

PROFESSIONALISM AND ETHICS IN THE COMPUTING OCCUPATION

by

Thomas A. Murray

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Department of Computer Science

The University of British Columbia
2075 Wesbrook Place
Vancouver, Canada
V6T 1W5

Date 27 Oct 75

ABSTRACT

This study is concerned with the development of professional conduct and ethical codes in the computing field. An inquiry is made into the general structure of professional organizations and the idea of professionalization. Ethical codes of some professions are examined for their content as well as their role in the development and the identity of the professional society. This, in turn, is related to the principal computer societies of the western world, and to their progress in professionalization and development of ethical codes. The computing professions are found to follow a typical pattern of professional development.

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Those who would have good government without its correlative misrule, and right without its correlative wrong, do not understand the principles of the universe.

- Chuang-tzu

I hold everyman debtor to his profession from the which as men do of course seek to receive countenance and profit so ought they of duty to endeavour themselves by way of amends to be a help and an ornament thereunto.

- Francis Bacon

I believe that by the very nature of their activity the technological intelligentsia do not interfere in the more complicated spheres of social life, namely in ideology.

- Nikita Krushchev

INTRODUCTION

To provide a context for the investigation of codes of ethics of the major computing societies, we will begin with a study of the general nature of professional societies. We will pay special attention to the process of professionalization, because the development of ethical standards, written and unwritten, are an intrinsic part of this process. In the second chapter, we will discuss matters related to ethical concerns that are pertinent to all professional societies: historical development of codes of ethics; the motivations for the development of ethical codes; the content of the codes; and means of enforcement. The final chapter consists of a detailed investigation of codes of ethics proposed by major computer societies in the U.S.A., Great Britain, Canada and Australia.

The computing societies of these countries are developing ethical codes, and guidelines for professional conduct. Existing ethical codes will be examined both for their content and their social implications. We will also consider whether the codes address themselves to issues important to the development of either the profession or of its social consciousness. The efforts of these societies represent the most advanced state of development of such codes by the computing societies of the western world. The societies examined are unquestionably the most significant in their respective countries. However, the situation in Japan has not been investigated, although it is a country whose culture is connected to that of the West.

1. SOFTWARE ENGINEERING AND COMPUTER SCIENCE

1.1 Occupations in the Computing Field

It is clear that there exists a significant effort in the production and use of computer software. Total software costs in the U.S. for 1972 have been estimated to exceed ten thousand million dollars, or 1% of the gross national product of the United States for that year. [15] It has also been estimated that there were 180,000 full-time programmers in the U.S. in 1973 [18] and almost twice that number of full-time computer operators. [16]

The people involved in this software effort may be considered to be those who make up the "computing occupation". This occupation can be broken down into several categories: 1. programmers, analysts, designers, etc., working in commercial, research, university, and government installations, either as employees or as contractors; 2. researchers, teachers, graduate students, and research assistants in the same types of installations, but distributed in different proportions among them; 3. managers and administrators who are in a close working relationship with the above groups and who are somewhat familiar with what programming is; and 4. operators, keypunchers, and other support personnel whose job classification is tied to the direct presence or use of a computer.

Among these groups in the computing occupation, the first may be singled out as a professional group. The attempt in this chapter will be to show that this group, consisting of programmers and others, has the characteristics of a profession at least to the degree that normally warrants such a classification. The second group in the occupation, which may be identified as the scientific arm of computing, must also be considered in a general setting. A sociological basis for the reasons to distinguish it from the professional arm (or, as a loose synonym, the engineering arm) will be proposed. We will discuss ethical standards of the professional group, as well as why a scientific group may not be expected to form a code of ethics.

1.2 Emergence of Professions

Carr-Saunders and Wilson [1, pp. 289-294] provide a history of the professions. They describe a significant movement toward associations that began in continental Europe in the eleventh century, and later spread to England; some of these associations were formed around the performance of specialized functions. The oldest professions of the clergy, law and medicine were formed at this time. The banding together of teachers and students led to the founding of universities. The universities subsequently came under the control of the church, and, as they were the places of training for specialized vocations, lawyers,

physicians, and civil servants were also members of the clergy.

As these professions evolved, they became free of the church; such was the case of the lawyers in Britain in the mid-thirteenth century. Other professions that evolved from the guilds had been at no time under the aegis of the church. As a result of the receding power of the church in England, all of the professions except teaching had been secularized by the end of the sixteenth century. Although the guilds have disappeared, groups that were originally guilds, such as the surgeons and apothecaries, have carried their identity into modern times as professions.

The classical professions formed in this period retain an image to this day of being the only groups that are properly considered as professions. The impression of such organizations as gentlemen's clubs derives from their origins, as Drinker [38, p. 37] has noted in the case of the legal profession.

But this gentleman image is properly associated only with professions prior to the industrial revolution, as noted by Carr-Saunders and Wilson [1] and Vollmer and Mills [9]. In the earlier phases of the industrial revolution, the inventor led the way in founding new crafts upon which professions were built. These crafts took advantage of the concurrent advance of science. As the foundations of science became stronger, the engineering professions developed out of these crafts. The advancement of these technical skills in turn made large scale industrialization possible, which further created the need for other special services, such as accounting, secretarial services, and systems of banking and insurance. None of these

latter professions is characterized by a direct dependence on science - one element which distinguishes them from engineering.

Thus, the professions played an important role in the shape of the industrial revolution, although the capitalist, as their benefactor, is probably the key figure. Looking to the future, one sociologist, Emile Durkheim [3], has predicted increasing importance of the professions; he sees the possibility of the "corporations" (professions) replacing territorial groups as the "elementary division[s] of the state" as "They would be a more faithful picture of the social life in its entirety."

1.3 Defining a Profession; Professionalization

The professions may be divided into three evolutionary groups. The most traditional are law, medicine, and the clergy. Then there are the professions founded on the practical applications of science, e.g., the engineering professions. Finally, there are the professions that arose to meet the needs of the industrial revolution but whose techniques are not founded in science.¹ The standard view of the maturation of professions as given by Vollmer and Mills [9, p. 2] is:

"...when we look at a diverse sampling of occupational groups, we find that many are assuming, at least in rudimentary form, some of the characteristics commonly attributed to the traditional professions. Furthermore, we find that many groups usually considered within the context

¹ For reasons discussed later, this presentation does not consider scientists as a professional group; this is a result of the definition of a profession that will be used.

of the traditional professions fall short of the professional model in significant respects. Therefore, it seems more useful to describe the characteristics of occupational institutions in terms of the concept professionalization [emphasis in original], assuming that many, if not all, occupations may be placed on a continuum between the ideal type "profession" at one end and completely unorganized professional categories, or "non-professions", at the other end. Professionalization is a process, then, that may affect any occupation to a greater or lesser degree."

Summaries of the characteristics of the professions are given by Cogan [2], Greenwood [41], and Goode [42]. On the basis of these, professions may be said to have the following distinguishing characteristics:

- (i) A practically applied technique based on a systematized body of knowledge, a facility in which is required of practitioners but is not expected of laymen.
- (ii) Mechanisms for the control of training and entrance requirements of aspirant professionals, and for maintaining the technical competence of its members.
- (iii) Respected standing in the community, which sanctions both its role in the training and discipline of its members, and its ability to be self-policing in the area of incompetent, unethical, or unprofessional behavior of its members.
- (iv) Formal statements of its rules of professional behavior and ethical conduct. These codes also serve as instruments of self-perpetuation of the profession.
- (v) A service orientation, sometimes with an altruistic content, the intent of which may be anything from blatant status seeking to a sincere desire to provide an essential service to the community.¹
- (vi) A professional culture, as discussed by Greenwood, whose values, norms, and symbols distinguish it from the other professions.

In addition to the above there has emerged a modern day concern for the social responsibility of a profession and its members. Although this attribute is not usually stated by

¹ Noting, however, "While the service ethic may be an important part of the ideological role of many professional groups, it is not so clear that the practitioners are necessarily so motivated." [4, p. 25]

sociologists to be one of the defining elements of a profession, it is nonetheless assuming a salient position among the concerns of some contemporary professional organizations.

Even with the device of professionalization being used, there would seem to be some inadequacy in the ability to characterize the evolution and identity of professions. For instance, professionalization is assumed in most authors' presentations to have an inevitable dynamic quality, which predicts that an occupation at the completely non-professional end of the continuum will naturally evolve, at however slow a rate, to a traditionally professionalized type. In specific cases this is hard to foresee; one might ask if a specialized body of knowledge, for instance, will ever be essential to the functioning of the members of a labor union composed of manual workers.

Cogan [2] has suggested that the "confusion" in defining a profession "...appears to derive in large part from the difficulty of communicating ideas when a single term [profession] is used to reference disparate referents." Three different levels of definition are suggested:

(1) Historical and lexicographical: Defining a profession in terms of the attributes of the traditional profession. (This is the type of definition that has been used in the preceding.)

(2) Persuasive definitions: Redirecting the attitudes of the members of the profession to convince them of the necessity of maintaining high educational and ethical standards.

(3) Operational definitions: These "...are guidelines for the practitioner as he faces the day-to-day decisions of his work. They are, for example, the rules of professional conduct; they mediate the practitioner's relations to his client, to his colleagues, to the public, to his association. They set forth the specific criteria of general and special education for the professional, the requirements for admission to practice, the standards for

competent service."

However, one should note that these definitions are usually characteristic of the type of group that is represented by the person proposing them. The first is the sociologist's view; the second is often the product of spokesmen of the more established professions, and reflects the desire for preservation of a power status of the profession; the third is the concern of all professions. Examples of the third are to be found in the American Bar Association's Codes of Professional Responsibility [28] and a book-length collection of hypothetical case studies of professional conduct, based on the codes of the engineering profession. [27] It is not clear that by the statement of these definitions any confusion (inadequacy or ambiguity might have been a better word) has been removed; the reader not aware of the typical sources of these definitions would be left with a false impression of the subject.

One further element of professionalization will be proposed in Section 2.3.

1.4 A Critique of Professionalization

The preceeding section has presented a summary of the most common view of professions as social groups that is to be found in the literature. A critique of these views is given by Johnson [4], revealing weaknesses in these definitions which the reader may already have noticed. Johnson subsequently provides an

alternative framework for the discussion of the professions. His own summary is:

"[W]e have concluded that the concept of professionalisation and its end-state, professionalism, are based upon models which are an abstraction from the core 'elements' which are most fully exhibited by the 'true' professions. This approach has been supplemented in the literature by a functionalist model which stresses the functional value of professional activity for all groups and classes in society and in so doing excludes from consideration the power dimension, which in turn suggests possible variations in the institutionalised forms of control of occupational activities. Neither approach is likely to provide the means of analysing real variations in the organisation of occupations in culturally and historically distinct societies. The concept of professionalisation itself is a straight-jacket imposing a view of occupational development which is uniform between cultures and unilinear in character. As a concept it does not provide the means by which we might identify the structural bases for variations in occupational control, except insofar as they are deviant from the expected progression towards professionalism. Finally, a major weakness of attempts to derive theoretical statements about professional occupations has been the confusion which exists over what the object of study actually is - an occupational activity or the institutionalised form of control of such an activity. In accepting the professions' own definitions of themselves, sociologists have tended to accept that a peculiar institutionalised form of control is the essential [emphasis in original] condition of such an occupation rather than being a peculiar historical product which can be said to have existed for a very short period and was a product of the specific historical conditions of nineteenth-century Anglo-American culture."

This critique is based on what Johnson believes to be a serious omission from most theories of professionalization:

"[I]n attempting to reconcile the inconsistent interpretations of the social role of the professions, the theory of professionalisation has excluded...the attempt to understand professional occupations in terms of their power relations in society - their sources of power and authority and the ways in which they use them."

Johnson presents a typology through which we "...may eradicate the limitations inherent in the view that all

occupations may be placed on a single continuum and are developing toward a uniform end state."¹ Noting that there is an "irreducible but variable minimum of uncertainty in the producer-consumer relationship, and, depending on the degree of this indeterminacy and the social structural context, various institutions will arise to reduce this uncertainty"; and that "Power relationships will determine whether uncertainty is reduced at the expense of the producer or the consumer", he describes "three broad resolutions of the tension existing in the producer consumer relationship":

1. Collegiate control, in which the producer defines the needs of the consumer and the manner in which these needs are catered for. Subtypes are professionalism, as normally described for a mature profession, and the guild system.

2. Patronage, and communal control, in which the consumer defines his own needs and the manner in which they are to be met. Subtypes of patronage include oligarchic patronage, such as when there is an aristocratic patron or oligarchy as the major consumer; and corporate patronage, as is the situation of accountancy in present day industries. Communal control is exemplified by the current activity in consumer politics.

3. Mediative, in which a third party mediates in the relationship between the producer and the consumer, defining both the needs and the manner in which the needs are to be met. Forms of this include capitalism and state mediation.

We shall find Johnson's critique of value in later treatments of the character of occupations, including the computing occupations.

¹ As he presents the typology, he uses the phrase "in a more developed form" at one spot where he is apparently presenting the beginnings of what he intends to be a more comprehensive treatment, yet to come.

1.5 Sociological Distinction of Science

Scientists also comprise occupational groups, but we should want to make some statement on whether or not they should be considered a professional group before proceeding to make any comparisons or contrasts of scientists to other occupational groups. This could be done by determining the degree to which science exhibits the attributes of a profession as presented in Section 1.3. As noted, scientists are not usually categorized as professionals by the sociological sources cited in Sections 1.3 and 1.4, whereas engineers are invariably so classified. It is of course not adequate to argue that scientists, in not being behaviorly identical to professional engineers, should not be considered a profession by this distinction alone. The omission of science from the category of professions is not without basis, as there are to be found qualities of professionalization that scientists do not exhibit, as well as basic differences in their functioning as a social group vs. that of engineers. The part of the following presentation that deals with the distinctions of scientists and engineers will be used to provide a theoretical framework with which to characterize the current composition of the computing occupation.

In describing whether or not science meets certain characteristics of professionalism, we must be sure to distinguish whether or not it is a condition that will never be met through the process of professionalization. Referring to the criteria of professionalism given in Section 1.3, the only quality which science will clearly never meet is that its

technique must be applied in a practical manner. Application begins to occur with the applied scientist and the professional. It also seems certain that science will never develop a service attitude that is provided on a practitioner-client basis, nor one that is directed to the wider community, outside of the occupation. Storer notes this [8, p. 16], and in fact, he sees it as a basic difference between science and the other professions. He refers to science as a "non-service profession"; it has a creative component that is found in the other professions, but it does not serve the needs of the layman directly and has a lack of concern for the utility of its product. Though he acknowledges that these contentions apply only to a central core of pure researchers, he asserts that such value structures are at least partially infused into the scientist whose work may have a practical application.

This lack of service orientation does not seem to preclude a social conscience, however, as has been noted by the American Association for the Advancement of Science Committee on Human Welfare. [32] This may mean that the lack of interface between scientists and the wider community is diminishing, though not as a result of the professionalization process. More likely, it is a result of a form of communal control (see Section 1.4) - a reaction by the scientist to the demands of an increasingly informed and concerned populace, even though there exists a lag in the public's understanding of the importance of science in the social structure. We have a case where the traditional discussions of professionalism would incorrectly describe the changes that are occurring in some occupational groups, in this

case science, vis-a-vis the community at large. That the increasing contact of science with the community is a process not properly described by the traditional mechanisms of professionalization provides another reason for science's failure to satisfy the definition of a profession.

The fact that there is a lack of a formally stated code of ethics for scientists in general, as noted by Cranberg [33], and that there are no qualifications exams or certification or licensing requirements for scientists, indicates also that science does not fully meet the lexicographical definition of professionalism. Most importantly, there is a fundamental difference in the operational characteristics of science that sets it outside of the normal mold of professional groups. It is that the consumer-producer relationship that Johnson describes (Section 4.1) is entirely internal: the scientist is both the producer and the consumer; he works within a community which both provides the product and uses and evaluates it, with no reliance on outside sources for evaluation. The analysis for this contention is provided by Storer [8, p. 77], for which he credits in large part Robert K. Merton's conceptualization of the norms of science.¹

In Storer's development, although both science and engineering are typified as "creative professions", they are distinguished by "the nature of the creative product" and by the

¹ See for instance Merton, R.K., The Sociology of Science. Theoretical and Empirical Investigations Edited and with an introduction by Norman W. Storer, The University of Chicago Press (1973), which contains a historical trace of Merton's work and excerpts therefrom.

audience to which the product is appropriately directed. A less concrete product is more reproducible, and is thus more easily evaluated by a collegium of experts; this situation is typical of the product and social organization of the scientific community. The generation of tangible products, which are produced for an outside group that is not expert in the production of the product, is typical of the professional function of engineers.

Storer states that scientists make up a self-contained social group, and, using an exchange model of social systems, he notes that the most important exchange commodity of scientists is professional recognition. Thus, all reward comes from within the social group. By contrast, Storer does not consider engineers to make up a social group, in part, because they do not have an internalized exchange commodity. The engineer does not have his colleagues evaluating his work, but sells it to a lay public.

The observation that the exchange system of science is internalized leads also to the conclusion that the consumer-producer relationship that Johnson is concerned with would have to be completely internal in the case of science. This situation is one that cannot be included under any of the occupational group classifications that Johnson proposes, so we have another formalization by which science fails to meet the definition of a profession.

It should be made clear, nonetheless, that elements of social behavior peculiar to science may or may not exist in the professions. Johnson [4, p. 56] notes that colleague evaluation

exists within the collegiately controlled professional type, and that it is the basis for prestige within the occupation. But this does not mean that in such a profession the consumer-producer relationship must be totally internalized. So long as the profession asserts a service orientation, much of its behavior is directed toward that end, indicating a primacy of interest in the client as consumer. We may even doubt that technical recognition within a profession is as important as Johnson suggests.

1.6 Situating Computer Science and Software Engineering

We have now laid the foundation to support the contention of Section 1.1, that within the computing occupation there is both an identifiable professional group and scientific group. It is clear that there has evolved an engineering branch to computing, called software engineering, as has been noted in a short history provided by Bauer ([12] and [13]), and as is exemplified by an important early conference on the subject. [20]

There is a parallel in the evolution of software engineering and the other engineering professions, in that they all have scientific foundations. In the case of software engineering the time scale of development has been severely compressed, a situation which may account in part for the failure of spokesmen in the field to appreciate the existence of both computer science and software engineering. The evolution of

software engineering has been reflected in the changing composition of the Association for Computing Machinery, the largest association of workers in computer programming and research fields in North America. Finerman [17] has noted that the Association was originally established by and for computer scientists, but that the membership is now tending to have an increasing number of applied practitioners.

We must be careful to understand that we are not asking how a profession can be formed. The development of software engineering as a profession has already begun without an act of will on the part of some occupational group. An occupational group does not simply turn itself into a professional group, despite the claim of the current president of British Computer Society [99] that they have achieved just that. A process of earning respect and of instilling a professional attitude into its membership must occur before the actual social status of an established profession is achieved. The questions to be asked concerning professionalization in software engineering are, what is the role of software engineering to be in society, and in turn, what kind of constraints will society place on it? The answers to these questions will be influenced by the service the profession provides and its consciousness of social responsibility; and the type of occupational control that will be placed on it. Underlying these questions is the concern for what the internal social structure of this new professional group shall be; i.e., to what degree does or will it exhibit the various properties of professionalization? These latter concerns are the ones most often raised by spokesmen within the

profession.

One point to be made concerning the state of development of software engineering is that it has a long way yet to go to complete the process of professionalization; usually this statement is made with some comparison to another technically based profession in mind. Such is the attitude expressed by Finerman. [17] Expressions of concern for the professional status of programmers and others are to be found among the earliest publications of the ACM and continue to the most recent. In late 1971, the Wage and Hour Division of the U.S. Department of Labor [24] decided that in most cases computer programmers and systems analysts do not have the same occupational requirements that are typified by other occupations which it regards as professions. Discriminants for this decision included whether the work is directly related to management policies of general business operations; the discretion and independent judgement that is required of the worker; and whether or not computing is to be considered a learned profession. In the case of the computing profession in the United States, all of these were deemed as not being exhibited to the extent typical of other occupational groups that the Wage and Hour Division has classified as professions. Their conclusions were based on information provided in statements made to a hearing on this matter, as presented by employer, employee, and occupational group representatives, including testimony of Walter Carlson. [16]

In the time period of the publication of the Communications of the ACM there are, however, some indications of positive

thrusts in the direction of professionalism. Notably, there was the establishment of membership standards, in a weak form, and two versions of a code of ethics. In the following we examine these and other developments in software engineering that may be considered as professionalizing attributes, often using the ACM as the example.

1. Occupational control. Four institutions are identified by Finerman [17] as being responsible for whether or not the practitioner is regarded and accepted as a professional. These institutions are the academic, industrial, governmental and professional groups. Finerman discusses the academic group only for its role in education, and this aspect will be considered in item 4 below. He contends that industrial employers "exacerbate" the problem of a low professional opinion of programmers. The employers' actual view may be shown, however, in the fact that junior programmers, programmers, and senior programmers are considered professional¹ in respective proportions of 58%, 77% and 87% in one survey.² [22]

At present there is no governmental control of the computing professions in the U.S., but there is increasing concern that some form of licensing will be imposed (e.g., [58]). There may be some basis to support licensing as a desirable and necessary step in professionalization.

The occupational control aspect of the computer profession

¹ On the basis that the employer considers them exempt from the provisions for overtime of the Fair Labor Standards Act, a classification that is based on the employee being in a "bona fide... professional" position. [24]

² The survey received 347 replies from the Fortune 1000 corporations at the time of reporting.

is presently under the predominant influence of the employer-employee relationship. The attempts to convert to a more traditional image of a professionalized society is thus not likely to occur while the most significant number of practitioners remain employees rather than, say, independent consultants.

2. Ethical and professional practice codes. For these to become a viable component, the professional society's enforcement of them must have the respect of the employer group as well as the sanction of the law. At present the Association for Computing Machinery has an ethical code, but no enforcement procedure. There are no evident indications that any employers have given recognition to this code, nor to the code of the British Computer Society in England.

3. Systematized body of knowledge. The recent emergence of computing technology and its relatively high rate of change have produced a situation where a stable body of knowledge has not been accumulated. There is no foundation to which the practitioner can refer in standard cases for making technical decisions, although there are some areas in which there is accumulated experience. The widespread interest now being shown in structured programming¹, the first unified and self-consistent technique for program generation to receive wide attention, is a promising development. A stabilization of the technology will have to occur for a body of knowledge to be

¹ Based primarily on the work of Dijkstra; see Dijkstra, E.W., "Notes on Structured Programming" in Dahl, O-J; Dijkstra, E.W. & Hoare, C.A.R., Structured Programming Academic Press, New York (1972).

identified. It is hard to predict whether this stabilization will precede, or be a result of, the development of a body of knowledge. This will depend on whether the scientific branch of computing tackles successfully problems that have practical applications, which would result in the accumulation of the body of knowledge first; or whether the applied practitioners must arrive at the needed techniques in a somewhat empirical fashion.

4. Training and education. In 1971 in the U.S., accreditation guidelines existed only for private EDP schools, and there were nonetheless more than 700 such private schools selling instruction in data processing with no accreditation by authorized bodies. [16] The larger portion of information processing personnel who are members of the American Federation of Information Processing Societies' (AFIPS) constituent societies have received their training from other than university education. [10] A former ACM president, Walter Carlson [16], has expressed the opinion that, given the context of a rapidly changing technology, "...the concept that a prolonged and specialized course of instruction can provide a lasting intellectual foundation for productive professional performance is not valid and, in fact, [is] misleading." But he also feels that "the inability of objective tests to quantify programmer skill levels may merely indicate that the intellectual requirements for programming are highly individual - the hallmark of a professional person." This would seem to conflict somewhat with the idea that a profession's technique is based on a uniform foundation and is consistently applied. His statement might be considered a rationalization of the

immaturity of the profession; he might rather have indicted the testing process. Bauer ([12] and [13]) has emphasized the importance of the education process for professional entrants if the techniques of software engineering are to advance, to the extent that he places no faith in the ability of the bulk of the existing programmers to participate in the utilization of newer techniques.

5. Entrance to the profession; membership classification. At present, acceptance into regular membership by the ACM requires only the endorsement of two other regular ACM members, plus either a university degree or four years experience in the data processing field. The statement on the back of the membership card reads:

"Persons qualified to be Members are those who subscribe to the purposes of the Association and have attained a professional stature by demonstrating intellectual competence and ethical conduct in the arts and sciences of information processing."

In point of fact, this is a false statement, as the lack of stringent entrance requirements as well as the lack of an enforcement procedure for the ethical code of the ACM evidence. Much will have to be done in this area before this facet of professionalization matures. Typical requirements on entrance are: specific educational background from an accredited institution, entrance testing, and in many cases, state controlled licensing. This is another area where the employer will have to endorse the validity of such qualifications as indicators of professional competence.

6. Service orientation. The fact that most computing

practitioners work as employees in industrial type situations would seem to preclude the emergence of a service orientation toward individual clients. Again, this is an area where imposing it as a requirement of professionalization ignores the type of occupational control that obtains.

7. Social responsibility. While the computer practitioner may not deal as an individual with clients, the profession as a whole, if it seeks to identify itself as a distinct occupational group, automatically assumes responsibility for the social effects of its technology. One might anticipate that this places computing in a particular bind: on the one hand, it is industry, as the controlling occupational group, that actually steers the course of this technology; on the other hand, the profession has achieved sufficient identity that it becomes the potential scapegoat for the ill effects of this technology. A survey conducted by the American Federation of Information Processing Societies and Time magazine [11] seems to indicate that the programming profession is in fact in no bad straits on account of this situation. The general public attitude toward members of the computing profession is favorable. Although there was endorsement of strong government regulation of computers, there was no question posed on regulation of practitioners. The public's perception of problems in computer billing seems realistic in usually ascribing the cause to personnel faults.

There are serious indictments of the social responsibilities of the professions. In discussing responsibility to the community, MacIver [6] asserts, "The group code has narrowed the sense of responsibility by refusing to

admit the application of its principles beyond the group." Robert Merton, as quoted in [4], makes a strong indictment of engineering professions, which software engineering parallels, in accusing their practitioners of having a "trained incapacity for thinking about and dealing with human affairs", a result of a "social perspective [that] the engineer derives from bureaucratic employment as well as a high level of functional specification within the profession." The task for software engineering does not appear to be easy.

In Section 1.5 we made a theoretical distinction between science and engineering. Identifying and describing the scientific branch of computing would not be an easy task, nor one that is relevant to a discussion of professionalization. It is sufficient to note that the professionalizing attitudes have been motivated by a concern for the applications of computing. Even though it is often those normally identified as computer scientists who express a concern for professionalism, they have done so only where the practical applications of their work have become significant. That is, once a part of the computer scientist's work has entered the realm of engineering practice, the concern for professional responsibility by the scientist follows. Thus, in the attempt to identify the degree to which software engineering is professionalized, we have effectively done so for anyone in the field whose work has practical application. We could say that when the computer scientist's work is directed toward practical application, he is actually functioning as an engineer. In the remainder of this dissertation we will not explicitly distinguish computer

scientists from software engineers, but will treat all of those whose work has practical application as members of the computing profession.

2. CODES OF ETHICS AND PROFESSIONAL PRACTICE

2.0 Introduction

At the outset we want to make the distinction between what we call a "code of ethics" and a "code of professional practice", such as is provided by Millerson [7, p. 149]. An ethical code prescribes the relationships the professional is to have with the various groups he interacts with in his practice. The code of professional practice specifies the proper technique the professional should use in the application of the technical aspects of his craft. In actual professional codes this distinction is not usually made, and to a certain extent, cannot be. For instance, the professional's exercise of his craft cannot be specified in the finest of detail, so his own value judgements, perhaps as guided by the ethical code, will enter into his work. The distinction between the two types of codes is made here only to provide two larger categories for the following examinations of codes of various professional societies.

Unless specifically stated to be a code of professional practice, we will usually encounter a code that is primarily of the ethical type, and refer to it variously as an ethical or professional (omitting the word practice) code. There is little apparent activity in the promulgation of professional practice

codes, so they will not be treated in this chapter. In examining the ethical codes of several professional societies, our objective is to identify general characteristics with which to build a framework for the discussion of the development of such codes in the computing profession.

2.1 Some Histories and Motivations of Professional Codes

The first code of the American Medical Association was written in 1848, being based on Sir Thomas Percival's Medical Ethics of 1803. The latest revision noted was in 1949. [40] In the history of American professional associations, it is one of the earliest of ethical codes to be adopted. Many others were introduced at the turn of the century. The American Bar Association (ABA), founded in 1878, adopted its own code in 1908. The earliest state bar association to adopt a code was Alabama, in 1887, being based on a series of lectures delivered at the University of Pennsylvania in 1854. [38] The latest form of the ABA code was adopted in 1970; the ABA also promulgates a code for the American Judiciary, first adopted about 1925 and last revised in 1972. [28] The Canadian Bar Association (CBA) adopted its Code of Ethics in 1970, at its fifth annual meeting. [44] The first code for public school teachers was adopted in 1896 by the Georgia State Teachers Association. The National Education Association (NEA), the primary national organization for school teachers in the United States, first adopted a code in 1929. [45] The first ethical code for architects appeared in

1917 [36], and for accountants in 1918. [30] The earliest code for engineers was that of the American Institute of Electrical Engineers of 1912; a code was adopted for civil engineers in 1927. Most of the existing codes of the various engineering societies bear agreement with the code of the Engineers Council for Professional Development (ECPD), which was adopted in 1947. [46]

The references cited in the previous paragraph do not provide detailed information on the motivations for adopting these codes, nor the historical climate surrounding their implementation. Statements on the adoption of ethical codes are typified by the following:

"The principles [of conduct for Architects] ...doubtless were stated in an endeavor to uplift the level of professional performance, to assure the public of our professional integrity as well as of competence, and to raise a standard of ethical conduct to which all architects of good will might repair." [36, p. 12]

Our own investigations show that the control of internal professional discipline is indeed the primary objective. The professions often claim that this is necessary to protect the client. However, some professions have a monopoly on the service they provide, and may also be in a position to exert strong control over its members. They may require members to provide standard services at minimum fees. Inasmuch as their ethical codes can become instruments of status maintenance, we should not accept unquestioningly their own statements on the role of their codes in regulating the profession.

Sometimes a crisis motivates the profession to reappraise or initiate the ethical or professional practice code. It may be

that the same "software crisis" that aroused the need for software engineering (Section 1.6) is simultaneously motivating computer societies to initiate such codes. The medical profession was traumatized by the Nazi atrocities of World War II, leading to the adoption of the Declaration of Geneva in 1948, which "was a restatement in terms of Twentieth Century experiences of the Hippocratic Oath." [29, p. 64]

2.2 Examples of Codes of Some Professions

We will now outline the codes of the primary professional organizations for law, medicine, architecture, accounting, and engineering in the United States, as well as providing some comments on those of the Canadian and British Columbian Bar and the British Columbia College of Physicians and Surgeons. Our emphasis on professional societies in the United States is due to the availability of reference materials as well as the fact that the most significant computer society we will be discussing is the United States based Association for Computing Machinery. The professions discussed differ in maturity and in types of occupational control, and their respective codes strongly reflect this situation. These codes are concerned with practical ethical standards. If we categorize codes on the basis of the what groups certain responsibilities are addressed to we find that they deal with the relations of the professional to his primary occupational control groups, generally being clients and employers. Of secondary importance are stipulations on the

relations among professionals, which deal with maintaining the integrity of the profession and the respect of the public. The only other general sentiment that appears with any regularity in the codes examined are those that remind the professional of his responsibility as an individual to the community in which he functions.

Codes may alternatively be categorized on the basis of the area of professional practice prescribed. Categories could include 'business practice', which encompasses all stipulations associated with the practitioner's operation of a business enterprise, his functioning as an employee, and his relations to his colleagues. This category is deemed to encompass, then, those rules that govern the day-to-day functioning of the professional. The category of 'technical practice' is used to include those items which stipulate the form or the level of the practitioner's technical performance. Some of the items categorizable under this heading are of sufficient detail to be considered appropriate for inclusion in a code of professional practice. Since there will be very few of these, however, they will not be given special treatment here. The two functional categories of business and technical practice are supplemented as necessary with categories from the previous classification.

The Code of Professional Responsibility of the ABA [28] is of elaborate structure. The nine Canons state general standards of professional conduct. Each Canon contains several Ethical Considerations, for guidance in specific situations, and

associated Disciplinary rules¹, which are mandatory minimum levels of conduct. The code is comprehensive, and has the advantage of a long term conscientiousness for its development. It is heavily supported by specific citations to the ABA Committee on Professional Ethics Opinions, previous codes of the ABA, law journals, and case and statute law. This extensive referencing in the code is itself unique among those examined, although other professions have published separate collections of real and hypothetical case deliberations. The primary motivation for the code is provided in the statement:

"[I]n the last analysis it is the desire for respect and confidence of the members of his profession and of the society which he serves that should provide to a lawyer the incentive for the highest possible degree of ethical conduct."

The ABA code states that it defines relationships of the lawyer to the public, to the legal system, and to other members of the profession. This statement omits that the code also defines duties of the lawyer to his clients, which considerations, in fact, occur more than any other. The ABA code is characterized by a redundancy, under different Canons, of some of its EC's and DR's. This seems to serve the purpose of reminding practitioners that they have the same responsibilities in several different contexts. Detail in the ABA Code of Professional Responsibility can be pretty thorough, such as in DR 2-102, which describes the specifics of the contents of

¹ References to specific Ethical Considerations and Disciplinary rules will be of the form EC num1-num2 and DR num1-num2, where num1 is the Canon number under which the EC or DR is found, and num2 is a specific suffix to the EC or DR.

letterheads and business cards, among other things.

Serious weaknesses occur in the code, such as its rationalizations of contingency fees, which read as though the finances of the lawyer are of primary interest. This situation occurs at the expense of the presumed service ethic of the profession. What the ABA code does assure, with its details on forms of business practice, is a certain level of etiquette in the profession. The wary client can at least know what the expected professional behavior of the lawyer will be, whether or not the client feels that it is a standard meriting respect.

Finally, we should note that the ABA code states responsibilities of the lawyer to the judiciary, and to the employees of the lawyer. These and the previously noted groups - the public, the legal system, other lawyers, and clients - all play some role in the occupational control of the legal profession. Primary control of the day-to-day mode of operation is probably the result of the standards of the bar association represented by this code.

Viewing the ABA code under the classification of the form of professional practices prescribed reveals an overwhelming concern for business practice. There is a virtual absence of items concerning technical standards.

The Canons of Ethics of the Canadian Bar Association, (see Orkin [44]), which is adopted unchanged by the Law Society of British Columbia [43], is a much less elaborate instrument than that of the ABA. In the case of British Columbia, the Professional Conduct Handbook (in [43]), presents Canons and contains another section that may be identified as a code of

professional practice. The latter complements the Canons, and the two sections together effectively yield a statement as comprehensive as that of the ABA's code. Orkin also provides many references to legal cases on the professional behavior of the Canadian lawyer.

The major headings of the CBA Canons prescribe the duties of the lawyer to the state, the court, clients, colleagues, and the lawyer himself. Although the Canons are stated as a general guide, they are presented with the admonition that they are not to be construed as allowing unprofessional behavior in areas not specifically covered. The British Columbia Law Society's Professional Conduct Handbook has extensive statements on the solicitor-client relationship, advertising by lawyers, relationships among solicitors, conduct of the lawyer as counsel, duty of the lawyer to the Law Society, and a general catch-all section. Many of these rules, of course, describe standards of business conduct.

The Principles of Medical Ethics of the American Medical Association, as reproduced in Fitts & Fitts [40], is of a simpler form than the code of the ABA. Certain matters of substance, such as the conditions of gratuitous service for fellow practitioners, are geared to the nature of the profession. The groups to whom responsibilities are designated are easily identified by the chapter headings: to clients, to the profession and other doctors, to the public, and a general statement reflecting relations to all of these. A reading of the code will reveal that the most detailed sections are those that define relations of the practitioner to the profession and his

colleagues. The implications of this are that the profession concentrates in this area because of its belief in the essential role of business standards in maintaining ethical and professional behavior. This may also be a result of it being easier for the profession to deal with the more immediate problems of the internal professional relationships. If either is the case, as they may also be for lawyers, it suggests that professionals must make a special effort to identify their external relationships to the wider community.

The AMA code is not without deficiencies. Notably, there is the absence of any statements of the duties of the physician in a time of war.

Although an ultimate ethical mandate is not stated for the physician, his primary responsibility seems to be toward the patient. This stands in some contrast to the statement of the ABA code that the basic commitment of the lawyer is "the desire for the respect and the confidence of his profession and the society which he serves." It might not be fair to accuse the ABA of making the interests of the client secondary, as the bulk of their code is concerned with the client, but the true thrust of their code remains unclear.

The Code of Ethics of the College of Physicians and Surgeons of British Columbia [31] parallels the AMA code somewhat in style and content, though in less detail. There are sections covering duties to the profession, to other physicians, and to patients. There are also sections of equal status that cover more detailed aspects, including one that prohibits members from performing non-therapeutic abortions. There are

several sections that deal with the business practices of doctors, all being in the same vein as the stipulations of the AMA code.

Architecture is a profession that exhibits both traditional features and a relationship to science. In examining its code of ethics we find one of simpler form than the two previously discussed. In fact, it may be that there is some correlation between the age of a profession and the complexity of its professional code. The examples considered here tend to support this observation. Furthermore, it is clear that the older professions have stronger ruling groups, capable of dictating details of professional behavior. There is also the simple accumulation of experience of the older professions, which could be reflected in their codes.

The Standards of Professional Practice of the American Institute of Architects, as reproduced in Cummings [36], are stated in two sections. They include "Obligations of Good Practice" and "Mandatory Standards", though it is not clear from Cummings if only one or the other of these two sections are enforceable under the disciplinary procedure. Considering both groups together, the bulk of the total of 26 items are concerned with the responsibility of the architect to his colleagues and to the profession as a whole. Second in concern is the relationship to the client. Lesser consideration is made of responsibilities to the public, the law, contractors, and employees. Recategorized, these items are heavily weighted toward defining business practices and relationships, with only one item being concerned with technical performance.

Wagner [46] notes that there there are more than 100 societies representing the various specialties of the engineering profession, there being no single code pertaining to all the branches within engineering. Wagner gives two examples, those of the American Association of Engineering (AAE) and the Engineers' Council for Professional Development (ECPD). As many engineering societies have adopted this code, we will use it here as a representative example for the engineering profession.

Neither the code of the AAE nor that of the ECPD has any of the supportive annotation that the Code of the Professional Responsibility of the ABA has. There is separate supportive documentation, as in a 1927 publication of the AAE, The Engineer and His Ethics, a codification of the AAE's Practice Committee decisions. The work of Alger, et. al. [27] is a more recent and extensive collection of actual and hypothetical situations that may be encountered by engineers. This book was supported by several engineering societies, including the ECPD.

In the ECPD Canons of Ethics for Engineers, entries are collected under major headings of several groups, such as clients, employers, or colleagues, to which certain responsibilities are assigned. The breakdown is similar to the code of architects, primary concern now being about equally divided between relations to client and employer and relations to colleagues. Several items are also included on the engineer's responsibilities to the public and to the profession itself.

Using the alternative categorization, the bulk of the items relate to the day-to-day business practice of the engineer. It is surprising that there were no items to be found that could be

classified as statements placing demands on the technical performance of the engineer, and that for such a fragmented profession, there were a reasonable number of items attributing responsibility to the profession.

Nowhere in this code is there a clearly stated ultimate mandate on the conduct of the engineer. It is not clear whether it is intended that his ultimate responsibility is to the client, the profession, or some other group. The most significant change in the content of this code from those previously examined is the equivalence of the employer to the client. The latter had been considered the more important in the other codes, if considered at all. This is clearly a result of the fact that a significant proportion of engineers engage in practice as employees, on a salaried basis. We can't tell from our reference if the employer of engineers endorses the stipulations of this code, or if there are any engineering branches for which membership in the corresponding society is required for employment in that speciality. The establishment of the respect of the employer group for a code of ethics is critical to its viability when, as is the case here and for computing practitioners, the majority of them are employees rather than independent practitioners. Unfortunately, we will find no comment on or evidence of situations where employers have taken recognition of such a code.

Carey [30] discusses the Rules of Professional Conduct of the American Institute of Accountants as the primary aspect of the ethics of public accounting. The other aspect is more akin to a code of professional practice. It consists of collections

of regularly issued statements on generally accepted accounting practice.

The Rules of Professional Conduct of the AIA, then, is its ethical code. The ultimate ethical mandate is asserted by Carey to be found in the concept of independence, meaning that the accountant must be independent in his work from the influences or the interests of others and his own personal interests. Although this allows personal discretion to enter into the accountant's work, there are objective standards in the code and among the generally accepted procedures of accounting practice.

This code states the obligations of the accountant to the groups of their clients, the profession, and their colleagues. Carey claims that the accountant has responsibilities to the public, but nothing explicit of this nature is found in the Rules. It nonetheless is present indirectly, in that assuring the competency of an audit statement gives the general user a degree of assurance that the audit is competently prepared.

Since there are only a few items addressed to responsibilities to the public or the profession, our alternative classification would place the bulk of the code under the heading of business practice. There are also no statements of technical competence to be found in the code.

2.3 Enforcement of Codes of Ethics

There may be only one significant problem facing a professional society that wants to enforce its code of ethics,

this being, what is to be the legal sanction for enforcement. Both sociologists and spokesmen of the professions, especially of those professions which do not yet have an enforcement procedure, usually imply that the mature professions enforce their codes autonomously. Investigations of actively enforced disciplinary procedures in the United States, such as those of the societies covered in the preceding, reveal that the profession does not have power of its own to effect a disciplinary procedure. Rather, it is the state which retains this power. Millerson [7, p. 171] claims that in Great Britain, professional societies that are chartered by an act of Parliament have the power to enforce their disciplinary procedures, but that no other British professional societies can do so. There seems to be no equivalent in England to the state and county boards of registration of the U.S, or the Provincial boards in Canada.

In the case of the American Bar Association, the court holds ultimate authority over the discipline of lawyers. The local bar association makes an initial investigation of a complaint, but their finding is referred to the court for adjudication. Drinker [37, p. 27] cites a court ruling that gives a clear picture of the actual efficacy of a professional code in the U.S.:

"The American and state bar associations are not legislative tribunals, and their [codes of ethics] are not of binding legal obligation and are not enforced as such by the courts, although they constitute a safe guide for professional conduct in the cases in which they apply, and an attorney may be disciplined by this court for not observing them."

The authority of the Court is not so clearly stated in

Canada, as much disciplinary authority has been relegated by statute to the Benchers (i.e., the ruling body) of the Provincial law societies. Orkin [44] notes that in many provinces the joint action of the Benchers and the court is needed to prohibit a lawyer from practice. Nonetheless, the court traditionally maintains summary jurisdiction over lawyers, apparently despite statute but not in conflict with the intent of the law. Since the court maintains this summary jurisdiction, and since there is an effective fusion of the barrister and solicitor roles in Canada, the ultimate disciplinary situation is akin to that of the United States.

More typically, the discipline of professional society members in the United States is carried out through some administrative branch of government. The AMA's Judicial Council does not seem to have the power to remove license. Rather, this power is vested in a local registration board, it seems, although neither Fishbein [39] nor Fitts & Fitts [40] are specific on this. For architects, Cummings [36] specifically notes that the states have the power to "revoke, suspend, or annul a license, or to reprimand, censure, or otherwise discipline the architect." Wagner [46] writes that the decentralization of the engineering profession prevents the adoption of an enforceable codes of ethics, not recognizing the importance of state licensing bodies as the ultimate enforcers of professional behavior. He does note that the effectiveness of such bodies has been hampered by a lack of financing and by the reluctance of engineers to report misconduct. Finally, Carey [30] notes that neither the national nor the state accountancy

boards have the right to suspend or revoke the licenses of Certified Public Accountants, and that this power lies in the state registration boards.

The summaries of professionalization in Section 1.3 recognize the situation where professions in the United States do not have ultimate control of professional behavior, which would seem to be an essential attribute of a mature profession. The sociologists of the professions, and the spokesmen of the professions who are concerned with the profession's development leave the impression that, as a profession matures, it comes to attain autonomy in the enforcement of its disciplinary procedures. In Greenwood's summary, outlined in Section 1.3, sanction of the community in the operation of the profession is identified as one of the elements of professionalization. It implies the community's sanction of a right of the profession to enforce its professional standards; but we have seen that this authority remains with the state. Johnson's description of professions [4, p. 54], which appears to consider professions in the U.S. as well as in Great Britain, leaves the same impression concerning collegiatly controlled professions in stating:

"In the case of professionalism the occupational association is the registering body, and it develops effective sanction mechanisms for controlling... occupational behavior." [4, p. 54]

Cranberg [34] states that the older professions set up "quasi-judicial bodies with the power to invoke sanctions" and that ethical codes form a "living body of law." The impression that professions achieve autonomy in the enforcement of their ethical codes perhaps derives from the situation in Great Britain, where

a certain few actually have that power.

Assuming the observation we make here is accurate, various questions arise concerning what we will call "cooperative state control"¹. What are the true motivations and techniques of a profession in its attempts to enter the situation of having strong control over the activities of its members as well as the ability to define the consumer's needs? How do governments come to cooperate in this procedure, and how do they come to recognize that the services of the profession merit state protection and control? Is it activities undertaken by the profession or by the state that lead to this control situation?

It is not proposed that these questions should be answered here, as it would be a task of detailed research that is not warranted by the objectives of this presentation.² As we examine the arguments of the various proponents of professionalization and the promulgation of a code of ethics in the computing field, we will attempt to identify steps taken to achieve cooperative state control.

This form of legal control does not imply that the state maintains an iron-handed control over the profession, or that it defines what acceptable levels of professional conduct are to be. The situation is cooperative in nature - the profession

¹ The use of the word here describes a control of the members of the profession, as much as control of the service it provides. When we speak of Johnson's collegiate control, and his other classification we are talking about a control of the producer-consumer relationship only.

² One assertion that has been encountered is that "...licensing of a profession has occurred in California only when occupational groups have used great pressure and much lobbying."
[58]

recognizes that it has no legal basis to disenfranchise one of its members, and must rely on the state's action to effect discipline. At the same time, the profession desires that the state shall recognize the statements of the profession on what are acceptable levels of professional conduct. Generally these are respected by the state, as in the case of the court receiving complaints against lawyers only through the bar associations, but it nonetheless retains its ultimate power of control in all cases.

The assertion made here may in other ways overstate the case. There are means by which professionals may be effectively restricted from practice by groups other than the state. For instance, "membership in the AMA is required by some hospitals and clinics as prerequisites for staff appointments." [40, p. 18] This would constrain a doctor disciplined by a profession but not by a state licensing board. Professional organizations may also try to impress their members with the idea that it is poor professional conduct to practice their trade in an institution that does not respect the profession's standards. Such is the stance of the American Association of University Professors, in reminding their members that they

"...have often considered it to be their duty, in order to indicated their support of the principles violated, to refrain from accepting appointments to an institution so long as it remains on the censure list."¹

On a different theme, a significant aspect in the structure of disciplinary provisions is that the group within the

¹ This statement appears in each issue of the Bulletin of the AAUP in the section listing institutions whose administrations the AAUP has censured for not following "generally recognized principles of academic freedom and tenure."

profession for the administration of the disciplinary procedure often has the responsibility to recommend changes to the ethical code or other articles of the profession. Sometimes this extends to having the power to actually make the desired changes. As an example from Fishbein [39], the Judicial Council of the AMA has played an important part in the evolution of the Principles of Medical Ethics, in that many of its decisions have been incorporated into revisions of this code. Such a provision for feedback seems to facilitate the evolution of an ethical code.

2.4 Licensing of Professionals

The legal profession is an anomaly in the world of professions, as it is an intimate participant in the legal system. It is probably the only profession whose sanctions come by way of the court. The standard means of governmental control of the other professions is through some mechanism of licensing.¹ Consistent with the assertion of the existence of

¹ We use here the definitions in [26] of certification and licensing:

"Certification - An affirmation by a governmental or private organization that an individual has met certain qualifications... [with] no prohibition against uncertified individuals performing the same task if they can find patrons.

"Licensing - The lifting of a legislative prohibition. The granting of a license may be based on the individual or organization meeting certain qualifications and [being] specific to certain tasks. Licensing differs from certification in that an individual or organization without a license cannot legally perform the particular task even if a willing patron is available."

cooperative state control in the previous section, professions want the requirements for obtaining a license to be in accord with their own definitions of professional qualifications and conduct. Professions whose licensing standards were imposed by the state, or those which anticipate the possibility of this happening, tend to consider themselves in an inferior state of professionalization.

The point to be made here is that although professions may have misgivings about the possibility of state licensing requirements, they must come to recognize the existence of licensing as an essential element in the control over professional standards of conduct that they are seeking. The more rapidly developing a profession, and the more impact it has on society, then the more precarious position it finds itself in. As we have chosen not to attempt to trace the sequence of events leading to cooperative state control, we can't state whether or not a profession must develop a professional tradition before the onset of licensing.¹

2.5 Science and a Code of Ethics

In the above we have considered only the professions - those occupational groups whose technique is applied to the

¹ Cranberg [34, p. 289] suggests the possibility that "The attainment of an ethical consensus on 'domestic' problems in the scientist's own house... may be a useful preliminary to the attainment of agreement on larger issues."

generation of products for consumption by some external group. There have also been calls for formally stated ethical codes of scientists, notably, those of Cranberg [33], [34], and [35]; and Barry Commoner, as chairman of the American Association for the Advancement of Science Committee on Science and Human Welfare [32]. Considering Storer's idealization of the social organization of science, as discussed in Section 1.4, it would appear that the internal structure of scientific practice is sufficient to guarantee adherence to an implicit ethical code. However, Commoner claims that this idealization is becoming less appropriate, and that the social structure of science is loosening, now needing the force of a formal code. He also suggests that the ethical problems of scientists are primarily in the area of the scientist's responsibilities for the social impact of his work. This is an area that is not controlled as part of the maintenance of the norms of science. An ethical code could be used as a supplementary statement, covering the responsibilities of scientists to those outside of the scientific community.

3. CODES OF ETHICS IN THE COMPUTING PROFESSION

3.1 Historical Development of Codes in the Computing Profession

Before turning to the codes themselves, we will undertake a brief historical survey. The presentation will center on the activities of four computer societies, each the primary or only such society in its respective country: the Association for Computing Machinery (ACM) in the U.S.; the British Computer Society (BCS); the Canadian Information Processing Society (CIPS); and the Australian Computer Society (ACS). The activities of the ACM will be of primary interest, as they reflect most strongly the degree of professionalization in North American computing.

These backgrounds are traced in an attempt to determine the circumstances and attitudes surrounding development of ethical or professional practice codes by these organizations. There are several areas which will be of interest: concerns for social responsibility; concerns for relationships among members of the profession; techniques of business practice; worries about technical competence of the practitioner; and the general standing of the profession. We will also undertake to discuss the role of certification and licensing of computer professionals.

3.2 Development of the ACM Code of Professional Conduct

Preceding the publication of the first ethical code in the February, 1967 issue of the Communications of the ACM [50], as reproduced herein in Appendix I, there was little apparent activity in developing such a code. Rather, the primary concern, as can be traced from issues of the Communications of the ACM beginning in 1959, was for the establishment of membership standards and professional identity. The earliest suggestion for the institution of a code of ethics is found in a letter in the September, 1961 issue. [47] Not until August 1966 was the subject broached again, by the then president of the ACM. [48] The first month of the following year found a letter [49] raising questions on the viability of a code of ethics for the ACM, pointing out the conflict between the loyalties to the employer and to society in general. These misgivings were founded in the writer's apparent belief that ethical codes traditionally deal with the problems of responsibility to society as their prime concern, although we have found that this is not usually the case.

The earliest official stand of the ACM on the matter of ethics was taken in July, 1966, as a result of the 1965 revisions of the ACM constitution. New membership requirements then took effect which required only the endorsement by two present members of the applicant's "intellectual competence and ethical conduct."

The first code of the ACM, "Professional Conduct in Information Processing", was proposed as a "set of

guidelines.... expected to evolve into a means of preserving a high level of ethical conduct." [Appendix I] There was no accompanying enforcement procedure. Donn Parker later discussed this code in an Article in the CACM [51] in his role as chairman of the Professional Standards and Practices Committee. This article contained no information on the specific motivations for the ACM's adoption of a code at that time. A cautious attitude is revealed in stating that the ACM should not go "outside the area of competence of a technical society" in its actions on ethics. Although this does not deal with problems of social responsibility, it is these very problems that have generated the strongest undercurrent of support for an ethics code in the ACM.

This code remained in effect only as a set of guidelines. Disciplinary power remained in the ACM council, by means of an article in the constitution that granted Council the power of expulsion on a three-fourths vote. In 1971, new amendments to the constitution allowed discipline for demonstrated lack of integrity, but also required the adoption of a code of ethics and an enforcement procedure. A period of interest in the adoption of new code followed, culminating in the publication of the proposed code of conduct [67] (reproduced in Appendix II), and an associated disciplinary procedure [68] in the April, 1973 issue of the CACM. The president of the ACM warned that the adoption of the code could lead to a possible loss of favorable tax status and the incurrence of burdensome legal expenses. He also suggested that reasonable courses of action would be to delay adoption of the enforcement procedure, or to alter the

requirements of the constitution. [65] The Professional Standards and Practices Committee, which drafted the code, stated that implementing the mechanisms was necessary to carry out the constitutional mandate. They took as their objective, in developing the code, the desires to have members maintain a high standard of skill upon which the public could rely. [66] The opposing view objected to the content of the code, but even more to the provisions of the disciplinary procedure. [69]

Letters published in response to the proposed code in July, 1973, largely opposed it, either suggesting that the ACM should concentrate on advancing the state of the art, or that the enforcement procedure should be held off until the ACM's resources are capable of handling it. [71] The Council proceeded to adopt the code, but not the disciplinary procedure, as reported by Anthony Ralston in the monthly "President's Letter" in the January 1974 issue of the Communications of the ACM. [72] He notes that the Council took the mandate of the original constitutional amendment requiring the adoption of such a code as a justification for their action. He added that he felt it was "a modest triumph for professionalism" and doubts that "it will measurably improve the ethical standards of our profession", suggesting that examples of good ethical behavior by senior members of the profession would be more effective.

As of this writing (May, 1975), this code remains in effect, and the mandate to adopt an enforcement procedure remains unfulfilled. The latest activity in the area of ethical codes was the report of the ACM Long Range Planning Committee. [75] It stated that it was not able to find a consensus among

its members on the issue of enforcement, and notes that the possibilities are to change the constitution, or to go ahead with enforcement. Neither of these suggestions is stated as preferred nor elaborated on.

3.2.1 Issues Regarding the ACM Code

Our investigations in the previous chapter found that those professions which had enforceable codes of ethics relied on what was there called cooperative state control to effect the legal basis for disciplining members. This would seem to suggest that the solution for the computer profession in the United States is to obtain governmental endorsement of their professional code. There may be significant problems in doing so, since the code's content is atypical for a professional society, and because the profession has a relatively low status in the eyes of the federal government (as discussed in Section 1.6). Further, there was no substantial indication of how a profession obtains the arrangement of cooperative control with the state, so we cannot predict or suggest a course for the ACM.

Considering licensing to be the standard mechanism by which such control is effected, we must take note of two possible views of the role of licensing. One is that it is the state's endorsement of a professions ethical standards; the other is that it is the state's imposition of minimum standards of technical competence. When certification is offered as an alternative to licensing, the profession is attempting to avoid

the second situation. In the ACM, there has been some worry that standards of competence will be imposed on the profession by a body not properly cognizant of the technology of the field of information processing. This is exemplified by Donn Parker's comment in [51], where he quotes U.S. Senator Sam Ervin:

"....thought should be given to a professional ethics code for the industry [by computer professionals] ...'If self-regulation and self-restraint are not exercised by all concerned with automatic data processing, public concern will soon reach the stage where strict legislative controls will be enacted, Government appropriations for research and development will be denied, and the computer will become the villain of our society.' "

Spokesmen in the ACM, and others associated with the U.S. computing profession, have recognized the particular problem in any statement of standards being formalized at the present state of the art in a rapidly developing technology (as in [58]).

Activities outside of the ACM have included a "roundtable" discussion sponsored by American Federation of Information Processing Societies (AFIPS) [26], recommending that they proceed with a project on certification. A suggested procedure was a program of: developing a set of universal job descriptions; developing minimum standards of job knowledge; developing testing for certification purposes; and instituting a public information program. In the report, licensing was not considered as a practical alternative. There has also existed an examination administered by the Data Processing Management Association since 1960 [26, p. 11], which has since been taken over by the Institute for the Certification of Computer

Professionals (ICCP), of which the ACM is a charter member.¹

Both licensing and certification are, in these references, desired as regulators of the technical competence of the individual. This suggests that the stronger interests of the profession are not in the development of a typical code of ethics, which usually have little content regulating technical competence.

Some amount of concern has been expressed for the role and the identity of the ACM, such as whether it shall remain primarily a technical and educational society, or whether it is appropriate for an organization of its present nature to adopt a code of ethics.¹ The existence of the two components of software engineering and computer science within a single professional organization is usually seen as the major complication in the attempts to define the ACM's long term objectives. However, the recent report of the ACM Long Range Planning Committee [75, p. 78] still lumps the two categories into one as "computer science and technology", suggesting that "in planning and evaluating [the ACM's] programs and services" the two may be treated as a unit. There have been no strong attempts to move the organization away from its primarily scientific orientation, but the number of 'practical people' in its membership becomes increasingly significant. [17] This may signal a change in the nature of the ACM, one that would make the existence of a code of ethics increasingly more important.

¹ For information on the evolution of the ICCP see [62], [63], [64], [74], [70], and [21]. See also Section 3.5 for the role of CIPS in the development of the ICCP.

¹ See for example [47], [59], [60], [61], and [71].

There has been significant concern expressed within the ACM on the social responsibility of the profession, just as there has been significant expressions of this in the general literature. One of the areas of concern has been whether or not ACM should take stands on political issues. A 1960 report on a meeting of the Council of the ACM [47] noted the tabling of a written request from E.C. Berkeley¹ to consider a proposal that the ACM co-sponsor a conference "on the peaceful uses of scientific research.

The politically active period of the late sixties and early seventies was reflected even in the pages of the Communications of the ACM, the trend being for the executive and the bulk of the membership of the ACM to resist political involvement. A petition submitted to the ACM Council, requesting that the ACM go on record as being opposed to the war in Vietnam "was considered outside the present purposes of the ACM". A "question of importance" was submitted to the ACM membership on this [52], and failed by a margin of four to one. [53] A letter from Joseph Weizenbaum in May, 1970 [54], criticized the ACM membership for having decided to carry through with its plans to have a national conference in Chicago, suggesting that in doing so they tacitly approved the actions of the police authorities of that city during the 1968 Democratic National Convention. Appearing in Computers and Automation in September, 1972, was a transcript of an address made by E.C. Berkeley to the 25th anniversary

¹ Editor of Computers and People (formerly Computers and Automation), and a founder of the ACM.

meeting of the ACM, which strongly criticized the ACM for not taking a stand against industries of their field which have a heavy involvement in the war. However, a recent president of the ACM has expressed the opinion that the ACM should not have an attitude that prevents the expression of political sentiment, though at the same time he seemed to deny that the ACM has any political power. [73]

Other expressions of social concern have also appeared in the Communications of the ACM. There have been arguments for and against the ACM's taking stands on political issues, and their instituting of public awareness education activities. Ralph Nader suggested [55] that the professional has responsibility for developing systems which will redress the balance against the consumer in existing systems, and that standards must be developed which will permit the professionals the recognition of conflicts between professional allegiances and corporate allegiances. He also suggested the institution of an award for the ACM member responsible for the most important program relative to a consumer problem [56], but action on this was tabled by the ACM Council. [57]

There has been a virtual void of items relating to the development of standards of business practice and colleague relationships for members of the profession in the U.S., except for a few brief mentions of the relations of employees to their employers, such as that of Donn Parker in [51]. The lack of development in this area is reflected in the actual content of the ACM's ethical code.

3.3 Developments in the British Computer Society

The British Computer Society is the most significant of its type in Great Britain and is the only computer society in that country to have established qualifying procedures for membership and ethical and professional practice codes.¹ It is, in fact, the only computer society in Europe to have established a code of ethics, and recently hosted a symposium in London on "Rules of Conduct Applicable in Informetrics" for the Council of Europe. [98] The current president of the BCS has claimed in [99] that this status has been achieved through a conscientious effort by the BCS to "turn itself into a professional body"² through

- "1. Creation of professional grades of membership.
2. Setting up a system of examinations and recognised exemptions therefrom.
3. Designing a code of ethics.
4. Devising a code of good practice."

In the following, attention is restricted to their ethical code, the Code of Conduct, and their code of professional practice, the Code of Good Practice. The BCS is notable for being the only professional society examined in this thesis that has carried this distinction to the point of developing two separate codes. Accountancy comes close to this situation, but their equivalent

¹ This has been inferred from the absence, in any of the references originating with the BCS, of mention of activity by other British computing societies in the same sphere of concern. It may be that there are no other computing societies in Great Britain of any significance.

² Recall our doubts about their capability to do so, as expressed in Section 1.6.

of a code of professional practice is not expressed as a code but as a collection of decisions.

First mention of the Code of Conduct occurs in the January, 1969 issue of The Computer Bulletin¹ [86], where the initial report of the working party on the code was noted to have been tabled at a meeting of the BCS Council, and that it was to be discussed further among Council and working party members. "Draft Notes for Guidance" appears in the August issue of that year, along with a report of intent to revise the disciplinary procedure. Apparently there existed a disciplinary procedure preceding any code of ethics. Relatively non-specific versions of the code of ethics and the revised disciplinary procedure were presented in later issues.

Reasons for the promulgation of a code center on the establishment of a standard of competence beyond that required by common law, so that the public could place its trust in the profession (e.g., [87]). The concerns of some letters received response, as published in The Computer Bulletin, included the comment that membership or exclusion should be based only on technical competence, echoing the sentiment of much of the response to the ethical code of the ACM; that the code protects the society without assuring the member that he will be able to

¹ The Computer Bulletin was published from 1957 to the end of 1972. It was replaced at that time by Computing, an industrial news tabloid. Because an incomplete collection of Computing was available to this writer, it was not examined for developments concerning the codes of the BCS. A recent communication from the Secretary-General of the BCS [98] has filled in the possible loss of information on this period. Publication of The Computer Bulletin, Series 2, resumed on a quarterly basis in September, 1974. The only issue available at the time of this writing contained no pertinent information.

defend himself [88]; the problem of viability when there are practitioners who are not BCS members [90]; and that the responsibilities of the employer as well as the practitioner must be recognized. [89] and [93]

The revised disciplinary procedure was accepted at the Annual General Meeting held near the end of 1970 by 77% of the voting members. [91] The final form of the Code of Conduct¹ was accepted on the authority of the BCS Council, after having received no comment on its final form from the membership. [94] It was the intent, in not making the Code of Conduct part of the Articles of the Association to allow it to be changed easily as experience was gained in its use.

The BCS Code of Good Practice [96] was introduced in the period following the implementation of the Code of Conduct. It is a detailed checklist to be used as an instrument of project review by the implementer as well as the user. It is not enforced under the disciplinary procedure unless departures from its procedures are associated with a formal complaint to the BCS under the Code of Conduct.

The first anticipation of the establishment of this code is found in the September, 1971 issue of The Computer Bulletin [95]. Reasons noted therein for its establishment were for it to be a standard of good practice for investigating and educational committees, as well as a quality standard for practitioners. The draft code was published in January, 1972 [96], and underwent review and study in anticipation of acceptance. [97] The code

¹ Reproduced herein as Appendix III; originally published in [94].

was ultimately accepted, the exact date of which we cannot fix because of the lapse in resource materials. It is currently reported by Ashill [98] to be held in good standing and is being studied for possible updating.

3.3.1 Issues Concerning the BCS Code

The problem of the legal sanction of the Code of Conduct has been explicitly considered by the BCS, as well as for the Disciplinary Procedure. The following was included in the explanatory notes that followed the implementation of the Disciplinary Procedure [92] :

"Broadly speaking the jurisdiction of a profession has the following limits

- 1 It can make regulations or Bye-laws for the conduct of its own affairs and the discipline of its members, but it cannot usurp the jurisdiction of the Courts in a dispute arising from the implementation of its rules.
- 2 If [its limitations] go beyond what can reasonably be related to professional standards of behavior the Courts may intervene...
- 3 The fact that a Bye-law or other statement is worded as a recommendation rather than a rule, will not prevent the Courts from considering the manner in which it is in fact applied.

"These points indicate that if the Society were to use its disciplinary powers in an oppressive manner, the membership could appeal to the Courts."

The Code itself also recognizes the inability of the Society to consider a complaint against a member whose conduct is the subject of legal proceedings, until those proceedings are terminated. [Item III.1.2 in Appendix III]

There is in this no indication of an intention to obtain

the cooperation of the state in carrying out the disciplinary function. As a British professional society, it would have to obtain charter through Parliament to acquire enforcement powers. BCS president Willey has claimed [99] that there is a need for statutory regulation of such things as data banks, but did not mention any legal restraints on practitioners.

There has been no indication that the development of the Code of Conduct and the Code of Good Practice have been inappropriate steps for the BCS. It has been claimed by Willey that the composition of the BCS, representing both scientific and commercial users, is particularly well suited to the implementation of such codes. An earlier president also felt [85] that the industry had become composed of people whose primary interests were practical results, making the establishment of professional attitudes more easily done. The BCS Code of Conduct has been idealized as a device that states important moral concerns, as was the general rule in the ACM. There has been no strong tendency in the BCS to discuss social responsibility as an issue separate from that of an ethical code, which was not the case in the American counterpart.

The Code of Good Practice provides an explicit statement on the business practices of the BCS member. But this code deals only in a very restricted sphere of project control, omitting items on privacy of client's information, restrictions on advertising, and the like. So we should not look here for many statements on forms of business practice of the type that appear in the code of the traditional professions.

3.4 Developments in the Australian Computer Society

The Australian Computer Society has not yet developed a code of ethics, but has been engaged in the process of doing so. The ACS efforts in this area appear to be the only undertaking of its type in Australia¹, although this conclusion is based on the lack of reference to similar activities in The Australian Computer Journal .

An early issue of The Australian Computer Journal carried a report of the May, 1968 meeting of the Council of the ACS [76], which contained several items of note. Among a presentation of the Society's aims and policies were the desires to have membership in the ACS be a hallmark of competence; that the society be considered an "authority on the implications of computer developments" and to have the society active in overseeing the training of computer professionals. There were several other items also identifiable as among those steps occupational groups take as part of professionalization. With these objectives apparently in mind, the Council adopted "in principle" the ACM's Guidelines on Professional Conduct in Information Processing (reproduced herein as Appendix I). A survey of the members of the profession in order to obtain their views on the above points was reported on in the next issue. [77] It found 88% of the membership being in favor of adopting a code of ethics, but no questions were asked on the nature of the

¹ The period being examined begins with the second issue of The Australian Computer Journal , May, 1968, and ends with the November, 1974 issue.

code or whether there should be an accompanying enforcement procedure.

We are later told that the earliest actions on the code of ethics issue in the ACS was the Council meeting of 28 November, 1967, at which time the Qualifications Committee was asked to draft a code of ethics. As the ACM's Guidelines were published before this committee reported¹, the ACS decided to adopt this code in November, 1968, with minor additions, as unenforced guidelines. In recognizing the lack of an enforcement procedure, they noted:

"...an ethical code can only be enforced by a Society that is able to protect its members against pressure to depart from such a code.... It was felt that the establishment of guidelines, which were in sympathy with those of a large overseas society, would encourage the growth of professionalism in the ACS, and begin the implementation of one of the Objects of the Society laid down in the Constitution."

Later in 1969 a proposed constitutional amendment was reported [79] which provided for the "adoption of a code of ethics and the expulsion of members whose conduct is prejudicial to the good name of the society." No further actions are reported until February, 1971 [80], when it was noted that the code was not being adopted, and that the Qualifications Committee was instructed to make recommendation on whether any code of ethics could be adopted in view of a divergence of opinions that had been expressed. The issue seemed to be dying; later reports of the Council meetings were marked for absence of any comments on the activities of the Qualifications Committee.

¹ The ACS notes the publication of the ACM Guidelines in the Communications of the ACM of March, 1968, although it was first published in February of the preceding year.

The idea of adopting a code was revived in 1974 [83], when the president of the ACS announced the intention of the ACS Council to adopt an obligatory code. Without explaining why the issue has now been resurrected, it is stated that the code of ethics would be an essential part of dealing with the problems of the rapid growth of computing. As of the time of this writing (May, 1975) it is not known if this intention was carried out, nor what the content was of the code that they proposed to adopt.

This on again, off again behavior is probably indicative of the compound problems of deciding on the content and role of a code of ethics. That basic differences in attitudes can exist is illustrated in comparing the sentiments of two significant articles on this subject that have appeared in The Australian Computer Journal. One states, that inasmuch as a code can stipulate qualifications for continued membership, "without a code there can be no profession." [81] The other views a code of ethics and qualifying examinations both as "placebos" - that professional behavior is not guaranteed by defining what it is or is not, and that a profession is not established "by a society constructing barricades against latecomers." [84]

In the sphere of defining its social responsibilities, the ACS has had a Standing Committee on Public Relations [76] and a later established Social Implications Committee. [82] As in other computing societies, there has been a current of concern for the social role of the profession, and a desire to have a strong control by the profession of the standards of professional practice. A recent commentary from a member of the

Society [84] has urged that the ACS assume a primarily humanistic orientation.

The composition of the ACS is probably biased toward scientific types. In a 1969 survey of the membership on stated reasons for joining the Society [77], 55% indicated desire to improve personal knowledge of computers as their primary interest, followed by: 17%, to make professional contacts; and 16%, to obtain professional recognition and qualifications. Other reasons accounted for the remainder. This similarity in composition to the ACM might lead us to presume that there will be some parallel in the courses of these two societies in the matters of ethical codes.

The ACS is taking steps to produce a "Code of Good Practice in relation to Privacy, Security, and Integrity of Data." [82] Nothing is indicated about what its specific content might be.

3.5 Developments in the Canadian Information Processing Society

Activities associated with the development of standards of practice in the Canadian Information Processing Society (CIPS) have been, until recently, almost entirely in the area of certification of programmers, what they call accreditation. They have also played a role in the development of the Institute for the Certification of Computer Professionals (ICCP). We will briefly describe the two below, noting also that the ACM's influence in Canada is significant, so that our discussion of developments in the ACM (Section 3.2) is also relevant in the

Canadian computing profession.

CIPS proposed the founding of an organization similar in purpose to the ICCP as part of its desire to establish a certified standard of competence for Canadian practitioners. A recommendation of a committee within CIPS to "examine the implications of accreditation" led the Board of Directors of CIPS to make contact with several North American computing societies, including ACM and DPMA,¹ which might be interested in a separate institute being established "to conduct the affairs of accreditation." [100] A detailed proposal was made shortly thereafter. [101] After some discussion of the proposal ([102], [103], [104], and [105]), it was not instituted, the executive of CIPS deciding not to do so after conducting a nationwide poll of the membership and obtaining an unfavorable response. [106]

CIPS later joined the Computer Foundation, the predecessor of the ICCP, the origin of which organization is now credited to a joint proposal of the ACM and the DPMA. [107] Though the idea was similar, the proposed activities of the Computer Foundation were not identical to those of the CIPS accreditation body proposal. The directors of CIPS decided to participate in the organizing committee of the Computer Foundation and to work to have it become compatible with the requirements of CIPS.

More recently, however, CIPS has taken a step toward the institution of a code of ethics. The executive has proposed that the national organization adopt a short code now in effect in

¹ The Data Processing Management Association until 1974 was the administrator of an exam leading to the Certificate in Data Processing (CDP), a certification that is oriented toward business data processing and management of data processing.

its Toronto group. [108] At their annual general meeting in June of 1975 it was decided that this was a matter of sufficient importance to poll the membership concerning the adoption of the code. [109]

3.6 The Content of the ACM and BCS Ethical Codes

We undertake now to examine the content of the ACM Code of Professional Conduct and the BCS Code of Conduct, as reproduced in Appendices II and III, respectively. Both of the classifications developed in Chapter 2 will be used, with extensions as necessary to the categories used there.

3.6.1 Structure of the Codes

The ACM code has adopted the form of the ABA Code of Professional Responsibility. It consists of major headings, the Canons, and subdivisions of recommended and enforceable considerations, called the Ethical Considerations (EC) and Disciplinary Rules (DR), respectively. Note that the latter is not to be confused with a disciplinary procedure. Since there is currently no enforcement procedure in effect in the ACM, the mandatory aspect of the DR's is questionable, and they are taken here on the same level as the EC's.

The general principles underlying the BCS Code of Conduct

are stated in the section headed Principles. Paragraph 1.6 in the code explains that these Principles are of a general nature, whereas the Notes for Guidance provide more detail. Section I of the Notes for Guidance is primarily an introduction and background to the code, as is the Forward by the President, and these sections will be largely ignored in the following discussion. All of the items under "Normal Business Activities", and "Activities on behalf of the Society" are apparently considered enforceable.

The BCS code is straightforward, but the highly structured ACM code has some peculiarities of content. These come in the form of redundancies in statements made by some of the EC's and DR's, such as repeated statements on misrepresentation of competence and improper use of ACM membership to gain professional advantage. Most of these redundancies are within a single Canon, but there would seem to be little harm in having redundancies not within the same Canon. As was suggested when this same situation was encountered in the ABA code, repeated statements under different Canons have the effect of placing a responsibility into more than one context.

The proposed CIPS code basically consists of only four paragraphs, each a brief statement on the responsibilities of a member to the public, employers and clients, and his colleagues, as well as to his own professional character. Because this code is still in the proposal stage, and because of its brevity, we will not discuss it below. We note only that its sentiments, being broadly expressed, agree with the more specific statement of the ACM and BCS codes.

3.6.2 Comparison of Codes

In comparing the two codes' major categories we find that ACM Canons 1 and 2 together correspond to BCS Principle 1 (on integrity and competence), and that ACM Canon 3 corresponds directly to BCS Principle 4 (on accepting responsibility for work done). There are no specific statements in the BCS Principles corresponding to the ACM's Canons 4 (act with professional responsibility) and 5 (use of skills for the advancement of human welfare). The remaining BCS Principles 2, 3, and 5 (discretion, impartiality and disclosure of conflicting interest, and not to seek personal advantage to the detriment of the Society) can account for the sentiment of ACM Canon 4 (act with professional responsibility), but the BCS Principles do not address themselves to the issues covered by the last ACM Canon, 5. We will see, in fact, that the Notes for Guidance of the BCS code contain an explicit disclaimer of any attempt to deal with the effects of computers on society.

This last distinction, in fact, is the most outstanding difference throughout the two codes, and distinguishes the ACM code from any of those examined in chapter 2. The large amount of literature on the subject of the impact of computers on society that is being generated in the U.S. is reflected in the formal statements on professional responsibility of the leading computer society of that country. Rather than accusing the ACM of being a maverick, they should be complimented for making explicit statements on the responsibilities of their members to society. (They may be accused of having omitted any statements

on the responsibility of the professional organization itself, however.) The most that professions typically do in this area is to assert that close definitions of standards of business practice is the means through which society is protected from abuses, albeit the protection is indirect.

There are unanswered problems related to this. Is the profession capable of dealing with this situation? Can it be trusted to make judicious decisions, i.e., is it safe to entrust an engineering type society to direct a technology that has a profound influence on human affairs? Is it within the function of a representative democracy to have a group of specialists defining the course of a major aspect of technology? Such is the attempt of the profession, although the real control remains neither in the profession nor the state, but in the business community. But if control were taken over by the state, would it be able to assure a safe and humanistic course? It is not safe at this juncture to predict what the best form of control shall be.

Other than this notable new component to a code of ethics, then, we are left with fairly typical examples of such codes. Neither code is so comprehensive as the ABA's, lacking the long historical development of that organization and its code; nor are they so clearly stated as the ECPD's, possibly lacking a clear view of which groups responsibilities are due to.

Without attempting too strict a classification of the lower level items of the two codes, certain trends nonetheless are apparent. In general, they follow the major headings of the codes. There are in both societies obvious biases of concern for

client and employer relationships. There is also a reasonable amount of concern for relations to colleagues, and to the profession as a whole. The ACM code reveals a significant number of items which are not specific about the locus of responsibility; the items involved deal primarily with the technical competence of the practitioner, and could thus be considered as a responsibility requirement placed directly on the practitioner, rather than on some interface between him and another group.

These trends are to be found in nearly isomorphic form in the categorization by functional requirement. For both codes, items describing standards of business practice correspond to those in the category of responsibilities to client and employer in the first classification, with a weaker connection to the categories of relations to colleagues and relations to third parties. And as already noted, items relating to technical performance in the second classification are all found to be non-specific in the first. This leaves a direct carry over of the categories on responsibility to society and the law and on responsibility to the profession, from the former classification to the latter.

In the BCS code, the the second categorization is weighted heavily toward statements of business practice. It also reveals that the BCS code has no direct requirements on the technical competence of the practitioner, a notable omission.

In either categorization both codes have entries concerning responsibilities to society and the law. If this category is split into two, we would find that the ACM code makes no

statements on the legal standing of the society regarding disciplinary action (as is covered in BCS items 1.12 and 1.16), or on the right of the society to refuse to disclose communications made to it in confidence by its members (as is in BCS item 1.16) On the other hand, the BCS code explicitly states that it is not taking a specific stand on the impacts of computers on basic human rights (item 1.5).

There are also differences to be found in the treatments of business dealings. The ACM code is less specific here. It does have statements concerning avoidance of conflict of interest, or the confidentiality of client and employer information. There are no statements regarding fee-splitting, advertising of services, luring away another practitioner's employees, non-competiton among members, or prevention of practice by nonprofessionals - to name just a few of the items that might be extracted from the codes examined in Chapter 2, and which might be considered applicable to most any professional society. The BCS code does have prohibitions on at least the first three of the items just given as omissions from the ACM code, but is still relatively sparse in detail. Apparently, though the computing professions display an interest in this area, they seem to need a longer tradition to be able to determine what practices are detrimental to the profession, or to determine what they want the nature of the profession to be, before the appropriate controls can be realized in ethical codes.

We might conclude then, that if the BCS code is typical but not highly developed, then the ACM code, with its possibly precocious but unusual concern for the impact of the

profession's practice on society, is relatively primitive and atypical in content.

3.7 Disciplinary Procedures in the ACM and the BCS

As there is the possibility that the ACM will ultimately adopt a disciplinary procedure, we will briefly examine the proposed procedure that was turned down by the ACM Council. [67] We will compare this to what we know of the BCS Disciplinary Procedure from some "Explanatory Notes." [92]

Both of these documents provide similar routes for receiving complaints, by way of an investigating committee, and of acting on these, by way of a disciplinary committee. In the case of the ACM, recommendations for disciplinary action are made to the Council, which then decides what action to take, be it expulsion, suspension, or admonition. No appeals procedure is provided for. In the BCS the disciplinary committee has responsibility for imposing the penalty, the possibilities being exclusion, suspension, reprimand, or admonishment. Members may appeal for a change in sentence, but the appeals committee has no power to overturn a decision of the disciplinary committee. In neither society is there a provision for destroying the records of disciplinary proceeding against those who were ultimately exonerated.

There exists no function for any of these committees to make recommendations for changes to the ethical codes or other documents under which the member is culpable, as is the case for

other professional societies that were investigated. In the ACM, no recognition is made of whether or not it has legal right to exclude members from the profession, but then, membership in the ACM is not now a requirement for practice. The profession will have to mature considerably before these become pertinent issues. There are no apparent published reports on the experience of the BCS in the utilization of their Disciplinary Procedure; their Disciplinary Committee has the option not to publicize any of their cases.

3.8 Conclusion

The development of ethical codes in the computing societies is seen to be following the same pattern as occurred in the other professional societies that were examined. This is reflected in both the evolution of the code from a set of general guidelines to a detailed statement of responsibilities, and in the actual content of the codes examined.

Most observers agree that the code of ethics is the instrument that assures the objectives of professionalization: the guarantees of a service ethic, and high standards of technical competence and business practice. The contents of the various codes examined reveal that they do indeed deal with some problems at this level. They are often weak in dealing with the responsibility of the practitioner and the profession for the effects of the application of their practice on society.

In the Association for Computing Machinery, the strong

interest in technical standards rather than a code of ethics may be seen as a reflection of the present scientific orientation of that body. As its membership composition gradually shifts toward software engineering, one expects that the desire for a code of ethics will strengthen. This is somewhat complicated by the presence of the Institute for the Certification of Computer Professionals , which could take over this role, or at least take some of the impetus out of it by decentralizing it. The British Computer Society provides a more typical example of the professionalization process, and a more typical code of ethics, than the ACM. Its position in control of the profession and the consumer is more advanced. The Canadian Information Processing Society and the Australian Computer Society are in the very early stages of the development of ethical codes.

It is not possible to account unambiguously for the high degree of activity in the North American computing community related to the issues of the impact of computer use on society and individuals. Perhaps it is an encouraging sign, a break in the traditional concerns of the profession. On the other hand, it may just be a passing trend.

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APPENDIX I

Professional Conduct in Information Processing¹

INTRODUCTION

This set of guidelines was adopted by the Council of the Association for Computing Machinery on November 11, 1966 in the spirit of providing a guide to the members of the Association. In the years to come this set of guidelines is expected to evolve into an effective means of preserving a high level of ethical conduct. In the meantime it is planned that ACM members will use these guidelines in their own professional lives. They are urged to refer ethical problems to the proper ACM authorities as specified in the Constitution and Bylaws to receive further guidance and in turn to assist in the evolution of the set of guidelines.

PREAMBLE

The professional person, to uphold and advance the honor, dignity and effectiveness of the profession in the arts and sciences of information processing, and in keeping with high standards of competence and ethical conduct: Will be honest, forthright and impartial; will serve with loyalty his employer, clients and the public; will strive to increase the competence and prestige of his profession; will use his special knowledge and skill for the advancement of human welfare.

1. Relations with the Public

- 1.1 An ACM member will have proper regard for the health, privacy, safety and general welfare of the public in the performance of his professional duties.
- 1.2 He will endeavor to extend public knowledge, understanding and appreciation of computing machines and information processing and achievements in their application, and will oppose any untrue, inaccurate or exaggerated statements or claims.
- 1.3 He will express an opinion on a subject within his competence only when it is founded on adequate knowledge and honest conviction, and will properly qualify himself when expressing an opinion outside of his professional field.
- 1.4 He will preface any partisan statement, criticisms or arguments that he may issue concerning information processing by clearly indicating on whose behalf they are

¹ First appearing in [50].

made.

2. Relations with Employers and Clients

- 2.1 An ACM member will act in professional matters as a faithful agent or trustee for each employer or client and will not disclose private information belonging to any present or former employer or client without his consent.
- 2.2 He will indicate to his employer or client the consequences to be expected if his professional judgement is overruled.
- 2.3 He will undertake only those professional assignments for which he is qualified and which the state of the art supports.
- 2.4 He is responsible to his employer or client to meet specifications to which he is committed in tasks he performs and products he produces, and to design and develop systems that adequately perform their function and satisfy his employer's or client's operational needs.

3. Relations with Other Professionals

- 3.1 An ACM member will take care that credit for work is given to those whom credit is properly due.
- 3.2 He will endeavor to provide opportunity and encouragement to the professional development and advancement of professionals or those aspiring to become professionals with whom he comes in contact.
- 3.3 He will not injure maliciously the professional reputation or practice of another person and will conduct professional competition on a high plane. If he has proof that another person has been unethical, illegal or unfair on his professional practice concerning information processing, he should so advise the proper authority.
- 3.4 He will cooperate in advancing information processing by interchanging information and experience with other professionals and students by contributing to public communications media and to the efforts of professional and scientific societies and schools.

APPENDIX II

Proposed ACM Code of Professional Conduct¹

October 6, 1972

Preamble

Recognition of professional status by the public depends not only on skill and dedication but also on adherence to a recognized code of Professional Conduct. The following code sets forth the general principles (Canons), professional ideals (Ethical Considerations), and mandatory rules (Disciplinary Rules) applicable to each ACM member.

The verbs "shall" (imperative) and "should" (encouragement) are used purposefully in the Code. The Canons and Ethical Considerations are not, however, binding rules. Each Disciplinary Rule is binding on each individual member of ACM. Failure to observe the Disciplinary Rules subjects the member to admonition, suspension, or expulsion from the Association as provided by the Constitution and Bylaws. The term "member(s)" is used in the code. The Disciplinary Rules of the Code apply, however, only to the classes of membership specified in Article 3, Section 4, of the Constitution of the ACM.

CANON 1

An ACM member shall act at all times with integrity.

Ethical Considerations

EC1.1 An ACM member shall properly qualify himself when expressing opinion outside his areas of competence. A member is encouraged to express his opinion on subjects within his areas of competence.

EC1.2 An ACM member shall preface any partisan statements about information processing by indicating clearly on whose behalf they are made.

EC1.3 An ACM member shall act faithfully on behalf of his employers or clients.

¹ As originally appearing in [67], having been accepted by the Council of the ACM . [72]

Disciplinary Rules

DR1.1.1 An ACM member shall not intentionally misrepresent his qualifications or credentials to present or prospective employers or clients.

DR1.1.2 An ACM member shall not deliberately make false or deceptive statements as to the present or expected state of affairs in any aspect of the capability, delivery, or use of information processing systems.

DR1.2.1 An ACM member shall not intentionally conceal or misrepresent on whose behalf any partisan statements are made.

DR1.3.1 An ACM member acting or employed as a consultant shall, prior to accepting information from a prospective client, inform the prospective client of all factors of which the member is aware which may affect the proper performance of the task.

DR1.3.2 An ACM member shall disclose any interest of which he is aware which does or may conflict with his duty to a present or prospective employer or client.

DR1.3.3 An ACM member shall not use any confidential information from any employer or client, past or present, without prior permission.

CANON 2

An ACM member should strive to increase his competence and the competence and prestige of his profession.

Ethical Considerations

EC2.1 An ACM member is encouraged to extend public knowledge, understanding, and appreciation of information processing, and to oppose any false or deceptive statements relating to information processing of which he is aware.

EC2.2 An ACM member shall not use his professional credentials to misrepresent his competence.

EC2.3 An ACM member shall undertake only those assignments and commitments for which he is qualified.

EC2.4 An ACM member shall strive to design and develop systems that adequately perform the intended functions and that satisfy his employer's or client's operational needs.

EC2.5 An ACM member should maintain and increase his competence through a program of continuing education encompassing the techniques, technical standards and practices in his fields of professional activity.

EC2.6 An ACM member should provide opportunity and encouragement for professional development and advancement of both professionals and those aspiring to be professionals.

Disciplinary Rules

DR2.2.1 An ACM member shall not use his professional credentials to misrepresent his competence.

DR2.3.1 An ACM member shall not undertake professional assignments without adequate preparation in the circumstances.

DR2.3.2 An ACM member shall not undertake professional assignments for which he knows or should know he is not competent or cannot become adequately competent without requiring the assistance of a professional who is competent to

perform the assignment.

DR2.4.1 An ACM member shall not represent that a product of his work will perform its function adequately and will meet the receiver's operational needs when he knows or should know that the product is deficient.

CANON 3

An ACM member shall accept responsibility for his work.

Ethical Considerations

EC3.1 An ACM member shall accept only those assignments for which there is reasonable expectancy for meeting requirements or specifications, and shall perform his assignments in a professional manner.

Disciplinary Rules

DR3.1.1 An ACM member shall not neglect any professional assignment which has been accepted.

DR3.1.2 An ACM member shall keep his employer or client properly informed on the progress of his assignments.

DR3.1.3 An ACM member shall not attempt to exonerate himself from, or to limit, his liability to his clients for his personal malpractice.

DR3.1.4 An ACM member shall indicate to his employer or client the consequences to be expected if his professional judgement is overruled.

CANON 4

An ACM member shall act with professional responsibility.

Ethical Considerations

EC4.1 An ACM member shall not use his membership in ACM improperly for professional advantage or to misrepresent the authority of his statements.

EC4.2 An ACM member shall conduct professional activities on a high plane.

EC4.3 An ACM member is encouraged to uphold and improve the professional standards of the Association through participation in their formulation, establishment, and enforcement.

Disciplinary Rules

DR4.1.1 An ACM member shall not speak on behalf of the Association or any of its subgroups without proper authority.

DR4.1.2 An ACM member shall not knowingly misrepresent the policies and views of the Association or any of its subgroups.

DR4.1.3 An ACM member shall preface partisan statements about information processing by indicating clearly on whose behalf they are made.

DR4.2.1 An ACM member shall not maliciously injure the professional reputation of any other person.

DR4.2.2 An ACM member shall not use the services of or his membership in the Association to gain unfair advantage.

DR4.2.3 An ACM member shall take care that credit for work is given to whom credit is properly due.

CANON 5

An ACM member should use his special knowledge and skills for the advancement of human welfare.

Ethical Considerations

EC5.1 An ACM member should consider the health, privacy, and general welfare of the public in the performance of his work.

EC5.2 An ACM member, whenever dealing with data concerning individuals, shall always consider the principle of the individual's privacy and seek the following:

- To minimize the data collected.
- To limit authorized access to the data.
- To provide proper security for the data.
- To determine the required retention period of the data.
- To ensure proper disposal of the data.

Disciplinary Rules

DR5.2.1 An ACM member shall express his professional opinions to his employers or clients regarding any adverse consequences to the public which might result from work proposed to him.

APPENDIX III

The British Computer Society Code of Conduct¹

Section I

Forward by the President

In point of detail, case law and doctrines of ethical behaviour vary from one professional institution to another. These differences, however, are superficial and reflect no more than the different environments in which different professions operate and the different temptations they represent.

Underlying them all however is a common code concerned to promote trust and confidence in integrity and upright dealing: trust and confidence between a professional man and his client: between one professional man and another; and between the profession as a whole and the public.

Trust and confidence cannot be established on a basis of mere wishful thinking. We do not trust our neighbours just because it would be nice to feel that they were trustworthy. Trust between men is established only by the practical experience they have of working together and finding one another trustworthy in the event. It is the duty of every professional man to act as a focus for the growth of this trust rather than the reverse, namely as a focus for its dissipation.

It follows that conduct calculated to create trust is of its nature ethical and conduct erosive of trust and confidence is what may be called unethical.

¹ Originally appearing in [94] and published with the following subheading:

"Approved by the Council - 17 February 1971.

"With the papers for the Annual General Meeting was included the proposed Code of Conduct with various notes. Members were asked to submit comments, a request which was repeated in the November issue of the Bulletin (page 374).

"No comments have been received on the Code of Conduct and only six members wrote about the disciplinary structure. The Council has therefore adopted the Code of Conduct which is published below. It will be reviewed annually to ensure that it keeps in step with developments in the computer profession."

The basic question which ethical procedures before Council have to settle is whether a member, the subject of a complaint, has caused himself to be distrusted or not as a result of the conduct complained of.

From this point of view there are certain commonly accepted criteria of ubiquitous occurrence in all professions: that the professional man should be single minded in the service of his employer or client; that if he is a consultant he should not attempt to serve clients whose interests are incompatible without proper disclosure; that disclosure of interest or conflict of interest, particularly financial interest, should be full, frank and immediate; that his disclosures to professional colleagues and to the Society should similarly be full, frank, and immediate; and that no advantage should be taken of the Society or professional colleagues by breach of any commonly understood code of behaviour; that all dealings should be open and nothing should be surreptitious.

If these general principles and their application are borne in mind the Society will be working to the common ideal of all professional bodies, and case law differences between one profession and another will be placed in their proper perspective.

Section III

Introduction

A member of the BCS is enjoined to attain in his work the high standards appropriate to a professional body.

He is expected to combat ignorance about his technology wherever he finds it and in particular in those areas where application of his technology appears to have dubious social merit.

Subject to the confidential relationship between himself and his client he is expected to transmit the benefit of information which he acquires during the practice of his profession, as a result of his technical knowledge, to illuminate any situation which may harm or seriously affect a third party.

It is his special responsibility to keep himself fully aware of relevant development in his technology.

He is expected to express an opinion on a subject in his field only when it is founded on an adequate knowledge and honest conviction and will properly qualify himself when expressing an opinion outside of his professional competence.

A member of the BCS is expected to apply the same high standard of behaviour in his social life as is demanded of him in his professional activities in so far as these interact.

Confidence is at the root of the validity of the qualifications of the Society and conduct which in any way undermines that confidence (e.g. a gross breach of a confidential relationship) is of deep concern to the Society.

Principles

A professional member of the BCS

1. Will behave at all times with integrity. He will not knowingly lay claims to a level of competence that he does not possess and he will at all times exercise competence at least to the level he claims.
2. Will act with complete discretion when entrusted with confidential information.
3. Will act with strict impartiality when purporting to give independent advice and must disclose any relevant interest.
4. Will accept full responsibility for any work which he undertakes and will construct and deliver that which he purports to deliver.
5. Will not seek personal advantage to the detriment of the Society.

Section III

Notes for Guidance

1. Introduction

1.1 At the Extra-ordinary General Meeting on 25 March 1968, certain amendments to the Articles of the Association were adopted to implement proposals for the Society to become a professional body.

1.2 A learned judge recently stated that among the essentials of professional activity are:

- a) a high standard of skill and knowledge
- b) a confidential relationship with clients
- c) public reliance upon the standards of its practitioners
- d) the observance of an ethical code

1.3 To meet the first requirement, the Society has introduced its examinations. It is recognised that whilst examinations do not constitute a guarantee of professional competence, they indicate that those who pass them have attained a recognised level of professional education.

1.4 To meet the last requirement and to complete the steps necessary for full professional status, the Society must now adopt a suitable ethical code and the Council recommends the

adoption of the Principles with Notes for Guidance set out below.

1.5 The code does not deal specifically with the effect of computer based systems on basic human rights but the Society is very concerned about this subject, on which it already has a standing committee which is to submit evidence to a Government Committee on Privacy, and two Specialist Groups on the subject.

1.6 Whereas the Principles of the Code of Conduct are of a basic and generalised nature, the Notes for Guidance, which follow it, are more detailed, [and] from time to time they will be developed to accomodate changes in the computing environment and with the growth of professionalism within the Society. Their purpose is to be illustrative of the principles, to assist members in applying the latter, and to guide the investigating committees.

1.7 The Articles of the Association of the Society do not differentiate between professional and non-qualified members, and the Notes for Guidance therefore apply to all grades of membership.

1.8 A professional worker exercises not only the skills which he has learned in his formal education and training, but also mature professional judgement developed from the use of those skills, in the varying situations of his day-to-day working life.

1.9 The level of a member's professional objectives will be dependent on, amongst other things, his seniority, his position, and his type of work. For example, consultants carry special professional obligations: A senior executive in charge of a major computer application or computer project is responsible for the accuracy of the information produced by the installation and for ensuring that those for whom it is prepared are fully aware of its limitations in relation to the purpose for which they intend to use it; he cannot, however, be held responsible if it is used for a purpose of which he is unaware or for which it was not intended. The responsibility of senior systems analysts and programmers is also heightened because their work is so little understood by others and failures can have serious consequences.

1.10 It must, however, be borne in mind that the more responsibility a member carries, the higher will be the standard that is expected of him, and the more rigorously may the Society's sanctions have to be applied. In the interest of the public, the highest standard will be expected of those in public practice who by the nature of their work accept personal responsibility for what they undertake.

1.11 The Society has no legal standing as between a member and his employer, whether an individual or a company. Its remedy lies in giving, where appropriate, the fullest support for a stand taken by a member who loses his job, or is in danger of

doing so, and of censuring the employer who seeks to place the member in a position which could cause him to violate the ethical code of his profession.

1.12 The Society cannot consider a complaint against a member where that member's conduct is the subject of legal proceedings; the Society has no power to take evidence on oath, nor compel the production of documents. In these circumstances a view expressed by any member in his official capacity on behalf of the Society could improperly influence the course of justice. The complaint could only be considered when the legal action is completed, or it is established that no legal proceedings will take place.

This does not prevent a member appearing in court as an 'expert witness'.

1.13 For the purpose of the Code of Conduct and these Notes for Guidance, an Institutional Member is regarded as being on the same footing as an Affiliate.

1.14 There can be no question of the Code of Ethics [sic] being controlled by a small unrepresentative group. Provisions will be made for a number of members of the Investigation Committee to retire each year. Members of the Disciplinary and Appeals Committees will be specifically appointed by the Council for each case to ensure that no member of any of the three committees serves on either of the other committees for that case. Further, the Chairmen of the Disciplinary and Appeals Committees will be advised by lawyers retained by the Society.

1.15 The Council will set a panel of advisors whom members can consult in strict confidence. For those subject to the provisions of the 'Official Secrets Act' the Society will find a member subject to the same Act, whom these members may be able to consult.

1.16 Members who feel that they need guidance are welcome to consult the Secretary-General of the Society; the matter will be treated in strict confidence and there is some authority for suggesting that any such communication made in good faith would be protected by qualified privilege.

2. Normal Business Activities

2.1 A member should so order his conduct as to uphold the professional standards of the Society, and assist the establishment of such standards.

2.2 A member should act in whatever capacity he may be engaged, in a manner based on trust and good faith towards his employers and clients, and towards others with whom his work is connected and towards other members of the Society.

2.3 A member should at all times exercise his skill, to the best of his ability, in the legitimate interests of his employers and

clients.

2.4 A member has an obligation to preserve his professional objectivity and impartiality, and to minimise the influence of personal prejudice in the presentation of his work to others. in brief, there must be no hidden bias; it should however be borne in mind that the position of a member who approaches a customer or client as a representative of, for example, a manufacturer, is already apparent to that customer or client.

2.5 A member should not deliberately make false or exaggerated statements as to the state of affairs existing or expected, regarding any aspect of the construction or use of computers.

2.6 A member should not disclose, or permit to be disclosed, or use to his own advantage, any confidential information relating to the affairs of his present or previous employers or clients, without their prior permission.

2.7 A member should not hold, assume or consciously accept a position in which his interests do or are likely to conflict with his duty unless that interest has been disclosed in advance.

2.8 A member acting or employed as a consultant should declare to clients, before accepting instructions, all interests which may affect the proper performance of his function for which he has accepted instructions.

For example:

- a) a directorship or controlling interest in any business which is in competition with his clients;
- b) any financial interest in any goods or services recommended to clients;
- c) a personal relationship with any person in a client's employ who might be influenced or directly affected, by his advice.

2.9 A member acting as a consultant should not invite, or permit the issue of an invitation to, any employee of a client to consider alternative employment, without prior consent of the client with whom he is in direct relationship (this does not apply to advertisement in the press). for this purpose a consultant means any member or firm whose advice is sought for a fee by a client on any aspect of computing.

2.10 A member must, when undertaking any consultancy work, provide a written agreement clearly stating the basis or amount of remuneration, before undertaking the assignment. he is expected not to structure his fees in any way as to affect his impartiality; examples which have in the past been regarded as suspect by other professions include fee-splitting, and many other cases of payment by results.

Fee splitting and payment by results can be regarded as unethical because the relative readiness of one or another to

pay an introductory fee might bias the judgement of the member making the introduction. Similarly, payment by results might make it difficult for a member impartially to recommend the best course in any given circumstances.

2.11 It is recognised that the concept of property applied to computer programs and systems is currently not fully protected by law and that, in particular, Patent and Copyright law are inadequate in this area. The absence of adequate legal protection and increasing value of the property vested in computer programs and systems emphasises the importance of the confidence placed in members of the Society. Any act which diminishes that confidence will place a member at risk of disciplinary action.

2.12 Members should have regard to the effect of computer based systems, in so far as these are known to them, on the basic human rights of individuals whether within the organisation, its customer or supplier or among the general public.

Where it is possible that decisions can be made within a computer based system which could adversely affect the social security, work or career of an individual, this decision should in each case be confirmed by a responsible executive who will remain accountable for that decision.

2.13 All advertising for which a member is responsible shall conform to the general provisions of the British Code of Advertising Practice, namely it shall be legal, decent, honest and truthful. In particular:

- a) advertisements should not contain any description, claim or illustration which is misleading about the product or service advertised, or about its suitability for the purpose recommended;
- b) advertisements should not contain any reference which is likely to lead the public to assume that the product or service has some special quality or property which cannot be established;
- c) advertisements should not misuse scientific terms, statistics, or quotations; in particular, claims should not appear to have a scientific basis they do not possess, nor statistics with limited validity be presented so as to imply they are universally true.

3. Activities on Behalf of the Society

3.1 No member shall bring the Society into disrepute by personal behaviour or acts when acknowledged or known to be a representative of the Society.

3.2 No member shall misrepresent the views of the Society nor represent that the views of a segment or group of the Society constitutes the views of the Society as a whole.

3.3 Any member when acting or speaking on behalf of the Society

shall, if faced with a conflict of interests, declare his position. No member shall serve his own pecuniary interests or those of the company which normally employs him when purporting to act in an independent manner as a representative of the Society, save as permitted by the Society following a full disclosure of all the facts.