99D005I

Report Submitted to:

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THE FUTURE OF THE ROYAL INSTITUTION OF GREAT BRITAIN: STRIVING FOR A MORE EFFICIENT ENVIRONMENT

3 March 1999

Abstract

The Royal Institution has upheld its mission of popularizing science over the past two centuries. While it has always encouraged cutting-edge science, the Royal Institution could enhance its impact on society with a more efficient administration. Our project entailed the installation of a new, comprehensive accounting software package as a first step towards implementing a solid, scaleable management system. The Royal Institution must cherish its heritage while embracing modern technology if it is to thrive in the next millenium.

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Table of Contents	John Bird
Executive Summary	Marybeth Frantz
Introduction	all members
Background Information	all members
Procedure	all members
Data	Marissa Mertzic
Analysis	Marissa Mertzic
Problems Encountered	John Bird
Conclusions and Recommendations	John Bird, Marybeth Frantz
Appendix A	Marybeth Frantz
Appendix B	John Bird
Appendix C	Marissa Mertzic
Appendix D	Marissa Mertzic
Appendix E	Marybeth Frantz
Appendix F	all members
Appendix G	all members
Bibliography	all members

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Acknowledgements

We would like to thank the following individuals for their help and support throughout our project. First, we would like to thank the staff members at the Royal Institution, especially Jean Whaley and Jay Lad, for their cooperation and for providing us with the opportunity to complete this project. We would also like to thank our advisors, Professors Joel J. Brattin and Peter R. Christopher, for their continued support and motivation during the course of our project. In addition, we wish to thank Professor Wesley Jamison for his help throughout the preparation process. Finally, we thank Professor Paul Davis, the Director of the London Project Center. Without the help of these individuals, we would not have been able to complete this project.

Table of Contents

1.0 Executive Summary

The Royal Institution of Great Britain (RI), founded in 1799, is a prestigious organization with a unique mission: to popularize science. Over the past two centuries, the Royal Institution has carried out this mission through its informative lectures and cutting-edge scientific research. In order to carry out its mission properly into the next millenium, its internal workings, starting with the financial management system, need to become as efficient as possible.

Our project's main focus was the new version of the accounting software, TAS Books. Despite a few problems with its installation, we successfully upgraded from the DOS version to Windows 95®. Following this upgrade, we worked with the RI's accountant to ensure that he was comfortable using the new features in the enhanced version because he is the system's primary user. The new enhancements will save him considerable time, allowing him to prepare reports more readily and focus on more important operations, such as grants.

Also during the course of our project, we distributed questionnaires and interviewed staff members, which led to a series of recommendations for the administrative sector of the RI, the second aspect of our project. These instruments allowed us a greater understanding of the organization in order to make the most beneficial recommendations. These recommendations lay the groundwork for a more efficient organization, which could ultimately result in an even more world-renowned RI.

The RI should first consider getting a new computer network system, where all computers are linked to each other. People would then be able to obtain information more readily. It would also bring standardization to the computer system, thereby

solving a great portion of the efficiency issue, thus simplifying further technological enhancements. Once the administration incorporates these recommendations, the RI can go proudly into the next millenium, continuing to popularize science.

2.0 INTRODUCTION

The Royal Institution of Great Britain (RI) is a unique organization that has always been involved in bridging the gap between science and society. The founders never intended the RI to be a research institution, but rather a place where the public could learn about science through informative lectures. Humphry Davy, one of the first lecturers, began to use experiments as demonstrations during his lectures. Consequently, on-site research became necessary. Over the years, the laboratory has grown to become one of the most advanced laboratory facilities in England and Europe. As more people attended the lectures, public support increased and the RI grew as an institution. It continues to carry on the original intent of bringing science to the public through lectures. However, for this institution to continue to thrive, its internal workings must become as efficient as possible. The specific area of interest to our project is the financial management system. This includes the accountant's job of keeping track of all financial transactions, such as grants, investments, income, and dividends, using a newly installed accounting software.

Our project group has upgraded the RI's accounting software to the Windows 95® version of TAS Books; they were formerly using the DOS version. The staff members were merely using the necessary operations of this software. Our primary goal for this project was to determine the maximum capabilities and most efficient use of the software for the Royal Institution. This, in turn, led us to look for methods that would increase the efficiency of the larger scope of the entire financial management system. One of the direct results of the project was to aid the staff members in the transition to the computerized financial system. The purpose of this project was to extend the capabilities

of the Royal Institution's current financial system, and to allow the staff to use the system effectively. A direct result of our efforts in the financial management of the RI was the recommendations concerning other areas in the administration that would benefit from upgraded technology; these areas could then run more efficiently.

By conducting background research on the topics of the history and financial situation of the Royal Institution, accounting, computer consulting, and computer literacy, we have gained a greater understanding of the project itself. Through the research of the Royal Institution's history, we have obtained information about the type of establishment sponsoring the project, so that we better understand the Institution's mission and the people with whom we have been speaking. It is also necessary to understand accounting principles to be familiar with common financial transactions. In addition, researching computer consulting has allowed an understanding of the process that experts use when analyzing a financial management system. Finally, we looked into aspects of technophobia, or computer literacy, in order to prepare ourselves for the possible levels of computer usage by the staff.

There is more detailed research in the areas of the software, TAS Books, and the financial status of the Royal Institution. This research on the software enabled us to understand its capabilities for application to the Institution. It was also necessary to research the financial statistics of the Institution so that we could comprehend the number of accounts and transactions that the project encompasses. This knowledge has helped us to make suggestions that are more accurate for the RI.

The primary goal of this project was to implement the newly installed financial management system efficiently. We have accomplished this task through the research of

the areas discussed above: TAS Books, accounting, computer consulting, computer literacy, and the history and financial status of the Royal Institution. The secondary goal of this project was to make suggestions to increase the efficiency of the overall financial management system at the Royal Institution. The result is the basis for a more efficient financial management system at the Royal Institution. This enabled us to look at the larger scope of the internal workings of the Royal Institution to see if other areas might also benefit from the same upgrade to efficiency.

This report was prepared by members of Worcester Polytechnic Institute London Project Center. The relationship of the Center to the Royal Institution of Great Britain and the relevance of the topic to the Royal Institution of Great Britain are presented in Appendix A.

3.0 BACKGROUND INFORMATION

3.1 The Royal Institution

3.1.1 The History of the Royal Institution

In studying the financial system of the Royal Institution of Great Britain, it is first necessary to become familiar with the Institution itself. A look at the history of the Royal Institution yields an understanding of the goals of the organization. It upholds the traditions of the popularization of science (Royal Institution, 1998). The two major figures in its history are Humphry Davy and Michael Faraday, who contributed numerous significant scientific and administrative gains to the Institution.

The Royal Institution was founded in 1799 with the aid of Sir Benjamin Thompson, more commonly known as Count Rumford (Thomas, 1991; Royal Institution, 1998). However, Morris Berman believes that it was Rumford's popularity with the British aristocracy in the late eighteenth century that enabled him to influence the building of such an establishment (Berman, 1978). Nonetheless, the ideologies that surrounded the turn of the nineteenth century were the real cause for the founding of the Royal Institution (Berman, 1978, pp. 2-6).

These ideologies were a direct result of the French and Industrial Revolutions, both occurring at this time. On the one hand, the French Revolution generated a profound interest among the upper class in educating the poor in order to correct political attitudes. On the other hand, the Industrial Revolution sought to define science in a way that would relieve agricultural adversity (Berman, 1978, p. 6). By bringing together the ideas of the two, the upper class decided to create an organization that would educate the

poor in science (Berman, 1978). Thus, the combination of the two allowed for the start of the Royal Institution.

The Industrial Revolution caused Britain to seek a manner by which to expose the lower class to simple explanations of scientific methods and applications. The Board of Agriculture and the Society for Bettering the Condition of the Poor (SBCP) in England failed to interest the remainder of the aristocracy in such an endeavor (Berman, 1978). In any case, the Royal Institution became the only organization created by this group to have such a lasting impact on society (Berman, 1978, pp. 8-12).

Count Rumford met with a select committee comprised of SBCP members to create a proposal for building the Institution. Rumford was responsible for obtaining the involvement of King George III, while Sir Thomas Bernard purchased the site of the new Institution. Shortly thereafter, Rumford departed to the United States, leaving control of the Institution ultimately to Bernard (Berman, 1978). However, prior to his departure, Rumford recruited Thomas Young and Humphry Davy to work in the Institution's laboratory (Thomas, 1991).

Humphry Davy quickly adapted to his new surroundings at the Institution. Davy started as a chemical assistant in 1801, and his lack of a previously established reputation allowed him a more immediate sense of belonging (Berman, 1978). According to Sir John Meurig Thomas, a professor at the RI, Davy then began giving chemistry lectures, which captivated his audience and gave the Royal Institution the prestige it needed. In 1802 the Royal Institution Committee appointed Davy as its Professor of Chemistry, then its Superintendent of the House (now known as Director) in 1804 (Thomas, 1991). Among other scientific feats, Davy discovered sodium, potassium, calcium, barium, and

magnesium, and thus managed to establish a reputation for the Institution's basement laboratory among the finest in the world. His continued scientific advances set a tradition for the others who followed (Thomas, 1991). With these feats, Davy gained the praise of the aristocracy, which included the further patronage of science. This money was critical, for without it the Royal Institution would have had to declare bankruptcy (Berman, 1978). Davy was also able to commission a museum, adjoining the laboratory and lecture area, so that the public could view important scientific materials; some of these items were everyday household items, while others were laboratory instruments. After seeing Davy's success with the Royal Institution, Irish landowners decided to follow his lead by founding similar organizations (Berman, 1978). The fact that others decided to use the Royal Institution as a model for new organizations proved that the RI had become successful in popularizing science.

In 1813, in one of his last acts as Director of the Institution, Davy hired Michael Faraday as a chemical assistant to William Thomas Brand (Berman, 1978; Thomas, 1991). Within days after he was hired, Faraday was permitted to help with the research; within weeks he was preparing samples of the newly discovered substance nitrogen trichloride. Faraday also soon expertly performed lecture experiments. Over the next two years Faraday closely assisted Davy on his tour of Europe (Thomas, 1991). This opportunity allowed Faraday to meet influential scientific minds, such as Volta and Professor Gustave de la Rive. In May 1815, Faraday returned to the Royal Institution under the title, Assistant in the Laboratory and Mineral Collection Superintendent of the Apparatus (Thomas, 1991).

Once he returned to the Institution, Faraday began to have profound effects on the Institution's future. Throughout his career, Faraday made numerous contributions to chemistry and physics, such as the discovery of benzene and the detection of electromagnetic induction (Berman, 1978; Thomas, 1991). In 1821, the Institution promoted him to Superintendent of the House (Royal Institution, 1998). While continuing his research, Faraday established the Friday evening discourses and Christmas lectures in 1826 (Royal Institution, 1998), and between the years 1835 and 1862, Faraday (as Director) gave lectures received by enormous audiences. His popularity thus spread, drawing more people through the doors of the Royal Institution and popularizing science for future generations (Thomas, 1991).

Since Faraday, there have been seven Nobel Prize winners among many other notable scientists at the Institution (Royal Institution, 1998). (However, Nobel Prizes were first awarded in 1901; thus, such great minds as Faraday never received them.) James Dewar presented his experiments on liquefying (otherwise) permanent gases, while Lord Rayleigh discovered argon (a noble gas that does not readily bond with other molecules) (Thomas, 1991). It was this discovery that awarded the Nobel Prize to Rayleigh in 1904 (Thomas, 1991 p. 180). William Crookes, inventor of the radiometer, was also president and lecturer at the RI. The most recent Nobel Prize winner (1967), Lord George Porter, worked at the Institution as the Director of the Davy Faraday Research Laboratory. He was working with a research team in applying photolysis (the splitting of molecules with light) to photosynthesis (the production of glucose as food) (Royal Institution, 1998). Other Nobel Prize winners, although not researchers at the Royal Institution, have given lectures there on their studies (Thomas, 1991).

In addition to its researchers, the Royal Institution is now noted as the world's oldest independent research establishment that allows for the education of children and adults in science (Royal Institution, 1998). The Christmas lectures started by Michael Faraday continue to this day to build children's desire to learn about science. Since 1988, these lectures have been videotaped and shown in the United States and Japan (Royal Institution, 1998). Additionally, it is currently possible to purchase the videos of the Christmas lecture series online (Woollard, 1998). This offer allows many more people to view the knowledge exhibited at the Royal Institution, thus furthering the popularization of science. There are also Friday evening lectures for members, for which Faraday himself set the tone, and evening lectures given for non-members (Thomas, 1991; Royal Institution, 1998). The original lecture hall was renamed the Davy Faraday Lecture Hall in honor of the two most prominent figures in the Institution's history (Thomas, 1991; Royal Institution, 1998). There is also a museum containing the preserved laboratory of Michael Faraday (on its original site) that displays the instruments he worked with, and includes the first sample of benzene he discovered (Royal Institution, 1998). Thus, through the above methods, the Royal Institution continues to achieve its mission in popularizing science.

The study of the history of the Royal Institution has allowed a look at the organization that is sponsoring the project. (For further information, refer to Appendix A.) By looking at its history and current status, a greater understanding of its type of facility develops. Nevertheless, the Royal Institution is a non-profit organization that occasionally has difficulties maintaining its budget. The next section explores the Institution's current financial status in greater detail.

3.1.2 Financial Status of the Royal Institution

The Royal Institution's financial status is currently at a bridge point. According to the Director's report of 1996, the Royal Institution remains "as dynamic and forward looking as any time in history" (Royal Institution, 1996, p. 6). Thus, they are prepared for future challenges. Financial aspects of the Institution had been tight; however, in 1996 and 1997, there were considerable surpluses of income. With the addition of the Operations Director, the Royal Institution has already restructured its financial situation by cutting costs and increasing the support of the organization (Royal Institution, 1996, p. 19). However, the current surplus will not last long if the Institution does not receive needed support from its members. In the 1997 Treasurer's Report, there is a request for continued funding of the Royal Institution's programs (Royal Institution, 1997, p. 20). Of particular interest to the audit committee was the fact that the Institution's normal operating account obtained a substantial surplus (Royal Institution, 1997, p. 29). The surplus was the result of a Value Added Tax (VAT) refund; therefore, it will not continue in future years. However, this surplus could allow for further development of facilities.

The newly installed financial management system is now managing the monthly expenses, which aids in determining their budget. The software is entitled TAS Books Accounting Plus®, which directly links to the Microsoft Excel® program. Once this system is enhanced, it will allow stricter management of financial transactions and determine exactly how much money the Royal Institution has, therefore allowing for the best future use of surplus money.

Although the Royal Institution arose from a precarious beginning, it has managed to endure adversity. Influencing other such institutions, it now remains the world's oldest independent research establishment that displays scientific advances. According to Sir

John Meurig Thomas, the Institution has continued to play a role in British scientific and cultural life for two hundred years (Thomas, 1991; Royal Institution, 1998). Thus the Royal Institution continues to uphold the traditions set by Davy and Faraday and remains a place of scientific thought and demonstration (Royal Institution, 1998). The overall guiding principle remains the popularization of science. If the Institution continues to build awareness of itself to the public, the increased support could bolster the RI into the next millennium.

It is important to study the Royal Institution and its history in order to gain an understanding of the establishment itself. The Royal Institution has existed for nearly two hundred years, and is rich in tradition and history; it continues to uphold its mission of popularizing science. By researching the RI's background, there is a better understanding for the organization itself. This knowledge is necessary to understand the Institution's mission. Understanding the mission and current financial status of the Royal Institution allows for the necessary information about the organization, thus aiding in the improvement of the financial management system. Because the goal of this project is enhancing the current financial system, it was first necessary to become familiar with the organization that is implementing the system. In addition, it was necessary to understand basic accounting principles because the financial system directly involves matters of accounting.

3.2 Accounting

The accounting profession is the art of maintaining and controlling the financial records of a specific company or organization. An accountant is one who devises particular systems for the financial needs of the business, as well as oversees the record

keeping and presents facts about the business in the form of reports. Essentially, accounting is the language of the business world. In order to communicate with accountants, it is necessary to know the language. A basic axiom is shown here: ASSETS = LIABILITIES + CAPITAL (Myer, 1967, p. 5; Whittington, 1996, p.14). An asset is the money that the business has in one form or another, while the liabilities represent the debts of the creditors, which is what they owe to the business. The capital in a business is the money owed to the owners or shareholders (TAS Books, 1999). There are two different types of accounting practices: the "cash flows" and "accrual accounting" (Myer, 1967, p. 6; Whittington, 1996, p.7). When looking at a company's financial management system, it is necessary to look at which type of basis they follow. "Cash flow" refers to recording something as income only when the company or organization receives the actual payments and looking at the flow of cash through statements. When something is sold but the company is still waiting for the payment, the organization is using the "accrual accounting". It attempts to place the money in the correct periods in which they were earned rather than the times the cash receipts were recorded (Whittington, 1996, p.8). Many businesses and organizations such as the Royal Institution use the accrual accounting system because they have transactions that are primarily large, mostly in the form of grants. Therefore, it is necessary to determine the money as income when it is recorded and not necessarily when the company or organization receives it.

The tasks that the accountant performs range from receipt posting to filing tax returns. In general, the accountant keeps track of all financial transactions within the business or organization (Burns, 1986, p. 58). Some examples are: rent checks, payroll,

the purchase of new office furniture, or billing another company for services. Another example is when the business has record-breaking sales one month, or a fire destroys a portion of the office. Many businesses need to take out loans, which is another example of the type of transactions that occur. There is interest on these loans and the maturity date of a loan is the date it expires (Myer, 1967, p. 61). These transactions may occur many times a day, but the accountant is responsible for recording them accurately (Myer, 1967, p. 63).

Assets such as the company building, company vehicles, and the equipment owned by the company are the fixed assets (Myer, 1967, p. 80; Whittington, 1996, p. 15; TAS Books, 1999). Because fixed assets are generally very expensive, businesses pay for them through a type of payment plan over a period of many years, and thus they treat them differently than something such as a monthly heating bill. The term that does deal with things on a monthly basis is depreciation (Myer, 1967, p. 83; Whittington, 1996, p. 64). Depreciation is accounting for the loss in value of a fixed asset over a period of time (Whittington, 1996, p.64; TAS Books, 1999). Accountants determine the rate of depreciation based on the approximate lifetime of the piece of equipment or the building. Once they determine the lifetime of the machine, the cost of the machinery is divided so that a fraction of it is paid every year. In an ideal situation, the machine "lives" longer than anticipated. This means that the depreciation on the machine is lowered because the machine has lasted longer than originally planned. If the machine fails earlier than expected, the business must purchase a new machine in addition to paying off the old one. There is also the cost of maintenance of the equipment and the potential of resale after it becomes of no use to them. Computers often can last much longer than they are

actually useful to the company. Because the average use of a computer to a company is three years (Caroline Graham-Brown, former Deputy Director of the RI), the company must periodically either buy completely new software, or purchase faster computers that are more capable. The old computers are of no retail value and are usually thrown away or donated to charity. Thus, the depreciation rate is very important for the financial growth and stability of a company (Myer, 1967, p. 83; Whittington, 1996, p.64). This aspect of accounting is universal, and found in all types of businesses. However, some types of organizations, such as non-profit organizations, have some unique accounting practices.

A non-profit organization has some defining characteristics. First, the people that contribute money to the organization do not receive financial reward. Next, there are no individual shareholders. The aim of the organization is towards the needs of the public and the survival of the organization rather than towards the demand of the financial market. In some cases, there is a minimal degree of public control; the little control that occurs is through public voting of financial budgets (May, 1975, p. 58; Upchurch, 1998, p.13). Generally, a board of trustees leads a non-profit organization. The organization's responsibility to the public is essential, as it is the sole contributor to the organization (May, 1975, p. 59; Upchurch, 1998, p. 13). The organization must have a positive effect on the community so that its support will enable the organization to survive. Thus, it is important to keep the public's best interest in mind when making financial management decisions.

The difference between accounting in businesses and non-profit organizations is that businesses tend to focus primarily on their creditors and investments, while the

managers of non-profit groups desire to know their available cash resources (May, 1975, p. 59; Upchurch, 1998, p. 13). In addition to this, accountants for non-profit organizations focus on certain objectives. The first objective of the accountant is to provide the necessary information for the proper care of the ideals and resources with which the organization was founded (May, 1975, p. 62; Upchurch, 1998, p. 14). This includes the economical management of the group. The second objective is to provide information that enables the public and those who are trustees to be aware of the programs that are occurring and what resources are being utilized under the direction of the trustees (May, 1975, p. 62; Upchurch, 1998, p. 431). An accountant is also responsible for allowing public officials to report on the use of public funds and the results of the campaign of the organization (May, 1975, p. 62; Upchurch, 1998, p. 432). In the Royal Institution's situation, the accountant records all financial transactions and controls the money by transferring the funds so that they gain the maximum profit. He does this with the aid of investment companies and financial advisors at the bank. Finally, the accountant, in accordance with the managerial staff, is responsible for ensuring that the organization complies with all administrative rules that relate to the distribution and use of the allotted resources (May, 1975, p. 62; Upchurch, 1998, p. 13). The focus of this discussion will now shift to a look at different aspects and issues of accounting in Great Britain to become familiar with the accounting community there.

The *British Accounting Review* is a journal that includes volumes on topics of accounting in the British community. It is necessary to examine this journal to become familiar with accounting issues that businesses in London have dealt with in the past. Some of these issues may arise in the research of the Royal Institution's financial

management system. Looking at the different groups and their reactions to this issue is one way to see how the British community of accounting functions. One article entitled "Summary Financial Statements: An Analysis of the Adoption Decision," by Martin Ward, reports on a government study that attempts to set up a standardized summary of financial statements for businesses. The purpose of the standardization is to make the statements easier to read for shareholders and to cut down on compliance costs. As a plan to see if the government should implement this, the government surveyed the top 1,000 companies to see if they were in favor of it and if they were willing to participate. The survey would help to determine the form of the standardized statements, whether they should become mandatory or not, and the information contained in them. The article analyzes the results of this survey, as well as some pros and cons to the actual standard statements by exploring the opinions of many British accounting organizations (Ward, 1998).

Major accounting organizations throughout Britain have given their opinion on the topic of standardized financial statements. The data showed that very few people would actually read the standard financial statements carefully. In justification, they claimed that the statements were difficult to understand. The Institute of Chartered Accountants in England and Wales thought that the statements were too detailed (Ward, 1998). They agreed that the statements should contain only essential items and have individual companies add clarification where necessary (Ward, 1998). The Accounting Standards Board thought the statements lacked detailed information (Ward, 1998).

The outcome was that the majority of Britain's largest companies do not issue the standard financial statements (Ward, 1998). However, the larger the company, the more

likely it is to issue the statements. The author of the article observed that the intent of the statement was to improve communication with the shareholders, and to reduce on compliance costs. The author, Ward, proved that the statements did reduce compliance costs and improve communication with shareholders. He also noted that the companies that have participated in the program of issuing standard financial statements have been successful.

The journal is relevant to the Royal Institution's financial management system because it is necessary to understand the internal and the external activities of British Accounting. The mission of the project is to improve and increase efficiency of the financial management system. Thus, the article provides attitudes and opinions in the British community on cutting costs and making financial statements easy to understand, thereby allowing for better efficiency of the system.

3.2.1 SORP

SORP stands for the Statement of Recommended Practice. It is a document created by the Charity Commissioners for England and Wales. Its purpose is to regulate the presentation of reports and to give guidelines as to what the reports should contain based on the size of the charity and its financial vision. The explained formats will accurately portray a charity's financial status at the end of each year. The standard also allows for a "timely and regular display" of its funds (Charity Commissioners for England and Wales, 1995).

In a charity organization such as the Royal Institution, the accounting of the organization is highly affected by these standards. With the installation of the Windows 95® version of TAS Books Accounting Plus® at the Royal Institution, the accountant is

able to produce reports that are more detailed. In addition, he will look to display the financial status of the organization accurately on a daily basis. The board of trustees also plays a part in preparing reports.

Each year the board of trustees for a charity is responsible for preparing an annual report and accounts. The report must contain a statement that describes the charity's goals and their plan for achieving these goals. This is a narrative aspect to the report that must describe any documents or reasons for the financial decisions made throughout the year. Some of the legal and administrative information that is required includes the charity's full name and a declaration of how the charity governs itself. The charity's registration number is also necessary on this report. An important fact for the board of trustees is that all members must participate in the writing of the report (Charity Commissioners for England and Wales, 1995). Each must receive a draft of the report and the accounts must follow usual administrative procedures when approving the report and accounts.

Another section of SORP defines the accounting policies and the accounts' structure. In order to ensure that the accounts provide a true and fair view of the organization's financial status, they should follow the guidelines of the Statements of Standard Accounting Practice (SSAPs) and the Financial Reporting Practice (FRPs) (Charity Commissioners for England and Wales, 1995). The guidelines also show a section of the statement of financial activities. It includes the Statement of Financial Activities (SOFA) and a summary of income and expenditure accounts. Independent audit and examinations, including the practice notes from the Auditing Practices Board,

are also contained in SORP. These standards will be useful when looking at different accounting standards at the Royal Institution.

The goal of this research is to have a basic understanding of accounting, financial management systems specifically in non-profit organizations, and the British standards of accounting. In reviewing the recently installed accounting software at the Royal Institution, it is necessary to be able to communicate in the terms of the British Accounting community. A more in-depth look at the accounting software is necessary because it is the focus of this project.

3.2.2 TAS Books

TAS Books is a basic accounting software package designed for moderate sized businesses. A consulting accountant installed TAS Books for DOS on the Royal Institution's computer. One of the parts of this project was to upgrade this version to the newest Windows 95® version, TAS Books Accounting Plus®. Knowledge of how the previous version of TAS Books was used at the RI was essential for the smooth and successful upgrade of the accounting package.

TAS Books is organized into a few main sections that cover most accounting areas. The main sections include Sales, Purchase, Cash Book, and Invoicing, with a few general options, including company information. These sections each contain options for entering or changing information and generating reports; there are also scripts to sum data from closed accounting periods. The Sales section includes the input of customer information and invoices. The Purchase section contains supplier information and payments on accounts. Cash Book allows for the maintenance of bank accounts and cash flow, while Invoicing focuses on sales book invoices. (For further information, refer to

Appendix B.) Options are organized under the easily identifiable main heading, and overall the software design is simple and options are easy to find.

TAS Books has only been installed at the RI for about six months and thus far has only been used for basic tasks. The accountant uses TAS Books to keep the accounts organized, but he must then re-type the financial figures in Microsoft Excel®; he uses Excel to design and print financial reports. This re-typing is due to the fact that dealing with scientific grants makes the accounting system for the Royal Institution different from that of most other organizations. Each grant is separate from all the others and cannot be figured into any other grant. TAS Books is incapable of reporting on individual grants. The new version, TAS Books Accounting Plus®, links to Excel for easy transfer of financial figures. This transfer of numbers is very time consuming when done by hand, yet is much easier now that the new version is working. Assessing and upgrading the accounting system is what many computer consultants do for a living. A look into computer consulting may yield a few ideas that could make this project have more of an impact on the accounting at the RI.

3.3 Computer Consulting

The large growth rate in the computer consulting field is a direct result of the increased demand for information processing in both the public and private sector (Simon, 1985). As government and business demand faster and more efficient computer systems to handle their information, a new demand has developed for the computer consultant. Organizations need a management system that most efficiently addresses their information needs. Consultants focus on keeping a clear picture of the current technology and the needs of the client organization. The best information system for an

organization is not necessarily the most technically advanced one, nor is it necessarily the most expensive. Consultants must be well versed in all aspects of a good information system, the computers, and the associated company (Simon 1985).

There is a very specific set of characteristics or traits that most organizations look for in a computer consultant (Simon, 1985). A client organization will only put its trust in the consultant if the consultant has a working understanding of the general principles of the client's business. A client wants his needs met by the information system, and the consultant must understand the needs of the business before designing a system. Clients are more comfortable if the consultant can speak the language of the business. If the consultant needs to ask what industry specific acronyms or terms mean, then the consultant's credibility becomes tarnished. Likewise, the clients must be able to understand the consultant. A good consultant realizes that clients may not be very computer literate, and therefore the consultant must avoid technical terms. The end result, not technical jargon, is what impresses a client (Simon, 1985). This result should be a proposal for a sensible, cost effective solution. Overly complicated and elaborate systems tend to be less cost effective, and thus less desirable for the client organization. Appearance is very important in the majority of business atmospheres, and consultants must always be mindful of their appearance. Proper business dress, such as shirt and tie, should be worn in most settings. A professional appearance gains respect from the client, and the client is more likely to consider a solution proposed by a respected professional (Simon, 1985). If a consultant is well respected by the client organization, then the staff of that organization will respond positively to the consultant's recommendations.

Although some of the interactions between consultants and clients are easy to see and understand, there are deeper, less logical interactions which also occur (Weinberg, 1985).

For the consultant, dealing with the people in a client organization is more difficult than dealing with the problem (Weinberg, 1985). Weinberg discusses human nature, and how it relates to consulting. Consultants must always remember that the clients do not enjoy being wrong. Humans are much more receptive to "improving" their ideas, rather than "correcting" them (Weinberg, 1985). The important thing for consultants to remember is they are not permanent employees (Weinberg, 1985). If the staff of the client organization does not feel comfortable with the consultant, they can easily terminate them. Consultants are usually working for, or with, the person(s) responsible for the problem, and therefore must never try to assign blame. Interacting with people is a very difficult part of consulting. The computer aspect is much more straightforward, and there are a few standard methods of system analysis that a consultant can follow. Because there are numerous individual models for system analysis and they are all slight variations on a common theme, this section will only discuss two methods. These particular methods are included because they offer advice on what information a consultant should look for at each particular stage of analysis.

One method of analysis is known as the *computer systems life cycle* (Simon, 1985, p. 95). The first stage of this method calls for the analysis of the client organization, and should yield a clear understanding of the problem areas. As soon as the consultant can identify the problem, he/she should draw up a few computerized solutions. The second stage is the system design stage. The most reasonable solutions from the first stage should be completely designed. The consultant then performs a cost-benefit

analysis of the solution to see if the system is worth considering. The fourth step is searching for suitable software available on the market. If no software qualifies, the consultant might consider creating a custom software package for the client. The fifth stage, which ties in closely to the fourth stage, is checking the hardware required by the software selected in the fourth step. If the hardware requirements are impractical, the consultant should consider another system. Once the consultant selects the software and the hardware, the next step is to install the computer system and verify that it can fulfill its requirements. Now that the system is installed, the staff of the client organization must be trained on how to use the new system. The amount of training depends on the complexity of the system and on the capabilities of the staff. The final stage is system maintenance. The person who initially performed the installation is best able to maintain the system. They would be the most familiar with the system, and best able to troubleshoot it when required. This last stage concludes the *computer systems life cycle* model (Simon, 1986). This method is by no means the only system analysis method that is published.

Another view on the planning of a computer system displays the process as a four step procedure (Chorafas, 1984). The process begins with the Problem Definition. When the Problem Definition stage is completed, the consultant should have learned the following: who wants the new system, why that person(s) wants that new system, what they want that system to do, and how it will really benefit the users (Chorafas, 1984). This information will help the consultant define the problem that he/she is trying to solve. The consultant must then carefully analyze the problem. The idea is to solve the actual problem, and not just a symptom of the problem. In the Problem Analysis stage, the

consultant should look for the following items: the actual problem, the cause of that problem, whether the problem can be mitigated or solved, and whether a new system is needed to deal with the problem (Chorafas, 1984). The analysis of the problem is a refinement of the problem statement, so that it most effectively addresses the important issues. The final stage looks at the environment in which the system will function. This stage should analyze the inputs, databases, text/data flows, report structure, interactivity, graphic means, rules and procedure that affect the system. This final stage is where the complete system begins to take shape. The specifics of the system need to be finalized by the consultant before the installation can begin.

This review of literature on computer consulting is relevant to this project because the project is, in essence, computer consulting. The Royal Institution has problems and issues they want addressed, and to do that successfully, there must be an understanding of the accepted and recommended methods of computer consulting. This information, as well as a study in computer literacy, will help to build the methodology used to solve the problems of the Royal Institution.

3.4 Computer Literacy

The topic of computer literacy is very relevant to our project because no matter what the outcome of our project, its success relies on the abilities of the people at the RI to use computers. The most efficient and capable accounting system might be running on the computer, but if the accountant does not use it, then it is useless. Keeping in mind that while the software is important to the final project, the people who use it are equally important. It was anticipated that most of the staff at the RI would be computer literate, and willing to adapt to new systems if they knew that the system could help them with

their job. The study also included some possible negative reactions to technology in case a difficult situation arose; an example could be someone who is not computer literate, and does not wish to learn to use a computer. Resistance or discomfort with computers has recently been labeled as technophobia. Technophobia is not necessarily as strong as the name implies. Technophobia is simply fear of technology.

"Technophobia can be any negative psychological reaction to technology" (Weil, Rosen & Sears, 1987). Technophobia can include simple avoidance of technology, limiting technological use to the bare minimum, and discomfort and decreased productivity when using technology (Weil, et al, 1987). Technophobia is not a physical condition, but a psychological condition. Technophobes generally display a certain level of discomfort or uncertainty when dealing with technology. Technophobia is a recognizable condition that psychiatrists have extensively studied. This study is necessary in order to identify its development stage.

How an individual first experiences technology is an essential element in development of technophobia (Weil, Rosen & Wugalter, 1990). A possible example might be a teacher who tries to teach students how to use technology that they themselves do not fully understand. Early confusing experiences with technology can start the development of technophobia (Weil, et al, 1990). Technology must be first introduced in an environment that is non-evaluative. Thus, teachers should not grade students on the first uses of technology. If in a work environment, the employee must not be evaluated too soon, nor rushed into new technology (Weil, et al, 1990).

Technophobia is relevant to this project because there was a possibility of finding some degree of technophobia at the Royal Institution; therefore knowledge of how to deal

with technophobia was important, in case it was present in some of the staff members. The project might also have involved people with little computer experience. The group must be careful not to instill technophobia by improperly introducing the staff to the new technology.

The above material shows the study of the following topics: the history of the Royal Institution, accounting, computer consulting, comparable institutions, and the social ramifications of technological advancements. These topics are important in further understanding the project at the Royal Institution. By studying the history of the Royal Institution, we can draw a clearer picture of the organization itself. Because the Institution has installed a new financial management system, it is vital to be familiar with basic accounting principles and TAS Books, the accounting software package. Finally, knowledge of computer consulting allows for the comprehension of the methods by which a consultant chooses a particular product for an organization.

4.0 PROCEDURE

The primary goal of this project was to investigate the current workings of the accounting system and to identify beneficial areas of the system that were not being utilized. We assessed what functions of the accounting system would be helpful to the staff, and then implemented those functions. Following this implementation, we helped the staff make the transition to the new enhancements of the system. We were then present for questions from the staff members to facilitate usage of the system. Our secondary goal was to identify any inefficient aspects of the financial management of the Royal Institution, and then recommend improvements. By attaining these goals, we intended to establish the basis for a more efficient financial management system at the Royal Institution of Great Britain. An extension of these goals was to see what other areas in the administration could become more efficient through the application of advanced technology. This allowed us to bridge what we have done with the financial management system with the possibilities for the technological future of the RI. One of the instruments that was a vital tool in this process was a quantitative and qualitative questionnaire.

4.1 Questionnaire

The quantitative section of the questionnaire determined the amount of computer usage by the associated staff and members. The relevant individuals were those who are directly affected by the changes we implemented in the financial management system. Thus, we used purposive sampling, because we took a select group that represents the desired population. All of these staff and members, mainly administrators, received the questionnaire. The purpose of this section was simply to gauge the level of computer

usage. Once we determined the level of computer experience, we began to make recommendations to increase computer usage among the administration at the Royal Institution.

The qualitative section of the questionnaire provided us with the individuals' opinions and feelings about computers. The questions inquired about interactions with computers in their daily lives. The qualitative part asked the staff and members whether or not they feel that computer usage is essential to the Royal Institution and why.

We pre-tested the questionnaire with our first liaison, an administrator, to insure that it contained minimal bias before we distributed it to the remaining respondents. We distributed this questionnaire to all affected staff and members at the Royal Institution. The questionnaire remains confidential in order to protect the individuals involved. The cover letter to the questionnaire stated that we had placed an envelope out for collection of questionnaires. Because there was low response to the questionnaires at first, we asked the remaining individuals for their completed questionnaires. The purpose of this section was to obtain different viewpoints on computer usage and the financial management system. This gave us the necessary information on which to focus our interviews.

4.2 Follow-Up Interviews

Following the collection and analysis of the questionnaire responses, we conducted follow-up interviews with most of the surveyed individuals. However, we consulted primarily with the accountant and the assistant accountant because the system enhancements affect them to the greatest degree. Therefore, a sampling technique was not required. We began our interviews following receipt of questionnaire responses. The

questions varied for each staff member, depending on their answers to the questionnaire. In our interviews, we sought attitudinal and behavioral data, meaning that we searched for the staff's feelings about computers and how computers relate to the current status of the Royal Institution and the Institution's future (Berg, 1998, p. 79). We also asked the staff and members what areas of technology within the administrative sector they feel have the potential to advance technologically. This allowed us to make recommendations as to ways in which our tasks in the financial management field may be applied to other areas. Once we understood the needs of the staff, we were then able to determine which areas of technology would most benefit the Royal Institution.

4.3 Contingency Plan

If our methods had failed to yield significant results, we planned to conduct focus group interviews. Although this method was not desirable, it would have been necessary as a last resort. This method is less time-consuming, but we would have sacrificed data precision (Berg, 1998, p.100). Thus, it would have acted as an effective safety net and a useful contingency plan. However, we did not encounter many problems with scheduling interviews; therefore, we did not need to use this method.

4.4 Accounting Software

In order to implement the new system effectively, we first needed to understand the DOS version of the software. We worked closely with the accountant at the RI to learn about the accounting system. We were especially interested in the most frequently performed tasks when updating because these are the tasks the accountant must understand fully. By observing and interviewing the accounting staff, we developed an understanding of how the accounting department operates. We then explored the

Windows 95® version of TAS Books, to identify aspects of the software that could be of use to the management of the Royal Institution. Once we had design for the operation of TAS Books, we implemented it. We practiced the upgrade process on a computer other than the accounting computer. Once we were confident that the transition had no negative effects, we upgraded the accounting system to TAS Books Accounting Plus® for Windows 95®. Essentially, we customized the usage of TAS Books Accounting Plus® for the Royal Institution. During this process, we discovered that a user manual for the staff is unnecessary because the manuals included with the software are very user-friendly. We met with the accountant to gain suggestions as to the benefits of an additional user manual from our group. He felt that it would be of no use and that the most important task for him was to start trying to do his work on the new software. This allowed him to identify areas that he may need further explanation. He then directed his questions to us while we were in London and we either answered them, or took him through the technical support process so that he was familiar with the extensive capabilities in this area. There is online reference help built into the software. We have shown the accountant how to use the new features, and they are also outlined in the help section of the software. The accountant was very willing to learn how to use the new features of the updated software, and has had no problems adjusting. These facts were highlighted in our final presentation for the RI.

4.5 Presentation

Our final project presentation in London highlighted the main points of our project. We tailored our presentation in London to our liaison and other employees from the Royal Institution. We focused on their interests, namely the accounting software and

the running of the financial sector, in our project. In addition, we covered the recommendations on the financial management system, and the administration as a whole.

4.6 Conclusion

To achieve the goals of our project, we used the questionnaire and interviews as instruments. These have allowed us to understand the level of computer usage; we also obtained some recommendations for the more efficient running of the financial management system. The accountant and his assistant are the primary users of the system, but it is user-friendly enough for all staff members to use for reference. We have thus aided in the transition to the new version of the accounting software, as well as made recommendations for financial management system. The implementation has been most beneficial to the RI, and in doing this we have also looked at ways in which other areas of administration would benefit from advancing their technology to become more efficient.

5.0 DATA

The data collected throughout our project concerns the role technology plays in the financial management of the Royal Institution, as well as the current overall status of technology at the RI. We collected data through questionnaires, follow-up interviews, and research on the accounting software. Our results are detailed below.

5.1 Questionnaires

We distributed ten questionnaires to the staff and members of the Royal Institution directly related to the financial management system. The collection rate was nine out of ten, or ninety percent. The data received in these questionnaire responses allowed us to assess the level of computer usage by this group of people. We also gained valuable information on the flow of financial information within the financial sector of the Royal Institution.

Seven of the ten people we questioned are members of the staff at the Royal Institution, while the other three are members of the RI. However, we only received nine questionnaires in return. The remaining person is the former chair of the audit committee, who is no longer involved with the RI's finances. Therefore, his response was not crucial to our study. The first of the 13 questions on the questionnaire asks about computer usage at work, in their job, at home, and for e-mail. Only one of the nine rarely uses his or her computer at work. The other eight (89%) use it daily or most of the time. All of the questioned individuals find computer use essential to their job. Eight (89%) of the respondents own at least one computer for personal use, while one respondent does not. In addition, seven (78%) of the respondents use e-mail on a daily basis.

The next series of questions deals with computers at the Royal Institution, particularly in the financial management area. We received several responses as to the importance of computers to the future of the Royal Institution. One person said that computers were important for communication and financial analysis. Others thought they were essential for research and administration, the book and accounting system, the website, and e-mail. Someone else saw computers as being important for communication with the rest of the world and for the smooth running of the RI. Finally, computers are vital for the RI, but a complete review is required. Eight people (89%) feel that computers enhance their daily work. Without the aid of computers, forty-four percent feel that they could not manage their work at all, while another forty-four percent feel they could not manage it well; one individual did not respond. When asked if they would like to be involved in the new financial management system, five of the nine said yes, one said no and the other three replied not applicable. Seeing financial printouts would be beneficial to forty-four percent of the sample, while other responses included "not helpful," "not applicable," and "possibly helpful." Forty-four percent stated that they would like to see monthly accounts while three found it not applicable and two would not. Four individuals (44%) responded that they would like training in how to read the monthly accounts. Three out of the nine indicated that they would like to be involved in setting the budgets, two replied no, three replied "not applicable," and one respondent said he was already involved in the setting of the budgets.

5.2 Follow-Up Interviews

The interviews we conducted were a follow-up to the questionnaires. We based each interview on the specific individual's responses to the questionnaire. The purpose

of the interviews was to determine reasons for the level of computer usage discovered by the questionnaires, as well as to ask for recommendations of areas that might benefit from the same type of upgrade and improved efficiency as that which is occurring in the financial management area. We chose the interviewees based on their relevance to the purpose of the interview. In other words, some of the questioned replied "not applicable" to many of the questions and would not provide any data needed. In addition, one person we interviewed did not complete a questionnaire because we did not consider him in the original list of relevant people. It was discovered after the second interview that he was someone with extremely important information that only an interview could obtain. The Deputy Director completed a questionnaire, and would have been our first interview, but she left the RI two weeks into our project.

Our first interview was with the Administration Manager, our second liaison. Her typical day consists of many reactive tasks. She handles the membership database, room bookings, and any general inquiries. Presently, her day is very unstructured, unorganized, and hectic. Since she is in charge of the membership, she talks to members on the telephone regularly; she has a personal relationship with the members. One benefit they receive from membership is this personal contact and the feeling that they are an integral part of the RI. She stated that talking to members on the telephone is her most time consuming task. She feels that the RI needs more computers, as well as more staff. The membership database she works on needs to be explored. She did not have any training in it and has learned things on a need-only basis through tutorials and contact with the company. She feels that training courses would be helpful. She suggested a system manager to control the computers and essentially a whole department of computer

knowledgeable people on hand. If something goes wrong, they are all responsible for finding the solution. In a sense, the new technology has given them additional work. Thus, there is currently a great deal of data entry.

The Administration Manager uses computers at work for the membership database, logging in payments, word processing, and e-mail. Her job is in direct relation to the financial management of the RI because she processes all the payments and takes minutes at the finance committee meetings. The system of processing payments is currently inefficient because she has to input all the payments before the accountant can input them on his system. Oftentimes they pile up next to her desk where there is the potential for information to get lost. She asked if it is possible to network the two systems: the membership database and the accounting software, TAS Books Accounting Plus®. This would eliminate inputting information twice. She also would like her system to produce more regular and detailed reports. Sometimes her reports do not match up with the accountant's reports and they have to resolve the discrepancy for the auditors. They do not have a standardized central system. She currently sees financial reports because she attends the finance committee meetings. Since the Deputy Director has left, the Administration Manager has taken over a great deal of that workload. It would therefore be helpful for her to see the monthly accounts.

Essentially, anything that computers can do, she would like to know about. She is only using about fifty percent of the membership database's capabilities and she would like to be able to produce more reports. This would lighten the accountant's load also because currently she cannot produce some of the reports that he needs. It therefore increases his work. She suggested that a major solution would be training in the area of

the database software. As far as new technology in the RI, a brand-new, customized system is the answer, in her opinion. They could utilize internal e-mail, voice activated controls, scanners, and basically anything else that is available on the market. Essentially, the answer to all the problems is a brand new computer system, started from scratch.

The second interview was with the accountant. Before the introduction of TAS Books, there was a different computer system, whose name was unknown to him at the time. The Deputy Director chose a new software package similar to the then current one, and the accountant rejected it. They were then in contact with the Kings Mill Partnership accounting firm who chose TAS Books, which was much less expensive and more in line with the needs of the RI. It is also recommended by the Institute of Chartered Accountants and cost only £99. The new software ran in parallel with the old software for approximately four months. There was also a little bit of training from Kings Mill upon installation of TAS Books. If there is a problem, he calls the person who installed the software, a member of Kings Mill. The accountant feels that more training would be useful if we introduced new versions, and he is generally pleased with what the software does for him presently.

He feels overall that the software has saved him a lot of time. It is linked with the manual accounts. Currently he does invoicing on Word Perfect instead of using the Sales Ledger on TAS Books. He is unsure that it would be practical because the billing of room bookings varies depending on the number of rooms booked. Room bookings are not like selling a product where there is a set price. The prices are never the same and this is a problem for the program. They only have fifteen to twenty bookings per month

so it does not take up that much time at the moment, but there is potential for growth in the future. He feels computers could reduce the amount of time he spends on daily tasks. Online banking is in the future of the RI, and this will eliminate the writing of checks. He would like access to the membership database. Members pay by check, direct debit, and credit cards. There is also a Deed of Covenance that allows the RI a tax refund. He produced a leaflet explaining this benefit and distributed it to members, but there was a low response in members to sign up for this. However, access to membership data would reduce his workload considerably. The next question dealt with communication between staff members.

He feels there is a good level of communication between staff members to a certain extent, but he does not receive a great deal of the information that he should know in a timely fashion; instead, he is often the last person to know. He is in charge of the payroll and is not always aware who should be on it or off it. Since the last Deputy Director came, there has been a lack of communication that has further increased following her departure. He hears things "through the grapevine." Thus, the communication within the RI's administration could be enhanced. Computers would help this lack of communication because he is not yet connected to the Internet or does not have e-mail access.

The assistant bookkeeper works closely with the accountant and has for the past nine years. She is responsible for the Purchase and Sales Ledger functions on TAS Books. She does the coding for the accounts and writes out all the checks. She also keeps track of all the invoices and posts them following their authorization. Her most time-consuming task is writing out the checks manually. She also is in charge of

reimbursing people from the petty cash fund, which includes all purchases under £40. She mentioned that having checks printed out would save her time, but that the future holds online banking which would completely eliminate the use of paper checks.

She uses TAS Books in her daily tasks and owns a personal computer for use at home; she uses it to do word processing. She is willing to learn any new aspects of the financial management system that involve computer software upgrading and feels that basic training is essential.

The Senior Researcher, Assistant Director of the Laboratory, and part-time Information Technology (IT) Manager is, in essence, the IT department for the RI. His main occupation is computational chemistry research, but he has taken on the responsibility of IT Manager as well. He has nine years of high performance UNIX experience, as well as some networking experience. He has installed most of the hardware and software at the RI except for the membership database and the accounting software. In addition, he is responsible for the daily computer maintenance and fixing any problems that arise. He makes decisions about the central mail server and makes most of the IT decisions for the researchers.

Since he began working at the RI nine and one-half years ago, they have never had an IT consultant come in although he feels they should. The RI has never had a full time IT staff member. They have had consultants come in for very specific areas of interest. They used to have Novell Network that would print out all their tickets for functions and allowed for better access of information by the administration, but the Deputy Director eliminated that system when she began two and a half years ago in order to start anew.

There is currently no IT budget; there is also no person to authorize purchases since the Deputy Director's recent departure. Thus, no one presently knows who is in charge of the money. He feels that IT is vital to the future of the RI. There are no hardware or software standards, and this presents a problem. He is trying to get everyone to use Eudora for e-mail, but he cannot enforce it.

Although he makes the buying decisions, he usually gets advice on what to buy and must go by the individual's request. He is essentially the one that shops around to get the best value. A group of graduate and post-doctorate students help him. There is no list of inventory, but he keeps most of the media in his office. Most of the software is owned, registered, and purchased by the RI. He allows people to take software home with them if the license allows it, and he relies on honesty.

Currently, the administrative staff members of the RI all use different computers and have their own printers. He believes that shared printers would be a very good idea. The graduate students currently do this in their labs. A web committee exists and outsources some of the information on the web page; the main "webmaster," however, is a graduate student. The RI shares a 2MB Internet connection with the University College London and costs about £6,000-£8,000 per year. This includes lines and support services. In the future, he would like to see coordination and a review of the current network. He would like to eliminate the use of Macintosh (Mac) computers and to have a coherent strategy. Mac hardware is currently a problem, and it is often due to a lack of user skill. He finds the present set-up quite risky because there are many things not backed up, and there is a great potential for data to get lost. There is no cover for the networking switch and if it goes, the RI could be out of the network for days until it gets

fixed. The incompatibility that exists within the administration and between the administrative end and the research end is "a nightmare."

The IT Manager had some suggestions to make areas of the RI more efficient through the use of technology. He suggested upgrading the network infrastructure and standardizing the systems. An important recommendation was to have backups to the administration's programs. Other areas that would be of use to the RI were color printers, some sort of integration with the phone system, and a fiber optic connection. Essentially everyone using the same system and training in how to use this system would increase the RI's overall efficiency.

Our final interview was with the Director of the Davy Faraday Research Laboratory. He describes his job at the Royal Institution as primarily a researcher, but he is also responsible for the Schools Lecture Program. Two-thirds of his budget goes to research. He describes his most time consuming tasks as supervising the students and writing money scripts. When asked if computers could make these tasks easier, he said that he did not believe so. He commented that in general the office IT is poor.

At the RI, he uses a PC for word processing, e-mail, and the Internet. At home, he has a Mac Powerbook. He feels that access to financial information such as grant spending would be beneficial and that office IT needs complete renovation. It needs to be properly networked. One thing he suggested was having the senior administrators have their schedules accessible to everyone so that it would be easier to make an appointment. He also said that the financial printouts he sees are sufficient but he would like to receive them more frequently.

The RI would benefit from any new and upcoming areas in technology. Video conferencing would be ideal for the lab researchers because they could communicate with scientists all over the world. Presently they use e-mail and it is sufficient, but video conferencing would be more useful. He understands that this is very expensive, but it may be in the RI's future.

Essentially, the office of the RI needs better equipment. The senior people need to be able to access financial data at the computers at their desks. The entire office also needs to be properly networked.

The people we chose to interview are of most relevance to our scope of research due to their connection to the financial management of the RI as well as their connection to any administrative decisions. Other people that received the questionnaire but were not interviewed included members and the director. These people were less directly relevant to questions about the internal workings of the RI.

5.3 Software Research

After the troublesome installation of the Windows 95® version of TAS Books, we finally had the opportunity to explore the new options available in the latest version of the TAS Books Software, TAS Books Accounting Plus®. We obtained this data by reading the existing TAS Books manuals, and by inspection after the installation onto our laptop was complete.

Many specific areas allow the accountant to perform the current tasks more efficiently. One of the accountant's concerns was that DOS does not allow him to import the data directly from TAS Books to Microsoft Excel®. This forced him to input the data twice. We found that TAS Books Accounting Plus® has the capability of converting

between Excel and TAS Books with the imported data carried along. Previously, the accountant also had to redefine the spacing of the data in the spreadsheet. The conversion between Excel and TAS Books eliminates this time consuming task. In order to look up something in the DOS version, you must know the code for it. TAS Books Accounting Plus® is much easier to use. The F2 key allows one to look up different files including the specific company. In the sales heading, one can look up customer details by the customer, group, or salesperson, for example. You do not have to search by codes so it is easier to search for information. This allows the accountant to find information faster.

This newest version of TAS Books contains options that were not included in the DOS version, many of which will yield an increased flow of financial information throughout the RI. One of the major differences between the DOS and the Windows 95® versions is that the Windows 95® version is much more user friendly. It has more options such as a Marketing and Products section. The existing headings also have more capabilities. The Nominal heading contains a section called utilities where the program will auto-create nominal departments if that is useful to the accountant. It also contains a financial script maintenance section where there is an option to delete old accounts. Deleted old accounts will free up space for the new accounts and will create less confusion when searching for information. In TAS Books Accounting Plus®, one is able to scroll through the accounts whereas in the DOS version, one is not. When looking up a current balance, for example, one can print out the entire spreadsheet to screen or disk and can include the past four years or any combination of the past four years. It is possible to graph the growth trends of any of the different categories in the same way.

The graphing capabilities are extensive. They include pie, bar, and area graphs with the additional option of three-dimensional display. There is also the ability to produce more types of reports and they are easier to write on the new version. This increased and more detailed report writing, the graphing capabilities, and the additional headings will allow better flow of information throughout the financial management system of the Royal Institution.

Other major uses for the software that increase efficiency were discovered through working with the accountant and observing what features he found useful. It is possible to look at the listing of companies with which the RI deals in the recurring journal section. This proved to be a help to the accountant because it cut down on the amount of time it takes to find information. Also, this list of companies is always changing and the accountant and his assistant usually have to print out new copies all the time to look up information. The ability to see the listing of companies in the recurring journal allows for less confusion of new and old copies and is easily accessible by using the shortcut F2. Another new feature is that the new version is year 2000 compliant. Many of the accounts such as grants that run for a number of years could not be processed past December 31, 1999. This is another area of increased efficiency. One thing the accountant wanted the software to do for him was to print ranges of accounts, as opposed to just one account at a time. The new version allows one to select a range of accounts and print a listing of detailed accounts to the screen or to the printer. This saves a lot of time, especially with grants. In the Sales Ledger, the new version contains four different pre-written letter types. The letters can be amended directly in Microsoft Word® to fit the needs of a unique organization such as the RI. More personalized letters

are necessary, sometimes, and the new features on this software allow for better catering to the needs of this organization.

We discovered that the new heading of Marketing is of no use to the RI. Because the RI does not have a marketing department, it is not effective in their financial management system.

The new version contains more detail in many areas that allow the accountant to perform tasks more efficiently. One is able to view more information on the screen when viewing the journals. Summaries allow the accountant to produce more visually pleasing reports, such as graphs. He can look at the income and expenditure records and use the comparative capabilities that the version contains. One can view the period values for a range of accounts in different spreadsheets.

To backup in the DOS version, the accountant had to use a separate DOS backup program; this procedure took place on a daily basis. It used to take three disks to backup the daily information. With the new version and information we have learned about it, the accountant now uses the backup option on the new version and uses only one disk, which takes approximately half the amount of time. He is now able to switch to the zip drive, something that was formerly impossible. There is also an option to protect the backup with a password.

The accountant has been finding more features that are creating results that are more efficient each time he uses it. He has already set up a new file on the software for the investment aspect of the RI. This includes the stocks and shares that the accountant usually analyzed once a month. By putting them on TAS Books, he is able to look at their growth on a monthly basis now. The accountant previously did this manually with

the DOS version. The new features increase efficiency and reduce the amount of time the accountant spends recording transactions and analyzing financial figures manually. This has freed up the accountant and allowed him to better view the financial status of the RI. He is generally satisfied with what the new version is doing for him, and due to the extensive help topics provided, he feels that no other manual is necessary.

6.0 ANALYSIS

The analysis of the data yields insight into the workings of the Royal Institution and the relationship that the RI holds with technology. Through the application of the questionnaire and the follow-up interviews, we were able to identify the level of computer literacy, the reasons for this level, and the respondents' desired input in the financial management of the Royal Institution.

Based on the questionnaire and interview responses, we have determined that the staff uses computers on a daily basis; however, because they only use select functions, they may be overlooking additional programs beneficial to their work. The data shows that most of the staff and members use computers on a daily basis, and that computers are essential for their daily jobs. This information tells us that the respondents have a general level of computer literacy in that they are at least somewhat familiar with computers. However, our purpose is to determine what levels exist and the reasons for these levels so that our recommendation may be as helpful to this organization as possible. As we probe deeper into the details of their computer usage, we find a lack of consistency, training and knowledge of some of the general functions of the programs most individuals are using. We have discovered that the affected staff members of the RI do not all have the same types of computers or a networked system of computers. We have discovered a breakdown of communication because of this. In addition, although all staff members have e-mail available to them, not all choose to use it. Most of those who have e-mail accounts use e-mail for personal reasons rather than for communication within the RI. Many staff members simply receive their systems without training. As a result, they must

discover their systems' capabilities for themselves. This method does not allow for the most efficient usage of their systems.

The overall level of computer knowledge at the RI should be higher than it is presently. The staff members are capable and willing to learn more about using computers to enhance their work. The usage level has not yet advanced due to lack of proper training, insufficient time to explore their computers' capabilities, and low number of staff members. There is a lack of extensive training; consequently, most people rely on the manuals and help lines of the particular programs they are using in order to figure out how to do a specific task. They are thus only learning the basic way to do something, instead of discovering the most efficient way. Because there has not been a great deal of training, the staff is not knowledgeable of the relatively extensive, but sparsely documented, capabilities of their programs. Calling help lines and referring to manuals takes time, and in a busy organization, there is not a lot of time to spend exploring the capabilities of the programs. Most people simply need to know how to do particular tasks relating directly to their work. In addition, there is a relatively low number of staff members. Therefore, the existing staff members are very busy; this is a major reason for the relatively low level of computer literacy. People do not have the time and are not getting the training to use their systems more efficiently.

Most respondents desire more input into the financial management aspect, meaning that the current scope of those who look into the finances is rather narrow. With TAS Books Accounting Plus®, the accountant will now be able to produce more detailed and easier to read graphical reports. This will allow the accountant to distribute

the monthly reports to a wider group of people, therefore increasing communication between the staff and members of the RI.

7.0 PROBLEMS ENCOUNTERED

7.1 Communication Breakdown

While completing their IQPs, it is common for groups to encounter a few setbacks and problems; some may seem large and sometimes insurmountable. We encountered our share of problems during the course of our project, and while they did not cause the premature end of our project that we expected at times, they did alter our project to some extent. The problems were in fact important enough and so time consuming that we feel justified in documenting them and including a short section that details the project-altering problems that we encountered while in London.

A project liaison generally serves two roles: to guide the project with the hope that it will benefit the sponsoring agency, and to introduce and guide the team around the project agency. Our project is concerned with the very heart of the internal workings of the Royal Institution: the financial management system. It is a very difficult thing to be a student, yet suggest to professionals ways they can do their job more effectively or efficiently. Our liaison, Deputy Director of the RI, was in a position that had direct control over the financial aspect of the RI, and it was under her name that we worked. These events suddenly changed when our liaison left the RI after our second week in London.

Our group did not know of the departure of our liaison until after she had already departed. We had not been informed about the departure, and assumed the reason was that the departure was unexpected. We were uncertain about the future of our project because our perception was that its only active supporter at the RI was our liaison; after her departure, it appeared as though our departure was to follow. After much confusion,

our advisors informed us that we now had a new liaison. She reassured us that our project did have a future, but we now felt we lacked any authority to make important changes.

Confidence in our project returned to us during the following week. The disruption was more psychological than logistical, and we soon resolved to carry on with the project as though nothing had changed. The sheer lack of communication among all parties in this situation was astounding; it is thus an excellent example of the disorganized line of communication within the RI that we address in our conclusions and recommendations chapter.

7.2 Software Difficulties

TAS Books, the accounting software at the RI, was once the main focus point of this project. However, we ran into a few time consuming problems that put the entire idea of upgrading the accounting software in jeopardy. The problems were unforeseen, and consumed valuable time. To counter the possible loss of the major section of our project, we adjusted the scope of the project to include areas such as recommendations for future IT implementation at the RI. The problems did help us, however, in the sense that they forced us to reshape our project in a way beneficial to the RI, and more inclusive of the RI's technological status. While a written description of our software problems could never fully express the aggravation they caused for us, it does show one drawback to increased technology: increased software problems and time consuming solutions.

The installation of both versions of TAS Books on our laptop went without incident. Both versions installed and ran without trouble. To ensure the correct transfer

of data between the two versions, we decided to restore the data from one of the RI's backup copies onto our laptop, under the DOS version. If the data made it successfully to the Windows 95® version, then we would know that the transition between the software packages would not destroy financial data. The test run of this transfer uncovered problems. The Windows version of TAS Books has a built-in option for importing data from the older DOS versions. Getting this option to work proved quite complicated.

The initial "import" of data from the DOS version to the Windows version halted on a software error with only the cryptic message "Software error 9." Our first attempt at bypassing the error was simply to restart the computer and try again. This attempt failed and we encountered the same error message, suggesting that transferring data from the old version to the new one was not going to be as easy as the software claimed. The section on importing data contained only basic information and no help for troubleshooting. We next attacked the problem from the DOS side of the equation. A patch disk was in the box, so the next step was to apply it. This patch updated our version 15 software to version 15B. We tried again, but to no avail. As a last resort, we called technical support.

Our first pleas for help were brushed aside by technical support because the support service had expired for the RI's copy of TAS Books for DOS. They informed us that for £180 they would renew the service contract for three months. We balked at this outrageous figure and turned down their offer. We discovered that although the RI had had the Windows version for a while, it had not yet been registered. Registering the software provides the RI with one month of free technical support. We faxed the

registration over to TAS Software immediately and were soon discussing our problem with a technical support representative.

The first call to technical support seemed as though it would solve our problem; our project appeared back on track. The support representative informed us that our DOS version of 15B was not compatible with the import feature of Windows, and that all we needed was the 15B to 16 patch disk. He assured us that the disk would be mailed that afternoon and our problems would be over in two to three days. The patch disk arrived in the mail three days later, and we eagerly updated our software. Unfortunately "Software error 9" greeted us once more.

The second call to technical support was more productive. The representative was appalled at what the previous representative told us, because the truth is that there is no difference between version 15B and 16, aside from the fact that 16 now supports long date fields for the year 2000 problem. The representative told us he had no idea why we were getting an error. Error nine, as it turns out, refers to a data error in a directory unrelated to importing data. The representative said he would mail us a copy of the newest version of TAS Books for Windows, now called TAS Books Accounting Plus®.

The new version of the software arrived at the RI, and we quickly installed the new TAS Books Accounting Plus®. We were very excited when the software worked, and the data had fully transferred to the new software package. The problems with the software ultimately took over a week to solve, but motivated us to reshape and expand our project in the process.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The Royal Institution remains a unique and prestigious organization that has an interesting decision ahead of it: to continue making minor changes in its internal workings, or to develop a vision for its future of technology to create a substantial foundation for the next millenium. From its beginning in 1799, the RI established itself as a leader in popularizing science, leading to a trend throughout Europe. As the years progressed, the laboratory started by Humphry Davy became among the finest in Europe, thus increasing the RI's prestige. Technological breakthroughs abounded at this unique organization, and its prestige is still renowned. However, although the laboratory at the Royal Institution continues its cutting-edge technological breakthroughs, its administration is falling behind in the ever-changing realm of technology. Its lack of organization and structure results in a lack of overall efficiency in the financial management system, and in the administration as a whole. Consequently, the current level of technology in the RI's administration must be improved. If the RI makes only minor changes, it will not increase its efficiency; however, if the RI implements major changes to its internal structure, the RI will reach new heights of efficiency and effectiveness.

8.1 Efficiency of Accounting Software

The improvements made to the efficiency of the accounting software have already saved the accountant significant time. Even the smallest enhancements in the new software create extensive amounts of saved time; probably the greatest example of this is the ability to save the information on TAS Books Accounting Plus® and open it in Microsoft Excel®. Formerly, the accountant typed the information twice in order to

create spreadsheets of the information. This new capability saves him a great deal of time and eliminates a possible source of error. As a result of the accountant's newly available time, he will better be able to prepare financial reports and balance the annual budget. These enhancements will also decrease his stress level, leading to his increased satisfaction with his work. Once workers are more satisfied, efficiency will increase further. The efficiency of the accounting software leads to the broader scope of the entire financial management system's efficiency.

8.2 Efficiency of Financial Management System

The current financial management system lacks organization and inter-communication. Nevertheless, there is the potential to improve the efficiency of the system based on the opinions of staff and our recommendations. Several of the recommendations include major revisions to the current system; these changes will benefit the RI as a whole, and will lead to increased efficiency. For the RI to reach the pinnacle of administrative efficiency, it must be willing to embrace change and eagerly accept constructive criticism.

The first of our recommended improvements is replacing its computer network. Currently, there is a lack of standardization and organization in the computers used by the administration. Some of the machines would be suitable for the new network, but the Macintosh computers are not well suited for the situation at the RI. A client-server network configuration would greatly improve the accessibility of information. Common information would be located on the server, and any authorized client would be able to access it with ease. Membership information, which more than one department requires, would no longer be entered twice. Redundancy would be minimized and information

exchange would be greatly enhanced. A central server would be an ideal situation for the next of our recommendations, backing up of critical information.

The risk of serious data loss is dangerously high at the Royal Institution. The accountant regularly backs up the financial information, but this is the exception, not the rule, in the administration. The administration does not backup membership data and ticket sales information regularly. Should the machines suffer from a hardware failure, this information would be lost. The RI should not accept this risk. The RI should backup important information on a regular schedule. The RI could easily automate this backup process if the information occupied a common server.

Currently, researchers handle the technology aspect of the administration, as they happen to be the most experienced at the task. It is our recommendation that the RI hires a full time Information Technology Manager to manage the computers at the RI. A permanent staff position in charge of technology can increase the cohesion of the network. Standardization is easier when the person designing the network makes all purchase decisions, instead of the individual staff members. Once these recommendations are embraced, there is room for significant growth of the RI.

8.3 Future of Technology: The RI Seizes Its Destiny

Once the RI updates its administrative technology, its two parts, research and administration, will both be on the cutting edge and go into the future with full force. There is a great potential at this prestigious organization that, once fully realized, will enable the continued status as a cutting-edge organization. The research aspect of the RI is very important, but the administration of the RI must not be forgotten. It is in the administration that small changes can greatly affect the operation of the entire RI. The

less work that is required behind the scenes translates to more work that can be directed to the public. The public would notice some changes in essential areas: more lectures, more programming for children, and more efficient rental of building space. The interaction with the public is what sustains the RI, and with increased public support, the RI can flourish. If increasing internal efficiency will eventually lead to increased public support, then it is an option that the RI should consider. The updated technology will increase efficiency, thus allowing the RI to concentrate its efforts on its mission: the popularization of science.

8.4 Recommendations for future IQPs

During our time at the RI, we saw several areas in which the RI could use some improvement; this improvement could easily be from a WPI IQP group. One such area was very close to our own project - the implementation of online banking. The RI has been curious about online banking for some time; they have some information on it, but they lack the time to research it and implement the online paying of bills. Another area that could use some critical analysis and correction is the membership database. The staff has had no time to explore fully the system and is uncertain of all its capabilities. A less technical area, but no less important, is the membership area. One possible IQP could investigate a membership drive to gain new members and curtail the decreasing membership trend. Another could be the design of a capital campaign. This could include surveying members and determining why they like the RI; they could then design a capital campaign highlighting those areas. Overall, there is a foundation with great potential from which to build a stronger establishment.

Appendix A: Mission and Organization of the Royal Institution

The Royal Institution of Great Britain, located at 21 Albemarle Street, London W1X 4BS, was founded by aide of the Royal family in 1799. Known for upholding the traditions of popularizing science, it has endured a long history, and will celebrate its bicentennial in 1999. The Institution is widely known for its outstanding researchers. There have been seven Nobel Prize winners at the Royal Institution, as well as other notable scientists, including Humphry Davy and Michael Faraday. The researchers give discourses to members on Friday evenings and to non-members on Tuesday evenings. Every year, there is also a Christmas lecture series for children. These lectures have become increasingly popular over the years. As a result the BBC (television company) now broadcasts these lectures via satellite into the United States and Japan.

The Royal Institution itself includes the Davy Faraday Lecture Hall, where researchers deliver lectures, and the Michael Faraday Museum, in remembrance of Michael Faraday's original laboratory. There are many items on display, including the first sample of benzene that Faraday discovered. In order to appreciate this museum to a greater extent, there are tours given upon request for five pounds. The museum is open Monday through Friday 10:00 AM to 4:00 PM. Admission is one pound sterling or 50 pence for children and seniors.

The Royal Institution, keeping with today's technology, has a web page (http://www/ri/ac/uk). Here one can find information on current events at the Institution, a brief history, as well as an introduction to some of the researchers. In addition to all of

this, there is a page that has directions, along with a map, so that people can find the Institution easily.

The current director of the Royal Institution is Dr. Susan Greenfield. Professor Richard Catlow is the Director of the Davy Faraday Research Laboratories. He, along with the members of the Finance Committee and a few other individuals, are in charge of setting the budget. Recent budgetary trends have shown a significant surplus; this is partly due to the VAT refund and investment of funds in recent years. However, there have been some difficulties in determining exactly how much money the Institution has at any given moment, therefore creating uncertainty.

This project is designed to increase the efficiency of the financial management system by first targeting the accounting software, TAS Books. Once this software is enhanced, this will allow for the further exploration of the financial system as a whole. This, in turn, will lead to incorporating these suggestions to the administration of the Royal Institution. Once this prestigious organization becomes as efficient as possible, it will better be able to continue its unique mission of popularizing science.

Appendix B: TAS Books[1]

How TAS Books can help an organization:

Management

- Know the financial position and the new worth of your business.
- Obtain trading results daily. Make vital decisions based on accurate and up-to-date facts and figures.
- By creating a better image for you company, your standing with your bank, auditor, lenders and shareholders will be improved.
- Improve the productivity of your staff without the need to increase their pay.
- Obtain help to set financial goals and operational targets with effective means to track progress.
- Have more time to spend strategically working on the business, rather than working in the business doing the accounts.

Finance

- Have full control of all the finance elements of your company and organize your financial records to provide accurate, timely information.
- Define exact financial goals, create financial reports, including Profit and Loss documents and set budget controls to help attain them.
- Track your receivables to target slow payers and use effective collection techniques.
- Forecast income for improved cash flow, enabling you to pay your bills on a timely basis and enjoy sound relationships with your suppliers.
- Effective supplier account management will create relationships based on trust and co-operation.
- Calculate and track your operational and overhead costs to determine whether additional personnel are feasible or necessary.

Sales and Marketing

- Communicate more efficiently with your customers and get help to effectively increase sales whilst keeping costs down.
- Know exactly where your sales comes from, who your customers are and direct your marketing to those customers.
- Help establish reasons why people buy your products or services.
- Track and measure the response of an individual advert or mailing accurately.
- Determine the most effective placement of your advertisements to get the best results.

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[1] This information is taken directly from the TAS Books brochure, distributed by Megatech Software PLC, UK

- Produce instant summary totals for your customers and customer groups.

Operations

- Document your procedures to effectively train others. By eliminating repetitive tasks or duplication you can increase productivity.
- Reduce clerical errors and guarantee that work is done well and on time.
- With a minimum of paperwork, organize, process, store, and retrieve, vital information in an efficient and accessible manner.
- Analyze and evaluate your current operations to determine if expansion is feasible of desirable.

TAS Books – A Quick Look

- Fully integrated, business accounting system with extended sales, marketing and financial analysis functions and features.
- Real-time, real-world accounting means that files are always up-to-date.
- Full double-entry accounting based on the latest 'single-ledger' design and 32-Bit technology for Windows 95 and Windows NT.
- Whenever possible, for maximum productivity, no use of the mouse is required.
- Unrivaled ease of use with award winning Account Processor™ technology, allowing you to undo whatever you do, with full security audit trail.
- Unrivalled auditability with instant drill down and drill around throughout the system.
- Single-user and multi-user network versions.
- Any number of departments/cost centers as well as any number of companies with consolidation.
- Dual VAT Registers support simultaneous use of both Standard as well as the Cash Accounting Scheme, with full EC Sales support
- System support 12 months or 13 (user-definable) periods with individual calendars.
- Non-destructive and non-obligatory month/period close and you may have up to five years open.
- Date Driven Account Processor engine allows for non-destructive year-end. If today is the day, simply run it.
- Open database architecture uses industry standard Btrieve® relational database.
- Fully scaleable – this means that the files may be virtually in size and are restricted only by the available disk space.
- High-speed navigation with easy –to-use and easy-to-remember program access system.
- Consistent multiple definition reporting filters and selection parameters down to individual days.
- Both BASDA / HM C&E VAT Level 2 Accredited and ICAEW Accredited.

Sales Ledger

- Unrivalled amount of customer details, sales, costs, margins and no less than five years summary totals, throughout the system.
- Any number of customers and delivery addresses. Meaningful ten alpha customer code for easy retrieval.
- A customer can also be a supplier, facilitating easy contras with Purchase Ledger, i.e., offset a sales invoice against a purchase invoice.
- Full support for recurring transactions, each with an individual calendar and any number of posting dates up to five years ahead.
- Easy payment allocation from on-screen lists with instant adjustments for settlement discounts, over/under payments, bank charges, currency conversion charges and other adjustments.
- If mistakes are made the payment can be unallocated. This will give correct aging for the now unpaid invoices.
- On-screen customer enquiry with full drill down will display all underlying invoice details, double entry, VAT, payment allocation, etc.

Purchase Ledger

- Unrivalled amount of supplier account details, purchases, groups, and no less than five years summary totals, throughout the system.
- Meaningful ten alpha supplier code (shortname) for easy retrieval.
- Full support for recurring transactions, each with an individual calendar and any number of posting dates up to five years ahead.
- Easy payment allocation from on-screen lists with instant adjustments for settlement discounts, over/under payments, bank charges, currency conversion charges and others.
- Full support for remittance advices with or without checks. Modifiable layouts with Word 6 or later.
- On-screen supplier account inquiries with full drill down display all underlying invoice details, double entry, VAT, payment allocation, etc.

Nominal Ledger

- Use your own Chart of Accounts. Unique renumber utility lets you re-arrange your COA at any time to perfectly match your business.
- High-speed, script-based report generator allows you to define your own format financial statements and supporting schedules.
- Full support for reversing transactions and recurring transactions, with individual calendars and posting dates up to five years in the future.
- All reports may be sent to screen printer or disk.

Cash Book

- Cash book is transparently updated by Sales and Purchase Ledger entries and always up-to-date.
- Full support for payments outside the scope of VAT, such as salaries, insurance payments and loans that do not update the VAT registers.
- Instant display of bank balances (how much you really have) and statement balances (how much the bank thinks you have).

Sales and Marketing

- Unique built-in functionality measuring the effectiveness of any direct or indirect sales and marketing program. (A feature not found in any other accounting system).
- Supports both fixed and variable costs and tracks in detail the number of orders, sales, costs, margins, both before and after fixed costs.

Data Warehouse-type Analysis and Management Information

- Simple 'point and click' retrieval with full drill down to underlying summary total, period totals, period and individual details.
- All ledger, bank, customer, suppliers, products, sales, and marketing information available in one designated area.
- Screens and graphs may be copied onto the clipboard and included in word processing documents.

Comprehensive marketing analysis reporting with numerous filters and selection facilities to show or print as much or as little detail as required.

Appendix C: Data Chart

Current Statistics from the Questionnaire 16/2/99

Number of Questionnaires received out of total distributed= 9/10= 90% RECEIVED

Exact Numbers

1. Employed at the RI?	**Position**	**Member**		
	7	2		
	Daily	**Never**	**Rarely**	**Most of the Time**
2. How often do you use a computer at work?	6	0	1	2
67% use it daily	**Essential**			
3. How important is computer use to your job?	9			
100% find it essential	**Yes**	**No**	**Several**	
4. Do you own a personal computer for use at home?	7	1	1	
89% own a computer	**Daily**	**Never**		
5. How often do you use e-mail?	7	2		
78% use it daily				
6. In what manner are computers important to the future of the Royal Institution?				
Communication and financial analysis				
Essential for research and administration (2)				
Book and Accounting System, Website (2), e-mail				
Very, Communication with the rest of the world				
They are vital but a complete review is required.				
for the smooth running of the RI	**enhance**	**hinder**	**no effect**	**NA**
7. Do you feel that computers could.....on your daily work?	8	0	0	1
89% feel computers enhance their daily work	**not at all**	**not well**	**not sure**	
8. How well could you manage your work without the aide of computers?	4	4	1	
44% say not at all while the other 44% say not well	**Yes**	**No**	**NA**	
9. Do you want to be involved in the new financial management system?	5	1	3	
56% say yes	**Yes**	**No**	**NA**	**Possibly**
10.Would seeing financial printouts be helpful to you?	4	1	3	1
44% say yes	**Yes**	**No**	**NA**	
11.Would you like to receive copies of the monthly accounts?	4	2	3	
44 % say yes	**Yes**	**No**	**NA**	
12. Would you like some training in how to use them?	3	4	2	
44% say no	**Yes**	**No**	**NA**	**Already is**
13. Would you like to be involved in setting the budgets?	3	2	3	1
33% say yes				

Appendix D: Organizational Chart

Council

Director
Susan Greenfield

Personal Assistant to the Director	*Gayna Clark*
Director's Office Assistant	*Vacant*
Director of Collections	*Frank James, PhD MSc*
Fundraising Campaign Coordinator	*Sandie Lowe*
Director of Exhibitions	*Irena McCabe, BSc MSc DipLib*
Assistant to Director of Collections (pt)	*Rajshree Ajodah*

Administration

Head of Operations
Position not filled
Administration Manager
Jean Whaley
Accountant
Jay Lad
Accounts Assistant (pt)
Savita Jeshani
Evening Events Manager (pt)
Frances Martin
Media Relations Officer (pt)
Hugh Rogers
Corporate Hospitality Administrator (pt)
Nicola Senior
Receptionists
Vacant

Programs

Director
Professor Richard Catlow
Secretary
Mrs. Jean Conisbee
Education Officer (pt)
Mr. Andy Piggott Med BSc
Wolfson Regional Advisor
Mr. David Royle
Clothworkers' Fellow in Mathematics (pt)
Roger Bray MA PhD
Clothworkers Lecture Supervisor
Mr. Bipin Parmar
Laboratory Assistant
Chris Knapp
Laboratory Superintendent and Premises Manager
Mr. David Madill
Workshop Superintendent and Premises Manager
Mr. Michael Sheehy

Research Personnel of the Davy Faraday Research Laboratory (resident)

Director and Wolfson Professor of Natural Philosophy
Professor Richard Catlow
Fullerian Professor of Chemistry
Professor Peter Day FRS
Professor of Chemistry
Professor Sir John Meurig Thomas FRS FRSE(hon)
Senior Research Fellows
Dr. Robert G. Bell BSc PhD
Dr. Gopinathan Sankar
Assistant Director
Dr. Simon G. Carling
Assistant Director and EPSRC Advanced Fellow
Dr. Mark A. Green
Secretary (pt)
Mrs. Dawn Hillman

Royal Institution Centre for the History of Science and Technology *Steering Committee*	**Finance Committee**	**Davy Faraday Research Laboratory Committee**
Mathematics Masterclasses	**Audit Committee**	**Organizing Committee**
Web Page Committee	**COPUS** ***Committee on the Public Understanding of Science, in Association with the Royal Society and the British Association***	**Schools' Lectures Advisory**

NOTE These are the main staff members that work in the building on a regular basis. The committees serve as a channel through which the members of the Royal Institution are able to voice their opinions.

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IQP/MQP SCANNING PROJECT

Appendix F: Questionnaire

1. What position do you hold at the Royal Institution?

2. How long have you worked at the Royal Institution?

3. How often do you use a computer at work?

4. How important is computer use to your job?

5. Do you own a personal computer for use at home?

6. How often do you use email?

7. In what manner are computers important to the future of the Royal Institution?

8. Do you feel that computers could
   a) enhance
   b) hinder
   c) have no effect on
   your daily work?

9. How well do you think you could manage your job without the aid of computers?

10. Do you want to be involved with the new Financial Management system?

    Would seeing financial printouts be helpful to you?

11. Would you like to receive copies of the monthly accounts?

12. Would you like some training in how to use them?

13. Would you like to be involved in setting budgets?

14. Please list any recommendation you have for aspects of the Financial Management system that can be enhanced.

Appendix G: Authors' Notes

Overall, this project has taught all three members of our group valuable lessons. We felt that it was appropriate to share what we have learned in this project in the following section. This experience has affected us all in different ways, due to our majors: biotechnology, chemical engineering, and management information systems.

Marybeth Frantz

As a biotechnology major, I have seen how scientific research can have profound effects on the technological status of the world. After attending the lecture entitled 'The Rise of the Superbug: Apocalypse Now?' at the RI, I have a greater appreciation for how study in biotechnology can benefit the world by finding cures for common diseases. It is amazing to be in the presence of an organization that continues to be a vital part of such important research. Also, after visiting the Faraday Museum, I am amazed at and encouraged by the amount that one person can accomplish in their lifetime. Overall, simply being in the presence of such a unique and prestigious organization gives us all an appreciation for tradition. We are in awe at how such an organization has continued to thrive for two centuries.

Marissa Mertzic

Although this project dealt with financial management and technology within a nonprofit organization, topics not closely related to chemical engineering, it has given me the opportunity to see technology and research as being evident around the world. I, too, attended a lecture at the Royal Institution sponsored by Scientists of the Century given by a young woman chemical engineer dealing with how her field is affected by the ever-

changing world of technology. It has been a unique organization to work with because we were in constant contact with prominent scientific researchers, as well as with the administration of the RI. All of these people maintained the ideals of the RI: to popularize science through lecture series, to continue state of the art scientific research, and to uphold the original intentions set by the founders of the Royal Institution 200 years ago.

John Bird

The Royal Institution is unlike any other organization with which I have ever had the privilege to work. As a Management Information Systems major, I have, and will spend all of my career in corporate America, where motivation stems from profit. It has been an interesting experience to see the inside of a charity, whose mission is to "make sense of science". There is a large difference between any other place I have worked, and the RI. I feel fortunate to have spent at least a little while in the midst of such an organization. I only hope that I can find a career with a sense of purpose comparable to that which exists within the RI.

Concluding Remarks

Finally, we have all gained a better sense of the intricacies of accounting, and have a new-found respect for all that it entails. We also have a better appreciation of group work and what constitutes working closely with other people. As a result of our IQP experience in London, we are more well-rounded individuals, coming away with a profound reverence for the impact that technology has on society.

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