in the near future.) These developments include attempts to increase the versatility of methods by preconcentration chemical procedures such as I initiated on returning from Goldschmidt's laboratory in Oslo to Saratoga Springs, New York, in 1939, as well as an account of efforts to extend dc-arc methods to major constituents in many materials. The work of Mitchell in Aberdeen on preconcentration is well known and available in the literature.

Now I do not wish to imply that many other persons have not made significant contributions to the development of dc arc methods, particularly in this country. These would at any rate have been at a considerably later date than the period ending in Germany in 1935 which I have presented above, because it has not been known in any detail in the English literature, and is so relatively inaccessible even in its original German.

Since these publications are relatively unknown and inaccessible to spectrochemists in this country, and because of the bearing of these papers on the history of dc arc analysis methods, I am prepared to make English translations of the pertinent portions of the original papers on La by Bauer; on Rb and Cs by Goldschmidt, Bauer, and Witte; on Ba by von Englehardt; on Li by Strock; and the very comprehensive paper by Preuss on tektites; if sufficient demand develops. Perhaps then some day these works will be recognized as substantial portions of the fundation of dc-arc spectrochemical analysis.

III. HISTORICAL ASSESSMENT OF dc ARC METHODS DEVELOPED BY GEOCHEMISTS IN THE 1930 DECADE

In the three decades since the general ideas of the geochemical distribution of the chemical elements in the earth's crust were established by Goldschmidt, and finally in the universe as summarized in his publication[33] of 1937, many detailed studies have been made of special areas or groups of elements. Even though such studies have involved more detailed sampling and the most recent sophisticated techniques and instrumentation, knowledge of the geochemical association of the elements as determined by Goldschmidt on the basis of dc-arc methods has not been altered much since then. Thus, the semi-quantitative dc arc methods on which a large portion of his work was based have been of great value. The same can be said for primary x-ray emission studies in the previous decade, and especially for the classical determination of rare earths in average shale carried out by Minami of Tokyo in Göttingen, during my time. Goldschmidt's element distributions have provided an important guide and body of experimental facts to be accounted for by cosmologist and nuclear physicists in deducing details of the process of nuclear synthesis of the chemical elements in the universe.

A brief illustration on the basis of some very recently published analyses of lithium in the same samples of some average samples of geological materials, still available in the geochemical laboratory at Göttingen, illustrates the quality of dc arc methods of the 1935 period.

The concentration calibration curve (Fig. 2) obtained from a series of standards containing Li as a silicate mineral in a base 45% NaCl, 5% SrO, and 50% SiO diluted with two parts carbon powder for arcing

is reproduced from my publication.[27] Note the two parallel curves obtained for two different Li lines, and also that the amount of sample for the strongly reversible line 6707 drastically effects the concentration to which that line may be used. My chief point, however, is to call attention to the third curve lying between those two curves. This was an attempt to calibrate for Li in $CaCO_3$-rich samples. It does not parallel the others. The spectra were very sensitive to variations in Si content. This situation was discussed in some detail in my paper and the statement made that any value determined for Li in $CaCO_3$-rich samples could be in error by a factor four.

A recent publication by Ohrdorf[34] gives results of atomic absorption Li-determinations of the same powdered samples analyzed by me in 1935 by dc carbon arc. For shale, sandstone, and graywache the agreement is acceptable. This is not true for the three limestones however.

Comparison of my 1935 dc-arc results with the 1968 atomic absorption results of Ohrdorf are contained in Table I.

Further evidence of the basic correctness of the dc arc Li data of 1935 may be demonstrated by two more comparisons with Ohrdorf's[34] 1968 atomic absorption data.

In Ohrdorf's[34] Table VI, Li values (ppm) found at different depths of a 6.62-m core taken at depth 5300 m in the Atlantic Ocean (Lamont A160 No. 7) were found to be: 91 at 0.5-m depth, 106 at 2-m, 99 at 3-m, 101 at 5-m, and 113 at 6-m depth. In a different core (Lamont A160 No. 8) a similar increase in Li with sediment depth was found: 58 at 2.65 m, 78 at 5 m, and 86 at 8.5 m. A single sample of deep sea red clay, presumably scraped from bottom (i.e., near surface of the sediment layer) by the Challenger Expedition, contained 80 ppm Li according to my 1935 dc-arc analysis.

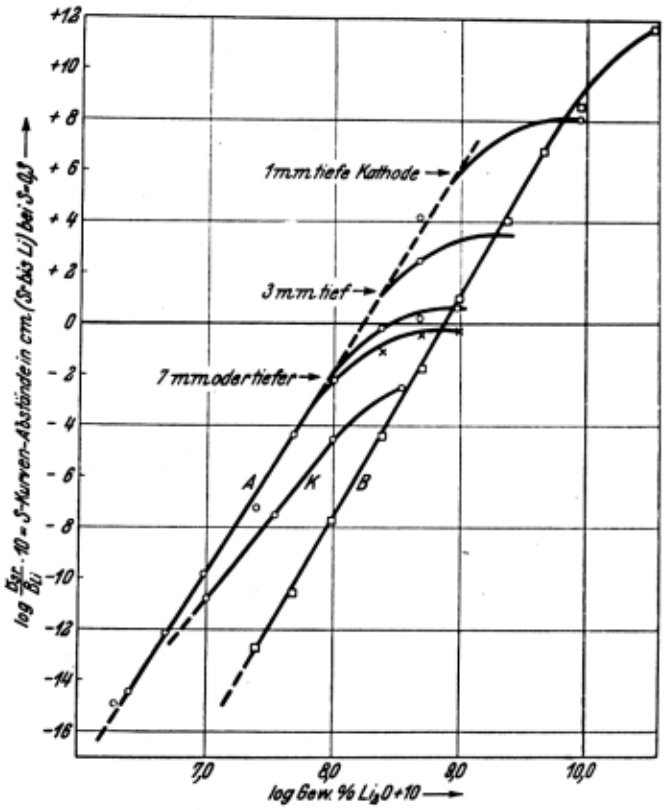


FIG. 2. From: L. W. Strock,[27] Curve K from Li standards in a $CaCO_3$-rich base which is very sensitive to variations in SiO_2 content. Curve B based on Li-6103.59. Curve A based on Li-6107.86 whose range of usefulness is limited by sample size because of strong self absorption

Table I. Comparative analyses of powdered average rock samples in Göttingen Geochemical Institute file.

	ppm Li	
	dc arc (L.W.S. 1935)	Atomic absorption (R.O. 1968)
11—carbonaceous sandstones	29	30
23—"Bunt" sandstones	16	20
36—paleozoic shales	63	79
17—Greywache	41	51
32—German devonian limestones	20	5
45—German Jurasic limestones	23	6
16—German cretaceous limestones	35	10

At any rate, as a result of several hundred analyses of all kinds of sediments, Ohrdorf has arrived at the same quantitative value for the average content of Li in the sedimentary rocks of the earth's crust as I derived in 1935 on the basis of less than 10% the number of samples. My value was 51.6-ppm Li vs 51 ppm obtained by Ohrdorf.

The large discrepency for the $CaCO_3$-rich materials, constituting only 8% of total sediments, has much less influence on the average Li-content of total sediments than would discrepancies of corresponding amounts in the shale or sandstone results. Unfortunately, in 1935, we had no opportunity of checking our analyses with independent methods of equal sensitivity such as exist today. These comparisons at least demonstrate that meaningful geochemical studies were made 35 years ago by means of the dc arc.

IV. CONCLUSION

That dc arc methods were already developed to a reliable quantitative level by 1935, should be evident from this survey and by comparing results of the period in the field of geochemistry with those of more recent vintage. Because of the nature of geological materials, their study has been uniquely suited to excitation in the dc arc and it is understandable that methods development was largely accomplished in geochemical laboratories. It is perhaps unfortunate for the history of dc arc that the basis of a quantitative method was developed by geochemists who perforce published in journals which were not read by the physicists and chemists who authored textbooks on applied spectroscopy prior to 1950.

The details of methods developed by 1950 were concerned largely with compensating for unfavorable and variable characteristics of the dc arc—characteristics clearly recognized, but whose more detailed study was left to a future generation of spectrochemists.

1. G. R. Harrison, R. C. Lord, and J. R. Loofbourow, *Practical Spectroscopy* (Prentice–Hall, Inc., New York, 1948); R. A. Sawyer, *Experimental Spectroscopy* (Prentice–Hall, Inc., New York, 1944); N. H. Nachtrieb, *Principles and Practice of Spectrochemical Analysis* (McGraw–Hill Book Co., New York, 1950); W. R. Brode, *Chemical Spectroscopy* (John Wiley & Sons, Inc., New York, 1939).
2. Adam Hilger Ltd. (London) Publications: *The practice of Spectrum Analysis* (1933), 6th ed.; *Wavelength Tables for Spectrum Analysis*, F. Twyman and D. M. Smith (1931), 2nd ed.; *Spectrochemical Abstracts*, F. Twyman, 1933–37 (1938); *Spectrum Analysis in 1938*, F. Twyman (1938).
3. W. Gerlach, Zeit. Anorg. Allgem. Chem. **142**, 383 (1925).
4. (a) W. Gerlach and E. Schweitzer, *Die chemische Emissions Spektralanalyse* (Voss, Leipzig, 1930), Vol. I (Eng. transl. publ. by Adam Hilger Ltd., London, 1931); W. Gerlach and W. Gerlach, Vol. II, 1933 with Engl. ed. (Adam Hilger Ltd., 1934)—Applications to medicine and mineralogy; W. Gerlach and Riedl, Vol. III (Voss, Leipzig, 1936), Engl. transl. (Adam Hilger Ltd., 1938).
5. G. Scheibe, *Chemische Spektralanalyse* (Akad. Verlag, Leipzig, 1933).
6. G. Scheibe and Neuhausse, Z. Angew. Chem. **41**, 1218 (1928).
7. V. M. Goldschmidt, Nachr. Akad. Wiss., Göttingen, Math.–Physick. Kl., Fachgr. III and IV, 398–401 (1930).
8. V. M. Goldschmidt and Cl. Peters, Nachr. Akad. Wiss., Göttingen, Math.–Physik. Kl., Fachgr. III and IV, 165–183 (1931).
9. R. Mannkopff and Cl. Peters, Z. Physik. **70**, 444 (1931).
10. V. M. Goldschmidt and Cl. Peters, (Sc) Nach. Akad. Wiss., Göttingen, Math.–Physik. Kl., Fachgr. III and IV, 257–279 (1931).
11. See Ref. 10 (Be), 360–376 (1932).
12. See Ref. 10 (Boron I), 402–407 (1932); (Boron II), 528 (1932).
13. See Ref. 10 (Ge), 141–166 (1933).
14. See Ref. 10 (As) Fachgr. IV Neue Folge **1**, 11–22 (1934).
15. V. M. Goldschmidt, H. Berman, H. Hauptman, and Cl. Peters, (Alkalis I) Nach. Akad. Wiss., Göttingen, Math.–Physik., Kl., Fachgr. III and IV, 235–244 (1933).
16. V. M. Goldschmidt and O. Hefter, (Se) Nach Akad. Wiss., Göttingen, Math.–Physik., Kl. Fachgr. III and IV, 245–252 (1933).
17. V. M. Goldschmidt and Cl. Peters (Troilite Nodules), Nach. Akad. Wiss., Göttingen, Math.–Physik., Kl., Fachgr. III and IV, 278–287 (1933).
18. See Ref. 17 (Minor Elements in Coals), Fachgr. III and IV, 371–386 (1933).
19. See Ref. 17 (Precious Metals), Fachgr. III and IV, 377–401 (1932); Cl. Peters, Metallwirtschaft **12**, 17–19 (1933); F. Haber and J. Jaenecke, Z. Anorg. Allgem. Chem. **147**, 156 (1925).
20. R. Mannkopff, Z. Physik **72**, 569 (1931).
21. R. Mannkopff, Z. Physik **76**, 396–406 (1932); **86**, 161–184 (1933).
22. Hans. Hörmann, Z. Physik **97**, 539–560 (1935).
23. Helmut Witte, Z. Physik **88**, 415–435 (1934).
24. Herbert Bauer, (La) Z. Anorg. Allgem. Chem. **221**, 209–24 (1935).
25. V. M. Goldschmidt, H. Bauer, and H. Witte (Alakali Metals II) Nachr. Ges. Wiss. Göttingen, Math.–Physik. Kl., Fachgr. IV, **1**, 39 (1934).
26. V. M. Goldschmidt and L. W. Strock, (Se) Nachr. Akad. Wiss., Göttingen, Math.–Physik. Kl., Fachgr. IV, N. F. **I**, 123 (1935).
27. L. W. Strock, (Li) Nachr. Akad. Wiss., Göttingen, Math.–Physik. Kl., Fachgr. IV 171–204 (1936).
28. W. von Englehardt, (Ba) Chem. Erde **10**, 187 (1936).
29. E. Preuss, (Tektites) Chem. Erde **9**, 365–418 (1935); Carbon Arc Methods, Z. Angew. Min. **I**, 167–194 (1938).
30. L. W. Strock, *Spectrum Analysis with the Carbon Arc Cathode Layer* ("Glimmschicht") (Adam Hilger Ltd., London, 1936).
31. R. L. Mitchell, "Spectrographic Analysis of Soils, Plants, and Related Materials," Commonwealth Bureau Soil Science, Tech. Communication No. 44., Macauley Institute for Soil Research, Aberdeen (1945).
32. B. F. Scribner and H. R. Mullins, J. Res. Natl. Bur. Std. **37**, 379 (1946).
33. V. M. Goldschmidt, "Geochemische Verteilungsgesetze des Elements IX.", Skrifter Norske Videnskaps–Akad. Oslo, Math.–Naturv. Kl. **4**, 1–148 (1937).
34. R. Ohrdorf, Geochim. Cosmochim. Acta **32**, 191–208 (1968).

SAS SEEKS GOVERNING BOARD DELEGATES

Have you always wanted to have a say in how your professional Society runs? If so, the Society for Applied Spectroscopy wants you to be a delegate to its Governing Board. SAS is seeking qualified individuals who are interested in being delegates to the Society's Governing Board meeting in Nashville, Tennessee on Tuesday, September 26, 2000 and at subsequent meetings which are held in conjunction with the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) meetings. If elected to the position, you will be required to vote on Society business at the meeting. A travel honorarium of $200 per meeting served will be given to those who are elected.

Qualifications include being a regular member in good standing of SAS and having an interest in the well-being of the Society. All applications will reviewed by the SAS Nominating Committee for eligibility. International members are encouraged to apply. Qualified candidates will be voted on by the membership at-large in July 2000. Ten delegates will be elected to serve. The 5 candidates who garner the most votes will serve three-year terms, while five next highest will serve two-year terms.

If you are interested in serving your professional society in this way, please submit your name and any relevant qualifications you feel would help the membership at-large determine whether you would be a good delegate to Dr. Richard Palmer, Nominating Committee Chairman, c/o SAS, 201B Broadway Street, Frederick, MD 21701. Nominations must be received by February 15, 2000.

Please call the Society office at 301-694-8122 if you have any questions.

The Vancouver Convention Center

Site of FACSS '99 and of the First Meeting of the SAS Governing Board outside of the United States

The Minutes and Reports from the October 1999 Meeting Of the SAS Governing Board

SAS GOVERNING BOARD MEETING MINUTES
TUESDAY, OCTOBER 26, 1999

I. Call To Order

President Robin Garrell called the meeting to order at 8:13 PM in the Cheakamus Room, Waterfront Centre Hotel, Vancouver, British Columbia. This is the first SAS Governing Board meeting held outside the United States.

II. Roll Call

The following answered the role call, except as noted:

President	Robin Garrell
President-Elect	Rina Dukor
Past-President	Joe Caruso
Parliamentarian	Larry Nafie
Secretary	Alexander Scheeline
Treasurer	Mary Tungol
Journal Editor	Joel Harris
Membership Education Chair	Chris Hassel
Newsletter Editor Designate	Marvin Margoshes

Executive Director Bonnie Saylor was absent (maternity leave). She was represented by the other two members of the SAS office staff, Barbara Stull and Victor Hutcherson.

Delegates by Local Section (only those answering the roll call are listed):

Arizona	Michelle Naharniak
Baltimore Washington	Diana Grant
Chicago	Doug Shrader
Cincinnati	Rajiv Soman
Cleveland	Rachel Barbour
Delaware Valley	Chris Hassell
Indiana	Patricia Lang
Intermountain	Paul Farnsworth
Kansas City	Karmie Galle
Minnesota	Jim Westberg
New England	Vasilis Gregoriou
New York	Augusta W. Fountain III
Northern California	Steve Barnett
Ohio Valley	Jim Gord
Pacific Northwest	Mike Carrabba

Pittsburgh	John Jackovitz
Rio Grande	Gary Rayson
Southern California	Jerry Kacsir, Warren Vidrine
Snake River	Bryan Bowie, David Heaps
St. Louis	John Koropchak

III. Introductions

Martha Chapin, representative from Allen Press, was introduced. New Website operator Pete Poston was introduced in absentia.

IV. Meeting Rules of Order

Parliamentarian Larry Nafie announced that Roberts Rules of Order rules would apply.

V. Approval of Minutes from March 9, 1999 Governing Board Meeting

Approval was moved by Mike Carrabba, seconded, and passed.

VI. Reports

A. President Report Attached

Regovernance was approved by a 19:1 margin. Rina Dukor and her committee members were thanked for the dedication to the regovernance effort. Members are encouraged to aggressively sign up additional members. Publicity materials (posters, overhead transparencies) are available from National office. Two ad hoc committees are being appointed: 1) Employment bureau on website. 2) International membership, and interactions with sister societies.

B. Secretary
Minutes of the previous meeting are the main part of the main part of the report. In addition, Scheeline noted that Roberts Rules do not require that the name of the seconder of a motion be entered in the minutes, and so henceforth they will not be.

C. Treasurer Report Attached

We project a surplus of $3,000 this year, and a deficit of $2,300 next year.

D. Executive Administrator Report Attached

The report was presented by Victor Hutcherson in Bonnie Saylor's stead. Before FACSS, we had 2355 US members and 452 International for a total of 2807. So far at FACSS, we have enrolled 15 new full members plus 4 student members, bringing the total to 2826.

E. Journal Editor Report Attached

We are developing the ability to email the Journal table of contents to members in advance of publication. Abstracts will also be available 1-2 months prior to publication.

F. Newsletter Editor Report Attached

The latest issue is available in the SAS booth and will soon be mailed to the membership. R. R. Brattain recollections of the development of infrared spectroscopy during World War II was forwarded to Margoshes by Joel Harris. Reports of Society business and minutes of meetings will be quickly posted on the website rather than waiting for completion of each Newsletter issue. 90% of members now have web access.

G. Membership Education Report Attached

Chris Hassell thanked Peter Griffiths, who taught single-handedly taught the 2-day FTIR course. Pat Treado's web-based course on chemical imaging will be ready soon. Hassell thanked outgoing Membership Education Chair Dave Styris, which sentiment was commended by the Board with a round of applause.

The reports were filed.

Approval of the Year 2000 budget was moved by Mike Carrabba, seconded, and unanimously approved.

VII. National SAS Committee Reports

A. Awards Report Attached

More nominations are needed from the membership.

B. Constitution and Bylaws Report Attached

Proposals for the various levels of corporate sponsorship, especially whether corporate sponsor logos should appear on the cover of the Journal, on the masthead page, or elsewhere, were closely examined. The proposed language for logo placement for Gold and Platinum members was amended to read: "Sustaining Sponsors, Gold will receive all benefits of Silver Sustaining Sponsors plus will be privileged to be allowed two uses of SAS mailing list and five complimentary memberships. Will be privileged to have the sponsor's logo featured monthly in the journal, Applied Spectroscopy." This amendment was moved by Mike Carrabba, seconded, and approved. The reason students can not serve as elected delegates to the Governing Board is that they are not fully-paying members. Any student who pays full dues may be a delegate.

Approval of the Bylaws changes as amended was moved by Rachel Barbour, seconded, and passed.

The new Constitutional amendments and Bylaws changes take effect January 1, 2000.

C. Local Section Affairs Report Attached

We receive too few nominees for student awards. Gary Rayson recommended that criteria for the awards be distributed with the call for nominations, a sentiment seconded by Rjiv Soman. Criteria are also posted on the web page. Nominations are due by April 1. Cincinnati won this year's Poehlmann Award.

D. Membership No Report

E. Nominating No Report

F. Publications Report Attached

G. Publicity No Report

H Tour Speaker Report Attached

For geographically large sections, it may be appropriate to have Tour Speakers make multiple stops. Marginal cost would be born by the Local Section, since all local costs are the Section's responsibility according to normal procedure.

I. Meggers Award Report Attached

J. Strock Award Report Attached

K. Lippincott Award Report Attached

L. Tellers Report Attached

Reports have been filed.

VIII. Delegate Reports

A. FACSS Report Attached

The next four FACSS meetings are in Nashville, Detroit, and Providence. The most likely site for the 2002 meeting is Ft. Lauderdale. It was commented that having four FACSS meetings in the eastern and central time zones in a row is too many. EAS is not interested in a joint meeting. It was reiterated from prior meetings that Friday morning sessions at FACSS should be discouraged; Mike Carrabba pointed out that the sheer size of the meeting might dictate the need to continue on Friday morning. The Japanese Spectroscopy Society has asked that there be a joint meeting with FACSS in Hawaii.

IX. Old Business
A. Regovernance

We need nominees for delegates. Elections will take place about Pittcon time.

B. Membership Survey Results

Results will be sent to all members. The copies handed out at the meeting may circulate. If data cross-correlations are desired, email Bonnie with requests. The results are already guiding design of member benefits.

C. New Corporate Sponsor Levels Already dealt with under VII. B.

D. Budget Already approved under VI.

E. Chemical Heritage Foundation Report attached

The Foundation is trying to define "instrument." We have been asked to suggest up to 20 nominees for initial inclusion in the Instrument Hall of Fame.

X. New Business

A. Announcements concerning members. Honorary Member Fred Brech passed away on October 22, 1999. Former journal editor Bill Fateley's son Scott was killed earlier the same week..

B. Approval of Marvin Margoshes as Newsletter Editor. Multiple delegates moved approval, which passed by acclamation.

XI. Date and Time of Next Meeting

At PittCon, SAS activities will focus on ideas for Local Section functions and member interactions. The next meeting of the Governing Board, under the revised Constitution and Bylaws, will take place during FACSS at the Opryland Hotel, Nashville, TN, on Tuesday, September 24, 2000 at 8 PM.

XII. Adjourn. By consensus, the meeting adjourned at 9:48 PM.

President's Report

Robin L. Garrell

This year has been marked by important changes in the structure and function of the Society: changes that renew and strengthen our organization. The areas most impacted have been governance of the society, membership, and member services. The principal changes are summarized below.

Governance

The Constitution and Bylaws changes agreed upon at the Governing Board meeting at Pittcon were overwhelmingly approved by the Society membership. Most significantly, the new governance structure provides for the election of at-large representatives to the Governing Board, voting representation of international members, and continuing representation of Local Sections, historically the focus of Society activities. We look forward to having closer ties to our many U.S. and international members who have not been able to participate in Local Section activities, but who would like to be more involved in the Society.

The membership also approved formal Bylaws regarding the Distinguished Service Award, and designation of one meeting (currently FACSS) as the annual meeting of the Society. As discussed at the last Governing Board meeting, we plan to continue to hold an informal meeting at Pittcon for elected members and delegates to the Governing Board, to discuss issues of concern both to the Local Sections and the Society as a whole.

Membership

Despite new and ongoing member recruitment and retention efforts, combined with enhanced member benefits, the trend in declining membership continues. Details can be found in the report of our Executive Administrator, Bonnie Saylor. Many other professional societies are experiencing similar membership trends. In an effort to stabilize our numbers, we are now offering a discount on multiple-year renewals. This will make renewal easier on members, save members money, facilitate financial planning, and reduce mailing costs.

Please remember that our most effective recruiting tools are our members: you! Overhead transparencies and PowerPoint files are available from the national office for you to incorporate into your presentations. Posters with tear-off cards for prospective student members will be mailed soon. Special discounts are offered for multiple student memberships.

The results of our 1999 member survey will be summarized in a separate report. Key findings will be sent to the membership in a future mailing.
Member services

The journal, Applied Spectroscopy, is better than ever, with first-rate articles, timely news features, high quality color graphics and rapid turnaround time for authors. The online version is now available in PDF format, greatly adding to the convenience and ease of access. Copies of the Focal Point book are still available. It is an outstanding resource for use in teaching, or as a convenient and inexpensive compendium.

The internet is being used for expanded and new member benefits. Pete Poston has graciously agreed to serve as our new webmaster, and has already given our SAS home page a whole new look, The web site has many new features, and more are planned for the coming months. The on-line Lab Guide is being beta-tested, while new web-based short courses are being developed. Both are scheduled to come online in within a year. At FACSS, we are offering a short course on developing your own web-based courses and teaching aids. An ad hoc committee will be exploring mechanisms for establishing and maintaining a web-based employment bureau.

Other developments

A new Corporate Sponsor structure is being proposed that we believe will be very attractive to prospective sponsors and provide greater stability in revenues to the Society. Please refer to the Constitution and Bylaws report for details.

The Executive Committee will be developing a set of charges for a new ad hoc Long-Range Planning Committee. Their tasks will include discussing how it may benefit the SAS to develop closer ties with other societies, proposing new membership and publication initiatives to be considered by the standing committees of the Society, and considering ways to help members with common technical interests communicate better with one another.

Rina Dukor, to whom we owe great thanks for her tireless efforts on the governance changes over the past several years, will become President of the Society in 2000. Vasilis Gregoriou will be the new President-Elect, while Joe Caruso steps down as Past-President. Chris Hassell will be our new Membership Education Coordinator. Congratulations go to Bonnie Saylor on the birth of her lovely daughter, Eleanor.

Thank you very much for giving me the opportunity to serve as your President this year. It has been a pleasure working with and learning from the outstanding individuals on the Executive and standing Committees, with the many active members of the Society, and with the terrific staff of the SAS National Office. Your contributions and commitment are the heart of the SAS and the worldwide spectroscopy community. I look forward to continuing to work with all of you in growing and strengthening our Society in the new millennium.

Treasurer's Report

Mary Widmark Tungol

The 1999 budget is currently on target, with a possible surplus projected for the end of the fiscal year. Revenues are projected to exceed predictions due to increases in membership dues, education, and general contributions. These projected increases should offset the expected decrease in advertising revenue. The Lab Guide, which was projected for completion this year, has been delayed, negating the projected $26,000 revenue for 1999. Concurrently, a portion of the expenses for its development have been pushed to next year. This will reduce the projected expenses for this year by $23,300. Focal Point Book sales have also been disappointing and anticipated income did not materialize, leaving revenues approximately $34,000 less than planned. Reductions in expenses, however, have offset decreased revenue. In particular, Journal advertising costs were significantly lower than predicted. It is projected that the Society should end 1999 with a surplus of approximately $3,000.

The budget proposed for 2000 holds membership revenue fiat except for the dues increase. Journal subscriptions take into consideration a 5% increase in subscription fees and is based on this year's numbers to date. Membership education revenue and expenses include the online education course and having the BIRS short course on the road. Journal expenses were proposed in consultation with our Journal Editor, Joel Harris, and Journal Publications includes the 4% increase being charged by Allan Press. Lab Guide expenses are those deferred from 1999 minus the cost of producing a printed version which is not anticipated for this year.

The proposed 2000 budget projects a slight deficit of $2,300 which is offset by the projected 1999 surplus.

October 24, 1999

	2000 Proposed Budget	1999 Budget	1999 as of September 30	Percent Used	Projections Till Year End	Total Inc/Exp Projected
REVENUES						
Membership Dues	$220,000.00	$190,000.00	$209,976.00	110.51%	$200.00 $	210,176.00
Jrnl Pub Sales/Adv	$150,000.00	$155,000.00	$94,057.04	60.68%	$45,800.00	$139,857.04
Jrnl Subscriptions	$465,000.00	$445,000.00	$441,283.63	99.16%	$0.00	$441,283.63
Membership Education	$15,000.00	$2,000.00	$8,519.50	425.98%	$0.00	$8,519.50
Investment Revenue	$26,500.00	$26,500.00	$22,783.03	85.97%	$3,700.00	$26,483.03
General Contributions	$3,000.00	$500.00	$4,131.00	826.20%	$0.00	$4,131.00
Other Revenue	$600.00	$500.00	$595.83	119.17%	$30.00	$625.83
Web Income	$1,200.00	$2,000.00	$1,140.00	57.00%	$0.00	$1,140.00
Focal Pt Book	$1,000.00	$24,000.00	$5,269.74	21.96%	$100.00	$5,369.74
Lab Guide	$0.00	$26,000.00	$0.00	0.00%	$0.00	$0.00
Total Revenue	$882,300.00	$871,500.00	$787,755.77	90.39%	$49,830.00	$837,585.77

(Continued on page 15)

EXPENSES

	2000 Proposed Budget	1999 Budget	1999 as of September 30	Percent Used	Projections Till Year End	Total Inc/Exp Projected
Salaries	$106,100.00	$103,000.00	$74,588.67	72.42%	$28,400.00	$102,988.67
Payroll Tax Exp	$13,800.00	$13,300.00	$6,172.56	46.41%	$7,100.00	$13,272.56
Emp Health/AccVac Ben	$3,000.00	$3,000.00	$1,842.49	61.42%	$3,000.00	$4,842.49
Awards/Reception	$10,000.00	$10,000.00	$5,292.21	52.92%	$9,700.00	$14,992.21
Exec Comm Retreat	$0.00	$ 800.00	$0.00	0.00%	$0.00	$0.00
Governing Board	$1,000.00	$1,000.00	$249.27	24.93%	$300.00	$549.27
Membership Committee	$200.00	$200.00	$0.00	0.00%	$0.00	$0.00
Other Committees	$500.00	$500.00	$209.40	41.88%	$0.00	$209.40
Journal Advertising	$100,000.00	$100,000.00	$44,628.39	44.63%	$40,083.00	$84,711.39
Journal Publication	$289,000.00	$278,000.00	$166,851.73	60.02%	$109,469.00	$276,320.73
Journal Postage	$41,200.00	$41,200.00	$10,577.44	25.67%	$30,600.00	$41,177.44
Journal Editorial Board	$1,000.00	$500.00	$871.77	174.35%	$0.00	$871.77
Journal Honorarium	$10,000.00	$10,000.00	$5,000.00	50.00%	$5,000.00	$10,000.00
Journal Furn/Equip	$1,000.00	$1,000.00	$0.00	0.00%	$3,000.00	$3,000.00
Journal Operating	$77,250.00	$75,000.00	$53,925.72	71.90%	$21,100.00	$75,025.72
Journal Travel	$5,000.00	$5,000.00	$1,178.90	23.58%	$1,700.00	$2,878.90
Journal Misc	$2,000.00	$500.00	$2,656.17	531.23%	$50.00	$2,706.17
Journal Online	$7,000.00	$7,000.00	$5,915.00	84.50%	$200.00	$6,115.00
Journal Back Issues	$3,600.00	$3,600.00	$1,589.53	44.15%	$1,900.00	$3,489.53
Member Services	$40,000.00	$38,800.00	$27,556.06	71.02%	$8,000.00	$35,556.06
Memb Ed Comm	$200.00	$200.00	$0.00	0.00%	$0.00	$0.00
Memb Ed Sht Courses	$15,000.00	$10,000.00	$8,082.38	80.82%	$3,000.00	$11,082.38
Newsletter	$8,550.00	$8,300.00	$3,144.11	37.88%	$3,500.00	$6,644.11
Web Expense	$5,000.00	$3,000.00	$309.65	10.32%	$300.00	$609.65
Lab Guide	$13,000.00	$32,300.00	$0.00	0.00%	$9,000.00	$9,000.00
Other Expense/Focal Pt.	$3,000.00	$6,000.00	$0.00	0.00%	$1,000.00	$1,000.00
SO Acct/Legal Fees	$8,000.00	$8,000.00	$8,052.45	100.66%	$1,200.00	$9,252.45
SO Conference Promo	$12,000.00	$12,000.00	$5,546.99	46.22%	$6,600.00	$12,146.99
SO Employee Training	$500.00	$500.00	$0.00	0.00%	$0.00	$0.00
SO Furniture/Equipment	$2,000.00	$3,000.00	$4,124.85	137.50%	$0.00	$4,124.85
SO Insurance	$900.00	$800.00	$926.00	115.75%	$0.00	$926.00
SO Postage	$15,000.00	$15,500.00	$21,962.22	141.69%	$0.00	$21,962.22
SO Printing	$9,000.00	$5,000.00	$8,371.71	167.43%	$300.00	$8,671.71
SO Supplies	$3,000.00	$4,000.00	$2,246.69	56.17%	$900.00	$3,146.69
SO Temp/Bookkeeper	$5,500.00	$5,000.00	$3,753.23	75.06%	$1,200.00	$4,953.23
SO Travel	$12,000.00	$12,000.00	$5,975.68	49.80%	$5,000.00	$10,975.68
SO Operating	$35,000.00	$27,500.00	$16,404.14	59.65%	$11,100.00	$27,504.14
SO Organization Dues	$1,000.00	$1,000.00	$1,367.97	136.80%	$0.00	$1,367.97
SO Miscellaneous	$800.00	$800.00	$2,269.61	283.70%	$200.00	$2,469.61
Officers Expenses	$15,000.00	$15,000.00	$8,377.49	55.85%	$7,500.00	$15,877.49
Bank Charges/Int Exp	$4,500.00	$4,500.00	$4,705.01	104.56%	$500.00	$5,205.01
Depreciation Expenses	$4,000.00	$4,000.00	$0.00	0.00%	$0.00	$0.00
Rounding	$0.00	($13.33)				
Total Expenses:	$884,600.00	$870,800.00	$514,712.16	59.11%	$320,902.00	$835,627.49
NET INCOME	($2,300.00)	$700.00	$273,043.61		($271,072.00)	$1,958.28
INCOME TAX EXP	$0.00	$0.00	($1,000.00)		$0.00	($1,000.00)
GAIN/(LOSS) ON ASTS	$0.00	$0.00	$0.00		$0.00	$0.00
NET AFTER TAXES	($2,300.00)	$700.00	$274,043.61			$2,958.28

Executive Administrator's Report
October 1999

Membership

Current 1999 Numbers
1999 2719 (This time last year was 2,882)
Membership Breakdown USA 2,305 International 414
Total New Members for 1999 332 Total Student Members 286
Total Not Renewed for 1999 560

Subscriptions

1998	1166	**Subscriber Breakdown**	USA 784	International 382
1999	1068	**Subscriber Breakdown**	USA 730	International 338

This time last year our subscriber numbers were at 1153

Membership Marketing

Since PITTCON in March 1999 we have completed several more direct mail campaigns including one to 1998 EAS attendees, one to 1998 FACSS attendees, one to 1999 Winter Plasma Meeting attendees, one to PITTCON '99 attendees, and several to non-member journal authors. We have worked with our graphic artist to do a recruitment poster for academic institutions and once again put in to place the local section-get-a-member campaign and the member-get-a-member campaigns. We also have sent out two comeback mailings and emails to try to get some non-renewed folks back and we also offered 1/2 year memberships. We also developed overheads that promote the Society that our members can use at the end of presentations. We had a nice response from our members asking to receive them. Hopefully they will use them.

Despite these efforts, our numbers are down significantly again (a chart is attached). We thought we had begun a reversal in numbers after last year, but we seem to be back to square one. Even our efforts at PITTCON at the booth yielded far fewer new members then ever before. As I have said before, we desperately need to have some local section assistance in recruiting and retaining members, but there does not seem to be any interest on most of their parts.

Members and Subscribers

We mailed first renewal notices to members and subscribers in August and have offered monetary incentives for returning the membership renewals early.

Looking at the numbers of non-renewed members we noticed that the two big groups who seem to bring us down in numbers are students who amount to 101 of the non-renewed members in 1999 and regular US members who amount to 317 of the non-renewed folks.

Finances

The budget has been prepared and will be presented by Mary Tungol. Our finances for 1999 are looking fairly good with a projection of a small surplus.

Journal Online

The journal can be accessed via the proprietary software from CatchWord or PDF formats. We currently have 134 members who have paid for online access and of our over 1,000 subscribers only 64 have actually taken the time to register with CatchWord so they can have access.

Focal Point Book

Despite vigorous promotion of the Focal Point Compilation book, we have only sold 264 to date. We have done numerous mail and email promotions to sell the book. Have taken out an ad in the Journal of Chemical Education, sent the book out for reviews, put its availability on Amazon.com, put flyers and ads in our journal regularly, promoted to libraries, promoted to academic folks numerous times, and included information on ordering in all mailings and all meetings we attend. We now plan to offer the books as incentives to join the Society.

Journal Editor's Report
Joel M. Harris
October 26,1999

The operation of Applied Spectroscopy has run smoothly since our meeting in March, despite the absence of the Editor from the journal office for several months while he was away on fellowship at Hebrew University. During the past 6 months, the backlog of accepted articles awaiting publication has not been reduced. The lead time from acceptance to publication remains at about 4.5 months, an increase of about 2 weeks compared to last year. We have started publishing somewhat longer issues (22 - 24 papers per issue) to clear the backlog. We expect to return to a steady-state length of - 20 papers per issue by the spring of next year.

The library subscription rate was increased by $100 (32%) this year, justified by the addition of site-licenses to the web edition. As a result of the increase, we stand to realize a significant increase (-$75,000) in income from library subscriptions to the journal compared to last year. We have been holding a harder line on quality of papers that are accepted, which has kept the total page count and publication cost under budget by -$18,000 projected for the year. So the overall financial health of SAS has improved by realizing a greater return from publishing the journal.

The on-line journal service provided by Catchword has posted the content of 1997 and 1998, with the ongoing issues of 1999 appearing about the same time that the printed version mails. Since our last meeting, Catchword is now providing PDF formatting of the journal in addition to its own Realpage format. Now a standard browser with an Adobe-acrobat plug-in can access the journal information. Personal as well as library access to the journal should now be easier; as an example, the University of Utah Library was unable to provide the Realpage version of Applied Spectroscopy; within the last month, the PDF version is now on-line available for all university students and staff on the University of Utah network. PDF formatting should also solve the problems that were encountered with Realpage access for scientists who work in industrial labs behind a Web-firewall. There are significant policy issues that we need to address for defining licensed subnets and pricing our library electronic access; a proposal to address this question will be brought to the Executive Committee Meeting by Paul Farnsworth.

The Publications Committee has urged us to attract more applications-directed manuscripts to the journal (while meeting the usual criteria of quality, novelty, and impact). To help meet this goal, Bonner Denton is now serving as an Associate Editor for the journal, focusing his efforts on the "Spectroscopic Techniques" section of the journal. This section is beginning to grow, and papers for this section are now printed with abstracts beginning on full pages. Charlie Mann is now serving the journal as Software Review Editor to provide critique of new software offerings in data analysis, library searching, and interpretation of spectra; his first column is scheduled for November and is covering computer-aided design packages. The significant growth of papers in the field of biological spectroscopy was mentioned in the March report. To increase the citation impact and readership of those articles, it is critical that we work to have Applied Spectroscopy abstracted in Medline. In the past month, I have received information on the National Library of Medicine Literature Selection Technical Review Committee to which we will present our case for the journal to be added to Med line. Increasing our impact in this field will eventually contribute to the growth of the journal and SAS.

Finally, a major project for the journal office over the summer and early fall was to transfer our database for manuscripts, authors, and reviewers to a Y2K-compliant editorial tracking program. With advice from other users including Allen Press, our office purchased PaperPath which has a large user base of smaller scholarly journals. The program has performed well during the past 6 weeks, and our database was translated successfully. Templating of our letters and forms is nearly done, and the transition should be complete in the next two weeks.

NEWSLETTER EDITOR'S REPORT

August 5, 1999

Taking over the post of Newsletter Editor was greatly helped by Mike Epstein's computer files and advice, and especially by the precedents he set during his tenure. They made it possible to put the Minutes and Reports from the March Governing Board on the SAS Web site in a short time, and the layout of the print version followed his examples. Now that I've climbed that learning curve, I hope to have the documents from future GB meetings posted more quickly. An extra help in this regard is the way that the newest software easily converts files into html format. One doesn't really have to learn a new programming language.

Shortly after I started this assignment, Joel Harris forwarded a manuscript from R. R. Brattain that he felt (and I agreed) was more suitable for The Spectrum than for Applied Spectroscopy. The memoir about how IR spectroscopy came into industrial use during World War II is now on the SAS Web site and in the latest issue of The Spectrum. It continues the practice that Mike Epstein started of reporting on the history of spectroscopy. More material of this kind is being sought.

So far, I have mainly followed the lead Epstein set, but there will be some changes. It is not planned to put the issues of the Spectrum online in .pdf format because of the length of time for most readers to download the files and the need for a large amount of RAM to open them. The contents are posted in .html format, because they are smaller files that are downloaded quickly and require little computer capacity to read. Also, much of it is being posted before the print issue is ready.

Now that the initial steps are done, my attention is turning to the direction the newsletter should take in the future. The issue will be discussed with the Publication Committee.

Marvin Margoshes

Membership Education Coordinator's Report

Revised October 7, 1999

The Society continues to implement procedures necessary to develop broader based educational programs, to enhance course accessibility to the membership, and to expand SAS course visibility beyond the membership. Apart from offerings of short courses and minicourses at FACSS '99, the Web-based course and the "on-the-road" course concepts are being pursued as high priority implementation goals. The Membership Education Committee and the Publications Committee are also working jointly to establish feasibility of publishing, as SAS publications, some of the courses presently being offered by the Society. This concept, introduced by the Publications Committee, provides the unique opportunity to secure our courses for posterity and

to expand their accessibility to and beyond the membership.

For FACSS '99, the Society offered its two-day short course on Fourier Transform Infrared Spectrometry, and three minicourses on the topics of Capillary Electrophoresis, Chemometrics, and Applying the Internet to Teaching Chemistry and Spectroscopy. Registration for these courses was very low--four for the short course, and four, five and three, respectively, for the minicourses. Low registrations prompted cancellation of two other minicourses, "Chemical Imaging" and "Speciation of Environmental Samples".

Several of our unique course related concepts are approaching fruition. At the time of this writing, development of the Web-based Chemical Imaging course was ahead of schedule and should easily meet the year-end availability deadline. The Biological Infrared Spectroscopy (BIRS) course was offered at the Rocky Mountain Conference (Denver, August '99) for the first time; there were ten registrants. This is another important step toward establishing BIRS as a major "on-the-road" course. To further support this effort, the Society is in the process of adding another member to the BIRS instructor team. This addition will not only enhance BIRS course scheduling flexibility, but it will provide SAS marketing experience needed to effectively "connect" with many of the commercial sectors requiring BIRS expertise. Finally, the initial phase of the SAS course-publication feasibility study identified three of our present instructors wishing to develop their courses into SAS publications. Augmentation of this concept into the SAS program is contingent on submission of proposals-for-publication by these instructors and on results of the Publication Committee's cost/benefit evaluation of the proposals.

David Styris

Awards Committee Report
Fall 1999

Distinguished Service Awards will be presented to Truman Waugh and Michael Epstein at the 1999 FACSS Meeting. At the same meeting Gary Hieftje will be awarded Honorary Membership. Last year's Award Committee was made up of Nohora Vela, chair, and Tom Vickers. Nominations are being sought for the 2000 awards. An ad soliciting nominations appeared in the June issue (p. 246A) of the Journal. The Executive Committee, through President Robin Garrell, has been asked for suggestions for Distinguished Service Awards. This year's committee is Tom Vickers, chair, and David Coleman. Nominations should be submitted through the Society for Applied Spectroscopy, 201B Broadway Street, Frederick, MD 21701-6501.

Thomas J. Vickers
Department of Chemistry
Florida State University
Tallahassee, FL 32306-4390
(850) 644-1846; fax (850) 644-8281
http://chemweb.chem.fsu.edu/tvickers/web/vickers.htm

Constitution and Bylaws Committee Report
Rina Dukor, Chair.
October 25, 1999

Additions Underlined (Example)
Deletions Lined-Out

PROPOSED BYLAWS CHANGES

ARTICLE I - MEMBERS

SECTION 5. A SPONSORING MEMBER may designate one representative who will enjoy all the privileges of a Regular Member and shall act as a liaison with the Society. This representative shall receive a subscription to Applied Spectroscopy by reason of dues paid.
The SPONSORING MEMBER levels and benefits will be as follows:

(a) *Contributing Sponsors* will be privileged to have their name listed on the Masthead page of *Applied Spectroscopy*. Will be allowed one use of one local section mailing list of their choice. Will receive a 12-month subscription to *Applied Spectroscopy*. Will have a company listing in all SAS promotional literature as well as in the Journal. Will have a hot-link from the SAS home page to their web page. May have one news release about the company or a specified product printed in the "What's New" section of *Applied Spectroscopy*. Will be eligible to participate in local section activities.

(b) *Sustaining Sponsors, Silver* will receive all benefits of Contributing Sponsors. The Silver Sustaining Sponsor will be allowed one use of the entire SAS mailing list and two complimentary memberships.

(c) *Sustaining Sponsors, Gold* will receive all benefits of Silver Sustaining Sponsors plus will be privileged to be allowed two uses of SAS mailing list and five complimentary memberships. Will be privileged to have their logo on the Masthead page of *Applied Spectroscopy*.

(d) *Sustaining Sponsor, Platinum* will receive all benefits of Gold Sustaining Sponsors plus be privileged to be allowed three uses of SAS mailing list and ten complimentary memberships.

SECTION 6. A STUDENT MEMBER shall not hold National Society or Local Section office, serve as a voting delegate to the National Society Governing

the local and national level. The extent of his/her participation in the business of a Local Section is the prerogative of that Section except for the limitations stated in the Constitution and Bylaws of the Society. Student Members shall have an annual subscription to Applied Spectroscopy by reason of dues paid.

ARTICLE II - QUALIFICATIONS FOR ELECTION/ APPOINTMENT

SECTION 1. Only members in good standing of the Society shall serve as elected or appointed officers or Governing Board members.

SECTION 4. Nominations for the 10 at-large Governing Board members may come from the Nominating Committee, any Local Section, or in an open nomination call through the Newsletter and the Journal. The list of nominees will be submitted through the Nominating Committee. Five (5) Governing Board members are to be elected as a group by the Local Sections Officer's Representative (maximum one representative per section). The Local Section Affairs Committee will coordinate the nomination and election of these 5 members.

ARTICLE III - DUTIES OF THE OFFICERS AND GOVERNING BOARD MEMBERS

SECTION 7. The Governing Board members:
(a) shall attend Governing Board Meetings;
(b) can be reimbursed up to $200.00 for each meeting for travel expenses;
(c) may serve on committees.

ARTICLE VII – DUES

SECTION 1. The current annual dues of the several types of membership shall be as follows (2000 rates):

Regular U.S. Member	$77.00
Regular Canada/Mexico Member	$93.00
Regular International Member	$118.00
Interim Dues U.S. Member	$47.00
Interim Canada/Mexico Member	$62.00
Interim International Member	$87.00
Student U.S. Member	$26.00
Student Canada/Mexico Member	$42.00
Student International Members	$66.00
Retired Member	$26.00
Emeritus Member	None
Distinguished Service	None
Honorary Member	None
Special Member	At Local Section Option

Sponsoring Member:

(a)	Contributing	$500.00
(b)	Sustaining, Silver	$1000.00
(c)	Sustaining, Gold	$1500.00
(d)	Sustaining, Platinum	$2000.00
(e)	Sustaining, Platinum for 3 years	$5000.00

ARTICLE VIII – ALLOCATION OF DUES

SECTION 1. The dues collected from the Regular Members, Interim Members, Retired Members and promotional memberships shall be allocated as follows:

Account of the Society 85%
Local Section 15%

The Local Section allocation shall be calculated by the Executive Administrator and forwarded to the Treasurer of the Local Section with which the member is affiliated.

SECTION 4. The completed annual activity questionnaire must be received by the Society Office on or before October 30th for the dues to be allocated for that year. The dues not allocated will be returned to the National budget.

ARTICLE XIII – COMMITTEES

SECTION 8. LOCAL SECTIONS AFFAIRS COMMITTEE
(f) Will coordinate the nomination and election of the five (5) Local Section Members to the Governing Board.

Local Section Affairs Committee Report
Fall 1999

At this time (July 1999), the Local Section Affairs Committee has:

1. Completed selection of the recipient of the SAS Graduate Student Award. Three nominations were submitted. The awardee is Gary Baker of the State University of New York at Buffalo.

2. Completed selection of the recipient of the William J. Poehlman Award. Three nominations were submitted. The Cincinnati Section will be the awardee.

S. Scott Saavedra

SAS PUBLICATIONS COMMITTEE REPORT
AUGUST 1999

1. Marvin Margoshes has agreed to serve as the new SAS Newsletter editor. We are certainly pleased to have such an outstanding editor to follow the outstanding efforts of Mike Epstein. The SAS Governing Board will vote on the appointment at the meeting in Vancouver.

2. The committee had strongly recommended that Applied Spectroscopy be made available in Acrobat PDF format, which is widely used and available for other journals. It is also available as HTML format. Previously Applied Spectroscopy was only available in a unique format used by Catchword (RealPage). Through the efforts and urging of Paul Farnsworth, Catchword is now providing Applied Spectroscopy in PDF format. Previous discussions of potential links to advertisers is impacted in that the PDF format does not support such links.

3. Further, important issues on future on-line publication remain for further discussion.

4. Sales of the Applied Spectroscopy Focal Point Book now stands at approximately 330.

5. Development of the SAS Labguide continues under the direction of Ron Williams. On update on progress will be provided at the Publications Committee meeting in Vancouver. Ron's report is below.

6. Progress on tutorial books has been slow. Authors who we were discussing writing the initial book on process Raman spectroscopy now have some concerns that have delayed an agreement. We have also approached SAS and FACSS short course teachers about the possibility of publishing a book or CD-ROM that would complement the short course or grow out of efforts already put into the short course. Some interest has been expressed by a few potential authors. We will continue to follow up on these possibilities.

REPORT ON STATUS OF ONLINE SAS LABGUIDE.
RON WILLIAMS
8/23/1999

Submitted to John Olesik, Chair - Publications Committee

The alpha version of the web site has been created and is now on line at www.saslabguide.org. At present there are only place holders for the advertising and actual products but the process of having the vendors enter their
information directly is ready after being beta-tested. There is a mechanism for me to view submitted material and approve its posting to the web site. I can also remove material from the web site as needed.

The hierarchal structure of the web-site is best viewed from the vendor information submission process. Users can either browse or use keyword searches. Dr. Ben Smith and I are still working on reference material for the Reference Section. This has not gone as quickly as I would like and suggestions are welcome.

Martha Chapin has a marketing plan and she and I have discussed various perquisites for vendors that may also benefit the society. Perhaps, for example, we could get vendors to pay for one year of membership for any instrument purchased through the web site. She is also generating ad rates, combo rates and promotional material for the site.

Tour Speaker Report
Fall 1999

Based on inputs from SAS local sections and other individuals associated with SAS, I have selected 12 people as potential SAS tour speakers (see list below). This list is being circulated among the local sections. I hope to come up with the final schedule (assignment of speakers to local sections) by the end of this month. Also, I am in the process of setting up the SAS tour speaker for Canada.

Short List of SAS Tour Speaker Candidates
Bruce Chase (Dupont) --- Raman Microscopy and FT-Raman

Paul Bohn (U of Illinois) --- Optical Spectroscopy, NSOM, and Monolayers

Linda McGown (Duke U) ---- DNA Analysis and Sequencing and Time-Resolved Fluorescence

Mike Morris (U of Michigan)--- Capillary and Gel Electrophoresis, and Raman Imaging

Mary Wirth (U of Delaware) --- Chromatographic Processes, and Single-Molecule Studies

Mark Arnold (U of Iowa) -- Near-Infrared Absorption, Glucose Sensors

Mike Natan (Penn State U) --- Surface-Enhanced Raman Scattering, Surface Plasmon Resonance, and Nanomaterials.

Evan Williams (UC-Berkeley)-- ICR-MS, Biomolecular Conformations and Dissociation.

Ken Marcus (Clemson U) --- AA and ICP.

Edward Yeung (Iowa State U) ---- CE, DNA, and Single Molecules.

Richard Keller (Los Alamos National Lab) - DNA sequencing and single molecule detection.

Patrick Treado (Chem-Icon) --- Spectral Imaging.

MEGGERS AWARD REPORT
Fall 1999

The 1999 Meggers Award is being presented to Katrin Kneipp for her paper entitled "Single-Molecule Detection of a Cyanine Dye in Silver Colloidal Solution Using Near-Infrared Surface-Enhanced Raman Scattering" which appeared in the journal, *Applied Spectroscopy*, volume 52, number 2, pages 175-178 (1998).

Lester Strock Award Committee Report
Fall 1999

Dr. D. Bruce Chase of Dupont Corporation is awarded the Lester Strock Award for his outstanding contributions in the area of vibrational spectroscopy of polymers and other industrially-important materials. Dr. Chase has done excellent work characterizing polymers during processing, employing both Raman and infrared spectroscopies . He has also made dynamic infrared measurements of tension and shear of polymers. Dr. Chase has utilized vibrational spectroscopy to better understand carbon structures, such as C60, C70, and carbon nanotubes.

Finally, an award to Dr. Chase cannot be given without mention of his important roles in the development and application of new analytical techniques. For example, Dr. Chase has made important contributions in the areas of FT-Raman spectroscopy and microspectroscopy, and surface-enhanced infrared spectroscopy in the near infrared spectral region.

Lippincott Award Report
Fall 1999

Each year the Lippincott Award is given by one of the three sponsoring societies -- SAS, Coblentz or the Optical Society of America on a rotating basis. This year's award was from Coblentz and Mitsuo Tasumi won the award for 1999. It will be presented at the Twelfth International Conference on Fourier Transform Spectroscopy August 22-27 in Tokyo Japan.

Teller's Committee Report
Fall 1999

The Teller's Committee, consisting of SAS members Scott Baker, Diana (Ciurczak) Grant, Victor Kalasinsky, and Marcus Schuetz, met on August 10, 1999.

The results of the 1999 elections were as follows:

President: Vasilis Gregoriou

Amendments to Articles IV, VII, and X of the SAS Constitution were all passed.

Respectfully submitted,

Diana M. (Ciurczak) Grant

FACSS Delegate Report

Prepared by Robin L. Garrell
4 January, 2000

The FACSS Governing Board met at Pittcon in Orlando, Florida on March 11, 1999. *SAS representatives present: Robin Garrell (President) and Rina Dukor (President-Elect).*

1. Increasing the number of FACSS-affiliated societies: New areas of analytical science are emerging and being explored by many small societies. A committee is being appointed to look into the affiliation program, with the specific charge of considering the merits of increasing the number of FACSS-affiliated societies, and how this would impact the future of FACSS.

2. Publishing the FACSS program: The program that will be mailed will be a reduced form, containing the full program schedule, including titles of presentations. A preliminary program with abstracts will be posted on the FACSS web page.

3. The FACSS logo: The FACSS logo has mutated each of the last several years. A consensus was reached that the original design should be retained, and that a gray-scale version be developed that could be used in place of the color logo when appropriate (e.g., to save printing costs).

4. Possibility of a joint EAS/FACSS meeting: Based on a series of discussions with EAS organizers, it was concluded that EAS is not interested in considering a one-time or periodic joint meeting with FACSS in the foreseeable future.

5. Treasurer's report: Paul Bourassa reported that an operating surplus was generated from the 1998 FACSS meeting in Austin, Texas.

6. 1999 budget: Adjustments were made in the 1999 budget to reflect increases in costs for audio visual equipment, Plenary Lecturers, and the Preliminary Program. Savings will accrue from a decrease in the cost of poster boards, deletion of the Gala, and an increase in the rebates from hotels. The bottom line reflects a net increase in expenses of $3,100.

7. 2000 budget: A budget for the year 2000 conference was discussed, revised and approved.

8. Long-range planning: John Olesik replaces Nancy Miller-Ihli, whose term has expired, on the Long-Range Planning Committee. The year 2001 meeting will be in Detroit; formal selection of the General Chair was deferred because of the lack of a quorum. The year 2002 meeting will be in Providence, R.I. The selection of the 2003 meeting will be made at the G.B. meeting in Vancouver.

9. Year 2000 meeting in Nashville, TN: The meeting layout, fund raising, program, and amenities were discussed briefly.

10. 1999 Program for FACSS, Vancouver: David Suzuki will provide the keynote address, "Setting the Bottom Line for the Next Millennium: Science, Economics and the Environment." Bruce Chase will accept his ACS Division of Analytical Chemistry Award in Spectrochemical Analysis at FACSS. Approximately 900 papers are being planned for, with space for 112 posters.

11. Bylaws: Rachel Barbour is reviewing the FACSS bylaws for changes and updates that need to be incorporated. Please contact her if you know of specific revisions that should be considered.

Report of the Representative to the Chemical Heritage Foundation

FALL 1999

Each of the 18 organizations affiliated with the Chemical Heritage Foundation has a representative on the Heritage Council, which has an advisory function but no authority. The authority belongs to the Board of Directors, consisting of 12 voting members and one non-voting (the President of the CHF); The American Chemical Society and The American Institute of Chemical Engineers have five of the seats between them.

The organizing meeting of the Council was held on March 31, with six members and two CHF staff present and nine members (including me) attending by conference phone. After a review of the by-laws, Dominick Attanasio was elected Chair of the Council. He represents the American Section of the Societe de Chimie Industrielle. The date and agenda of the next meeting were set.

The first regular meeting was held at the CHF on April 27. After another review of the by-laws, two matters of substance were discussed, and recommendations sent to the Board:

1. The criteria for new affiliated organizations.
2. Membership dues

The latter is a rather tricky matter because of the diverse structures of the present affiliated organizations and the range of sizes of their budgets. The Chemical Manufacturers Association has 195 members and a budget of $40 million; the Chemists Club has 1,000 members but little funds at this time. They donated their library to CHF. Some organizations do not collect dues. The matter was not really resolved, but after much discussion the Council made these recommendations to the Board:

Dues of the greater of $0.10/per member or $1000.
The Council should make individual recommendations for organizations whose members pay no dues.
The Board should continue to waive dues in special situations.

I haven't heard yet what the Board decided.

A visit to the CHF Web site at http://www.chemheritage.org is recommended to get an overview of the Foundation, its activities, and the building it occupies in the historic section of Philadelphia.

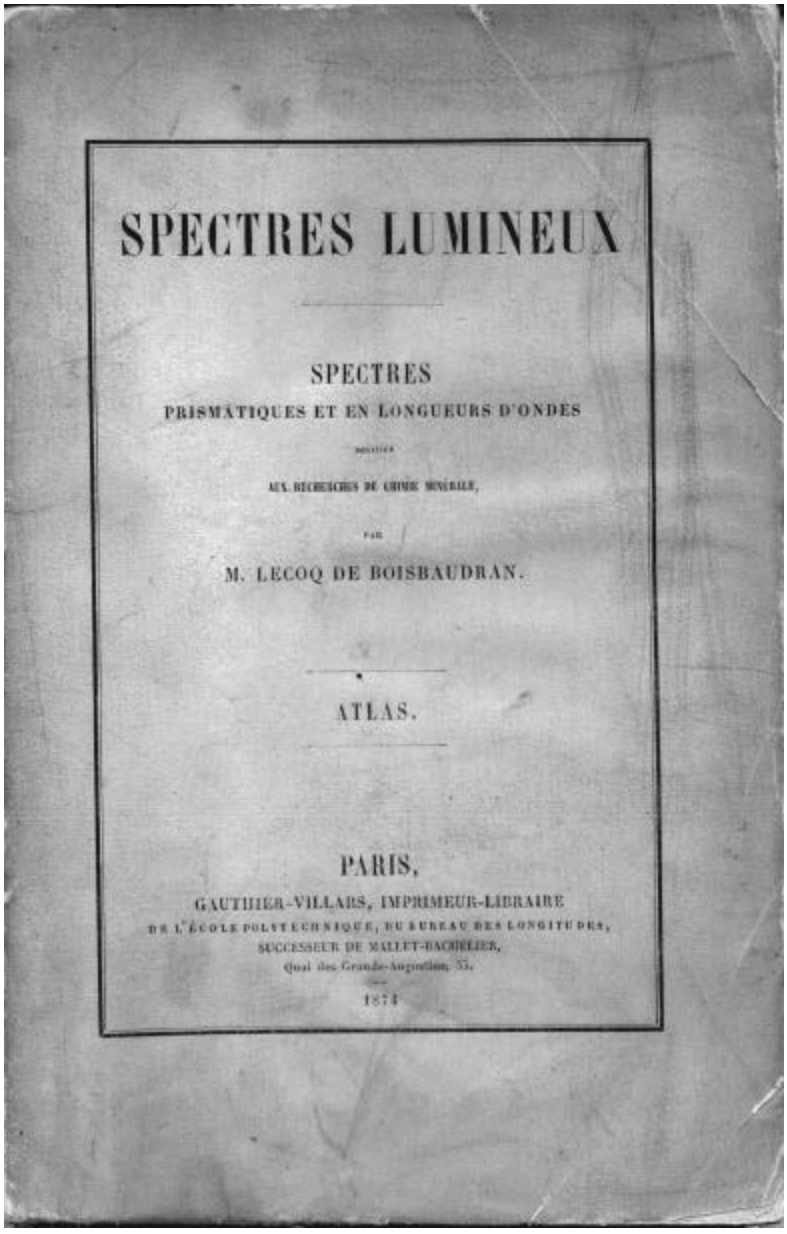
SAS should continue to be affiliated with CHF. We should consider depositing our archives at CHF, where they will be safer than at our central office.

Marvin Margoshes
August 5, 1999

One of the more popular attractions for visitors to Vancouver to see (and hear) is this steam-operated clock in the Gaslight District, a short stroll from the Convention Center. The clock is powered by a steam line that heats many buildings in the downtown area. Steam lifts one of the steel weights that drive the clock every 45 minutes, and every 15 minutes the four snaller steam whistles at the top that play a tune that approximates the familiar Canterbury chimes. A larger whistle announces the time hourly.

The clock was created by Raymond Saunders, a nearby shopkeeper, in 1977, from two tons of parts that cost $40,000.

One might say of the clock a paraphrase of what is sometimes said of performing children: the remarkable thing isn't how well it does, but that it does it at all.



SPECTRES LUMINEUX

SPECTRES
PRISMATIQUES ET EN LONGUEURS D'ONDES

M. LECOQ DE BOISBAUDRAN.

ATLAS.

PARIS,
GAUTHIER-VILLARS, IMPRIMEUR-LIBRAIRE
DE L'ÉCOLE POLYTECHNIQUE, DU BUREAU DES LONGITUDES,
SUCCESSEUR DE MALLET-BACHELIER,
1874

Is this the oldest book on spectroscopy?

This is a copy of the cover of one of a pair of paper-covered books that were published in Paris in 1874. This volume contains illustrations of atomic and molecular spectra of a variety of materials, and the other volume describes the experimental conditions.

Do you know something about this work or its author? If so, send your information to the Editor at physchem@earthlink.net. If not, you can read more in the Fall issue of The Spectrum, or in the near future at the Newsletter area of the SAS Web site at: http:\\www.s-a-s.org.