to accomplish all influence what one may safely spend. The worth of a meeting can't be calculated readily, since its benefits are not always concrete.

At Esso Research we have found it least expensive to to use a small company-owned meeting site, but this use is strictly limited by its size and more-spartan facilities. Resort areas are more expensive, of course, but one should consider the possibility of using them in their off-seasons.

As mentioned, hotel costs must be balanced against transportation costs. What may seem to be a good "package deal" from a hotel can be cancelled out by high transportation costs for a majority of the attendees. The use of a convention booking service, one that maintains files on the size and facilities of a variety of hotels and resorts, can be helpful. Hotel chains frequently have salesmen who specialize in convention business and can provide information as to their own hotels' facilities. A file of brochures on types of hotels in various locations is useful. Those on meeting-arrangements staffs should be always alert in their own travels for suitable areas for company meetings.

Staff.—Meetings operations are a highly specialized type of activity, and there are a great many tricks of the trade to be learned. The meetings staff must often guide the chairman of a given meeting without letting him know it. They must be vigilant to keep each meeting out of the many pitfalls that threaten, for if a meeting is not successful the meetings staff will be blamed, not the chairman. At a meeting, one must be prepared for any and all eventualities, especially at a meeting held at a non-company site, bearing in mind that McGurk's law: "Any improbable event which would create maximum confusion if it did occur—will occur," is always operative in meeting activities.

Despite this need for planning, attention to pre-meeting details, and eternal vigilance during the meetings, the activities of the meeting-organizing group must be largely behind the scenes, guiding and assisting but rarely intruding into the meeting program itself, except in emergencies. The smoothest-running meeting is that in which the "operations" are least obvious.

Know-how about Company programs and "know-who" about Company people are minimum requirements for company-meeting managers. These must be coupled with tact, friendliness, and ability to meet emergencies calmly, be they real or imagined.

Face-to-face communication is said to be the best method for transmitting information. Well-planned meetings which allow adequate time for both formal and informal discussion closely approximate this face-to-face method, and have other advantages. In this era of close attention to costs, care must be taken to balance unit and total meeting costs against real benefits, but most companies that use technical meetings continue to find them a prime means of internal communications.

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Some Personnel Problems of a Small Indexing Project*

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The abstracting and indexing of the scientific and technical literature can be and is being carried out by a variety of individuals, differing greatly from each other in their backgrounds and qualifications.

The reference librarian, trained primarily in the field of Library Science, is usually saddled with the onerous responsibility of indexing, annotating and even abstracting articles of interest as they come across the library desk. Many of these individuals possess a good scientific background and are well-qualified to perform this important function. On the other hand, many do not and are obliged to pick up whatever scientific subject matter they can in a rather disorganized, haphazard manner. In spite of this serious handicap, it is possible for them to prepare fairly good abstracts, particularly of the indicative type, and to index the subject matter at least in a superficial manner. Thus, they perform a valuable function in screening the large volume of pertinent scientific and technical writings, thereby freeing the laboratory scientist for his more highly specialized professional functions.

It has been the experience of many groups, however, that if highly detailed informative abstracts are desired, or "indexing in depth" is necessary, individuals with a great deal of formal scientific background must be recruited and employed. Thus, the "literature scientist," a fully competent chemist, physicist or biologist, has come into his own. The chemical industry as a whole has been a pioneer in the development of this new profession. The pharmaceutical sector of this industry, with its voluminous and highly specialized information requirements, has, by and large, supplied the proper intellectual climate in which the practitioners of this new profession might flourish.

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QUALIFICATIONS OF INDEXERS

The Cardiovascular Literature Project was established several years ago in order to provide for the bibliographic control of information concerning the effects of chemical substances upon the cardiovascular system. The collection, indexing and dissemination of this large body of data scattered throughout the polyglot world literature involved the development of a relatively new approach, which, in its essence, combined indexing with abstracting. There procedures have been adequately described elsewhere.[1,2] It should be emphasized here, however, that the entire success of this large undertaking depends upon the high level of professional competence required of the indexers who are responsible for both the choice of pertinent articles to be indexed as well as for the careful selection of indexable information which they contain.

The subject matter which involves physiology, pharmacology, anatomy, internal medicine and other specialties, in addition to chemistry, is exceedingly complex. Since academic instruction in these fields is not available in the undergraduate curriculum, it was necessary to limit the recruitment of indexers to individuals with graduate or medical training.

The shortage of such scientists is too well known to require elaboration. It was soon apparent that the employment of full-time indexers was out of the question. An attempt was therefore made to emulate *Chemical Abstracts* and rely largely upon part-time, non-resident indexing personnel, trained by correspondence and supervised by resident, full-time staff.

The trials and tribulations which were experienced before a well-qualified group of indexers could be recruited and trained form the basis of the present communication. It is hoped that our experience will be of some value to others who might be contemplating the establishment of similar projects in the field of scientific and technical literature.

First of all, minimum standards for indexers were established. In concurrence with other information services, we feel that the seven qualifications listed here are of primary importance.

1. Adequate graduate training in the fields of physiology, biochemistry, pharmacology or medicine with as much overlap as possible, is essential if we are to assume that the users of the finished product will be on an intellectual level similar to that of the writers of the original papers. This is most important, since experience has indicated to us time and again that the most meaningful indexing can be done only by individuals steeped in the literature of their chosen field and aware of the searching habits of their colleagues. For our indexers, we require a masters or doctorate degree in the biological sciences and training at or beyond the second year in medicine.

2. Scientists, actively engaged in professional activities, are busy people. One of our major problems has been that of partially training a person only to have him drop out of the project because he has over-estimated the time he has available. The CVLP has established a minimum of thirty indexed articles per month per indexer.

3. As it becomes increasingly difficult to borrow journals from out-of-town libraries, it is imperative that our indexers have access to adequate scientific libraries.

4. Finding indexers with a proficiency in languages other than English has quite possibly been our most serious problem, particularly when it is linked with requirement 3. Since the work done by each indexer is checked against the original literature by a second indexer or by one of our full-time checkers, it is essential that we have at least two persons for each language. Requirements 3 and 4 are met somewhat more easily by our use of overseas indexers.

5. To have a knack for and interest in indexing should *a priori* be a qualification of a good indexer. The procedures for our relatively difficult technique of indexing-abstracting are surprisingly easy for some and surprisingly difficult for other would-be indexers to grasp. Each trainee is sent a complete training manual outlining our aims and our procedures before he receives the assignment. Despite this preliminary screening, it is rather amazing what is returned to us by some of our trainees. In other words, subject matter training is certainly not sufficient in itself.

6. Due to the various bottlenecks and delays arising in the main office involving typists, checkers, assigners and other factors surrounding an office dedicated to the accumulation and coordination of data, we prefer that our indexers consider their work for us as a source of additional income or as a chance to keep up with the literature in the field of cardiology. The very nature of our work precludes an ability to provide permanent work for any except our resident employees.

7. This leads us to a further qualification, that of satisfaction with the fee for indexing. Each indexer (except in cases of extra long articles or very difficult languages) is paid $2.00 per acceptable paper. Once an individual is properly trained, he should be able to average two papers per hour, which has resulted in a satisfactory remuneration for all except two of our indexers.

It stands to reason that the active users of the literature are the most logical people to hire as indexers. Unfortunately, when applying this idea practically, we find that too often the active users do not have the time, or possibly the desire, to index for us. Most of our more dependable indexers are former users of the literature who have now retired.

With these qualifications in mind, the problems of recruitment may now be discussed under these four headings: 1, advertisements in *Science*; 2, from Chemical-Biological Coordination Center; 3, general publicity; 4, referred by other indexers.

Our original recruitment was through an advertisement in *Science* for scientifically trained people with reading knowledge of some foreign language to do indexing. This was followed by a second advertisement three years later stressing a proficiency in foreign languages. Of our present 26 indexers, 7 were recruited through these advertisements and of the 121 additional persons who were at one time actively enrolled in our training program, 53 were so recruited. A voluminous and time-consuming correspondence was necessary for the purpose of properly screening applicants.

Upon the termination of the Chemical-Biological Coordination Center, with which we were originally affiliated, we received five of our present indexers from their list of coders and four of the indexers who are no longer with us. Some indexers were recruited upon recommendation

by members of our advisory committee or by employees of the National Academy of Sciences, through the services of the Federation of American Societies for Experimental Biology, and *via* letters written to medical schools and scientific institutions. A total of 42 indexers have been so recruited, nine of whom are still with us. We are still receiving inquiries concerning openings from individuals who have learned of our activities from their colleagues. Indexers working for us have referred a great many people to us, a total of 36 being accepted into our training program. Of these, five remain. Despite all of these methods of recruitment, we have found it extremely difficult to find properly qualified indexers for Spanish and Italian, and to find sufficient indexers for the very difficult but most important Scandinavian and Slavic languages.

Through these media of recruitment we have received applications from 172 qualified persons, broken down by groups, as follows

1. Active	
(a) trained and working	23
(b) being trained	3
2. Waiting, as possible trainees	25
3. At one time employed, no longer with us	121
	172

Of those indexers in group 1: 4 handle only English; 4, only French; 1, only Italian; 2, only Spanish; 2, only German; 2, only Japanese; and the remainder 2 or more languages. Five of these indexers reside outside of the United States.

The people in group 2 include those who have the necessary qualifications specified in our advertisements but who must wait for vacancies in the popular languages which they can use.

The third group, unfortunately the largest, illustrates one of the major drawbacks to our recruitment and part-time employment policy. Let me emphasize that these 121 people were actively employed, had received training assignments and were incorporated in our time plan for production of the finished handbook. They may be broken down into three groups:

1. dropped out after quite a productive period	17
2. returned training assignment incomplete	48
3. dropped out after completing 60 or less articles	56
	121

Group one could be considered normal or expected turnover for a project such as ours. These people were employed for a year or more, their work, except in two cases, was consistently satisfactory and they contributed a valuable portion of our accumulated data. Of these 17 indexers, 10 dropped out because of added responsibility assumed with new jobs or lack of time as in the case of one medical student when he began his internship. Three indexers withdrew when the not-yet-indexed English language journals became too scarce for them to be adequately employed. Two indexers withdrew because they felt that our remuneration was not commensurate with the time involved. Fortunately, both of these indexers could handle only English. The final two indexers in group one were terminated by our office because the work was submitted too infrequently in one case and because the work had seriously fallen off in quality in the second case. On the whole, the effort expended upon this group was adjudged to have been worthwhile.

Group two includes trainees who were sent training assignments which were returned partially finished or returned essentially unopened. Fortunately, most of these were returned relatively promptly (*i.e.*, within three months) and could be reassigned to other trainees. Some, however, were returned only after many pleading and prompting letters and some assignments were never returned, necessitating time-consuming reduplication of the reference cards for assigned articles. The size of this non-productive group indicates inadequacies in our screening methods. Nothing in his opening letters indicated that one man would return 2 out of 50 assigned articles after a three months' delay and feel that he had done rather well. It was amazing how often work was submitted which indicated a total inability on the trainee's part to see how his 12-sentence index entry, or his two word telegraphic entry, differed from the precise but informative entry requested. We are deeply appreciative of those members in group 2 who immediately realized their inabilities as indexers and returned their material promptly.

If group two may be considered non-productive and group one may be considered inevitable, certainly group three may be considered frustrating. These 56 people completed their training assignments and were on their second or third assignments. A great deal of time had been spent on assigning and checking their work; they were presumed to be an integral part of our project. Of these 56 people, 24 dropped out because they had inadequate time available; about half assuming added responsibilities in new jobs, the other half having overestimated their available free time; 18 were dropped because their work beyond the training period showed no improvement; 5 dropped out due to illness; 5 dropped out because they themselves considered the language in which they professed proficiency too difficult; 2 withdrew due to their inability to obtain journals and 2 withdrew "due to unforeseen circumstances."

Beyond the apparently inevitable large turn-over involved with part-time non-resident indexers, there exist other disadvantages to this system. One of those is certainly the voluminous, individual correspondence necessary between assigner, checker and indexer, and the rather elaborate bookkeeping which is necessary to keep track of payments to our far-flung staff. Group conferences are impossible and any amount of letter writing cannot fully replace the rapport possible when individuals are working in close proximity to one another. Further difficulties arise in the inevitable delays in transport of materials.

Having discussed some of the problems involved in a "by-mail" training program, it is also important, however, to review and elaborate on the advantages of such a system.

First of all, as already has been indicated, it has been possible for us to take full advantage of the skills and expert knowledge of many highly-qualified scientists, who otherwise would certainly not have been available to us. Our indexers, we are certain, represent a good cross-section of the prospective users of our compilation. They were thus able to select and index the pertinent material from

the point of view of the prospective user, a necessary attribute of any successful system of literature control. In addition, they were able to cover each assigned journal on a page-by-page basis. As a result, a great amount of potentially "hidden" material was unearthed and indexed. By carefully examining bibliographies accompanying indexed papers, they supplied us with numerous references to journals which we had not expected to contain pertinent information. Their language capabilities made it possible for us to circumvent expensive and time-consuming translation procedures.

From the cost point of view, the use of part-time, non-resident indexers is strongly justified. Payment on a "piece-work" basis was found to be cheaper than its alternative, the hiring of highly-paid professionals on a full-time basis. Since indexing is such an exacting procedure, it cannot be carried on as efficiently on a full-time, 40-hour week basis as on a part-time arrangement. Furthermore, the increased flexibility inherent in part-time employment enabled us to cover the foreign language literature with a minimum of delay by spacing and distributing assignments properly. That is, if there was a large amount of Russian literature, for example, to be covered, Russian language indexers would receive larger assignments. Conversely, it would have been very difficult, if not impossible, to keep a Chinese language indexer, for example, busy on a full-time basis.

The "growing pains" of our undertaking have been emphasized in our discussion of recruiting. We have every reason to believe, however, that things have now "settled down" somewhat and that we have been successful in securing the services of an excellent and stable group of part-time indexers, trained in our methods and procedures.

It may also be mentioned that we have found it impossible to rely upon our indexers for a very important aspect of our work, that of standardizing chemical nomenclature. Due to the bewildering array of trade names (particularly in foreign journals), generic names, Geneva names, *etc.*, we have found it necessary to advise our indexers simply to list all drug names given in the indexed paper, without attempting any changes. The control of chemical nomenclature is the responsibility of a highly-qualified, full-time, resident chemist.

In order to maintain the highest standards of accuracy and to assure comprehensive coverage, all submitted indexing is checked against the original literature by a second individual. This rather expensive procedure has also enabled us to train our indexers. A voluminous correspondence is carried on with our part-time staff and mistakes and errors of judgement are carefully pointed out. We have now arrived at the stage, however, where in some cases checking has been found to be superfluous and some indexers have been allowed to select papers and to submit their indexing directly for editorial review.

Perhaps the best measure of our success is indicated by our first volume.[3] It covers some 13,427 papers published in more than 400 journals in some score of languages during the years 1951–55. In addition, we have indexed approximately 18,000 papers published in 1931–50 and over 9,000 papers which appeared after 1955. These will provide material for two further volumes of our series.

If we have achieved a measure of success in this difficult undertaking, it has been due, to a large extent, to the excellent qualifications of our part-time, non-resident staff which was so laboriously recruited.

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