Engineering
By William Turnbull, Junior Dean and Merrill Weed, '21, Ohio Experimental Station

As all of you know the College of Engineering office has temporary quarters only in the familiar location—to the left as you enter Lord Hall. When the east wing of Brown Hall is completed (May Heaven and a kindly legislature grant that it soon be started!) Dean Hitchcock's office will move into a suite built especially for them, facing east on the engineering quadrangle.

But even temporary quarters must be livable. And the new Junior Dean had to be provided with a place to work. Alumni coming back for a chat with Miss Glasgow and a handclasp with Dean Hitchcock will notice, with approval, the changes which have been made.

To begin with, the place has been painted, and the big main office, always cheery with the friendliness of Miss Glasgow and her assistants, is bright and fresh looking. The shape of the room is different, too; there is a broad alcove near the windows for desks and typewriters. In the corner, next to Dean Hitchcock's sanctum, a room has been built for Junior Dean Turnbull. This room communicates with Dean Hitchcock's office, so the two Deans can swap yarns and ideas in privacy.

The football season is over and college activities have settled down to a recognizable pattern of work and play. It will surely be of interest to Alumni of the College of Engineering to look over the roster and see which of the old professors are still on the job and spot the names of classmates or student acquaintances who are now on the force as teachers.

The University Directory, just out, is the authority for this information. There are fourteen departments in the College, and here is the staff, including the graduate assistants. Men who are new this year are marked with a star.

College Office: Dean E. A. Hitchcock, Junior Dean W. D. Turnbull, Miss Leonora Glasgow, Miss Lilian Bradshaw, Miss Elfa H urns.


Machinery: James E. Boyd, Percy C. Ott, Samuel B. Folk, Ralph W. Powell.


Mineralogy: Wm. J. McCauley.

Physics: Alpheus W. Smith, Allen D. Cole (Died December 1, 1928), E. J. Crone, editor of the publication which enjoys an international reputation.
The progress of civilization throughout the world is being charted daily by some 60 persons in a fourth-floor office of the Chemistry Building.

So vital and so accurate is the charting that scientists from all fields, from all countries, now depend upon the work of this group to keep abreast of developments in chemistry.

The office is that of the internationally-renowned journal, Chemical Abstracts. Its staff of editors and indexers scan some 5,400 scientific publications in 31 languages, publish a semi-monthly journal that is a complete and up-to-the-minute digest of the newest information of chemical or chemical engineering interest. Chemistry is a fundamental science and science has much to do with gains in human welfare. As the journal reports the advances of chemistry, it is, literally, charting the consequential advance of civilization.

Last year, CA reported 50,657 abstracts of papers plus 10,417 abstracts of chemical patents issued in 17 countries. It receives regular reports from countries behind the Iron Curtain, including Soviet Russia.

Such a flow of information is actually a two-way street. Russian scientific publications are obtained in return for Western publications. While scientists in America read of Russian experiments and laboratory work, Russian scientists read of Western work. Lest that frighten some, the editors of Chemical Abstracts hasten to point out that Eastern scientists are limited by their number and their inadequate laboratory facilities. The West has far more to gain because it has a greater number of scientists to explore and utilize information obtained from behind the Iron Curtain. Moreover, what the Soviets get is screened for military security.

The value of such publication paid off during World War II. American scientists, reading abstracts of German papers, got many valuable leads that told them of the progress of German chemistry and provided a jumping-off place for American experiments. Chemical Abstracts, in a sense, is the Reader's Digest of the world of chemistry. It gains its material from already-published papers. Thus, the Russian scientist who reads an American experiment, could also have gotten the material by subscribing to the publication in which the paper was first published. Or an agent could have purchased and photographed the magazine in this country.

Dr. Evan J. Crane, BA'11, DSc'38, longtime editor of Chemical Abstracts, puts it succinctly: "None can afford to forego access to the ideas and results of others. Often the scientist in a small college in this country, or another, provides ideas and information of high significance. If he is shut off from a portion of acquired knowledge by general publication restrictions his chances of contributing essential information are lessened. If there were no publication there would be almost no scientific progress."

Through Chemical Abstracts, a scientist can refer to all work on similar projects done by others, can note their successes and their failures, can avoid blind alleys when he plots his own path of investigation.

The journal is a non-profit publication of the American Chemical Society. It is not a part of the University except that Ohio State, for the last 43 years, has provided office space and utilities for the journal. The cost of personnel and printing is met by subscription fees ($15 per year to members of ACS; $60 a year to non-members).

45 Years Old. Originally founded at the University of Illinois in 1907, the office of Chemical Abstracts was moved to Ohio State in 1909 upon the invitation of the late Prof. William McPherson. At that time, the office force numbered four, aided by 175 abstractors scattered throughout the country. Today, its staff includes 60 full-time employees, plus 15 part-time workers, and some 850 abstractors stationed throughout the world.

Chief charter of the progress of chemistry is Editor Crane. His entire career has been devoted to the dissemination of scientific information. He joined CA as associate editor in 1911, became editor in 1914. A kindly, congenial man, who doesn't know the meaning of a 40-hour week, he has gained world acclaim for his work in abstracting and indexing. Last year, "E. J.," as his associates respectfully call him, was awarded the Priestley Medal, highest honor in American chemistry.

An insight into his capacity for work is told by his Rotarian pals. Occasionally they can convince him of the need for recreation and a game of low-stakes poker. He has reluctantly joined them — has eased his conscience by pulling a sheaf of galley proofs from his pocket and checking them while he sat out a poor hand. He is a past president of the Columbus Rotary Club.

He has been instrumental in formulating the policies and procedures of Chemical Abstracts, including the highly complex system of indexing and cross-indexing millions of abstracts.

'He has a fondness for boiling down letters written to his abstractors in or-
picture of all chemical exploration of that year.

Decennial Index. Since reference to a number of yearly indexes can be a time-consuming task, the office also publishes collective indexes, encompassing the work of a ten-year period. Best way to comprehend the magnitude of a ten-year index is to place the galley proofs, end to end, on East Broad Street in Columbus.

If the reader started at Broad and High, reading type this size as he walked east, he would reach the Columbus General Depot, five miles away, before he came to the end of the galley proofs for one Decennial Index.

Since such proofs are read twice by the office before publication, the staff has the onerous chore of reading ten miles of proof.

The abstract is then sent to the printer, returned for careful proofreading, then published in one of the bulky semi-monthly issues of Chemical Abstracts (500 large pages per month).

By that time, the job on that paper is about half done. The trained indexer takes over, prepares thorough indexes that serve as an adequate and effective key to every bit of information reported in the abstract. Some 650 words of index are prepared for every 1,000 words of abstract. The indexes are indexed by authors, subjects, patent numbers, formulas and organic rings.

At the end of a publication year, each subscriber finds that his index plus the abstracts provides a comprehensive

branches of chemistry have to be standardized, consideration must be given the fact that most organic compounds can be correctly named in various ways. In the last index, the heading "Steel" involved 8,000 cards, many of which said like things differently before the editor finished with them.

When the giant job is finished, subscribers have available a multi- volume work of some 6,000 pages in an abbreviated form that would be the equivalent of almost 30,000 standard textbook pages. Cost of the Decennial Index: $120 (ACS members get a 50% discount, school libraries, 40% discount).

University Gains. Ohio State has gained definite advantages by being host to the editorial office of Chemical Abstracts. Chemists the world over have become familiar with the University and its work through the publication of the journal. The periodicals received for checking have provided the most complete current chemical periodical library in the world (many of the periodicals could not be obtained by the University otherwise). University scientists and students are welcome to use the periodicals for study. Many internationally famed chemists have visited the office to consult on such problems as nomenclature, and the nomenclature experts on the CA staff have made themselves available to chemists on the campus for advice. In addition, a good deal of employment of students, student wives and chemical graduates is provided by CA.

What of the future? Indications are that the work in the past will be but a drop in a test tube compared to that which lies ahead. With the increase in research that followed the decline dur-
ing World War II, there will be many thousands of additional papers to be abstracted. By 1960, the staff foresees an annual abstracting of 95,000 papers.

In 1954, another collective index will get underway. Where the last Decennial Index had 6,000 pages, the next one will run in the neighborhood of 23,000 pages, will require 15 large volumes. Reason for the bulging difference: the last index covered the war years when many phases of investigation were secret and could not be published. The next index will cover the rapidly expanding chemical research activities following World War II. Galley proofs of the next collective index will approach 20 miles in length, instead of five.

Like many University departments, the office of CA is no longer adequate to care for its expanding staff. Thousands of vital reference cards that should be kept in fireproof safes are stored in cardboard containers, simply because there is no space for additional safes. Desk space for editors and indexers is cramped. Some indexers work in crowded soundproof cubicles that have been erected in the aisles between workbenches in an unused chemical laboratory. With the approaching Decennial Index, the office will have to expand to provide more room for present employees and those who will have to be hired.

In the meantime, the staff continues to work in its office in the Chemistry Building, tolerating the cramped facilities in order to continue the fascinating work of helping chemistry plot the way for civilization.
Abstracts Service Compiles Data

Chemical Abstracts Service strives to produce, publish, and index abstracts of every paper and patent on chemistry or chemical engineering published anywhere in the world; it is the sole chemical abstracting service in the English language and the leader of all science abstracting services. Without Chemical Abstracts Service all of science would incur an incalculable disadvantage, for new research and discoveries rest on the foundations laid by the research of previous workers.

Scientists can only know what has gone before by making a complete survey of the literature. But today, it is impossible for any scientist to keep abreast of the vast number of publications of interest to chemists and chemical engineers.

Furthermore, many of these publications are not easily accessible (this is especially true in the case of journals from Russia and its satellites), are quite expensive, and with increasing frequency appear in languages not common to all chemists and chemical engineers. The volume of chemical literature is growing at an alarming rate, and it is impossible to be aware of every paper that is published.

Published Bi-Weekly

Every other Monday, Chemical Abstracts Service publishes more than five hundred large, fine-print, 2-column pages of brief, non-critical, informative abstracts of the significant content of about 6000 different scientific articles and patents.

In 1960, Chemical Abstracts published over 132,000 abstracts (26,023 columns), reporting new chemical information contained in papers that appeared in about 8000 different journals, from 100 countries, in 52 languages, and in patents issued in 23 countries. All abstracts are printed in English although the majority of the original research papers are written in other languages. The abstracts are carefully classified into 50 sections and subsections and cross-referenced.

Preparation, editing, and publishing of abstracts is only a part of the service provided by Chemical Abstracts Service; complete indexing of this information is an equally important and sizable task. Author and patent indexes appear in every individual number as well as semiannually, annually, and collectively at ten-year intervals.

Carefully Indexed

Since Chemical Abstracts is used as much for retrospective literature searches as for keeping abreast of current developments, the subject matter is most carefully indexed. Approximately 300,000 new chemical compounds are reported and systematically named and indexed every year by Chemical Abstracts.

The 1959 Subject Index consists of 3042 3-column pages of 6-point type containing 615,466 entries or an average of 4.9 entries per abstract. Thus the scientist can search through the indexes when he needs to gather information and background material on a problem under investigation.

In the past these subject indexes appeared annually and collectively every ten years, but now appear semiannually and collectively every five years. The Fifth Decennial Index to Chemical Abstracts, consisting of 190 volumes, has reached the size of the Encyclopedia Britannica.

Additional Services

Many additional valuable services are now also performed by the staff of Chemical Abstracts Service; and a staff of 2566 subject-expert abstractors around the world.

At OSU Since 1909

Chemical Abstracts came to the Ohio State campus in 1909—two years after its founding at the Bureau of Standards in Washington in 1907—under the direction of Professor William I. McPherson, then head of the chemistry department.

For nearly half a century, D. E. J. Crane served as editor of Chemical Abstracts and, in 1951, he was named the first director of Chemical Abstracts Service. Upon Dr. Crane's retirement, October, 1958, Dale B. Bake succeeded to the directorship and Dr. Charles L. Bernier became chief assistant director. Meanwhile T. Capelli was named nomenclature director and executive consultant.

Chemical Abstracts Service maintains a vigorous research program guided by its research director, Dr. G. Malcolm Dyson, recipient of the ACS's 1961 Arthur M. Patterson Award for Documentation of Chemistry. This Award was presented at May 13, 1961. Better documentation and retrieval methods are constantly being sought because of the ever-increasing difficulty of keeping up with the explosively growing scientific literature.

Specialized Indexes

Some of these studies assist the production of the traditional Chemical Abstracts Service publications, while others deal with additional information service, including specialized indexes. One of these special publications, now being prepared, is Lexicon of Trivial Names.

Mechanized information services are expected to supplement effectively the traditional abstracts and indexes, but not replace them. The result will be a bettered total service. Dr. Dyson emphasizes that the human brain will always play an important and essential role both in producing informat indices and in their use.

The volume of chemical research and the resulting primary literature in chemistry (journals containing origin contributions) is doubling every eight years and so is the number of papers published.
ber of abstracts published by Chemical Abstracts. Chemistry is a basic science—feeding the other sciences and fostering the growth of the whole economy—so that chemical progress provides a measure of scientific progress in general.

Measure of Research

Consequently, the source of origin and number of papers abstracted and published by Chemical Abstracts Service provide a good measure of the scientific research and development of the various nations. The United States is producing about 27 percent of the world’s chemical research, the U.S.S.R. is second with 19 percent, followed by England with 13 percent, Germany 8 percent, Japan 8 percent, France and Italy in order. Research in chemistry has been estimated to represent 40 percent of the total research in science.

There are corresponding chemical abstracting services in Germany known as Chemisches Zentralblatt and in the Soviet Union known as Referativnyi Zhurnal, Khimiya. The former is in its 132nd year and the latter is nine years old. Both of these services are covering the literature of chemistry thoroughly. However, their indexes are late in issuance and not up to the standards of the Chemical Abstracts Service which is by far the most widely used service.

In France, a former chemical abstracting service was replaced by an annotation service (very brief, descriptive abstracts) devoted to the whole of natural science. This service has no indexes and therefore is not effectively used for searching back through the record. For many years the world’s new pure and applied chemistry was abstracted and indexed in Great Britain; this general coverage was given up at the end of 1953. Certain branches of chemistry still have abstracting services in England, but British chemists now depend for the most part on Chemical Abstracts Service.

Organization Set Up

The position of the abstracting and indexing services in the United States has been strengthened by the organization in 1958 of the National Federation of Science Abstracting and Indexing Services (NFSAIS), of which Chemical Abstracts Service is a charter member. The National Science Foundation (NSF) has taken an active interest in this organization and co-operation between NSF and NFSAIS is strengthening American accomplishments in dealing with scientific information to ensure availability.

It has long been recognized that “know-how” is a significant factor in industrial progress. In research, “know” is required even more than is “know-how.” The scientists’ task of keeping “in the know” is facilitated by Chemical Abstracts Service’s classified abstracts and index keys.
Abstracts Equals 'Staff'

For OSU Grid Tickets

By CAROLYN FOCHT

Of The Dispatch Staff

Chemical Abstracts Service moved off the Ohio State University campus four years ago, but still is considered university staff when it comes to dividing up the coveted OSU football tickets.

George Staten, OSU ticket director, said Tuesday Chemical Abstracts has a building on campus and is classified as university staff for tickets. (The building is not actually on the campus but adjoins it.)

"THEY PAY $16 for a season book—the staff price," Staten said, declining to say how many tickets have been allocated to the Columbus-based information arm of the American Chemical Society.

Though it has ties with the university, described by one official as "like cousinship," Chemical Abstracts no longer is on the OSU campus.

"Our building is on our own land, but we're surrounded by OSU and consider ourselves part of the university community," a Chemical Abstracts spokesman said.

TIES BETWEEN the university and the research information firm at 2540 Olentangy River Rd., are difficult to define. A Chemical Abstracts spokesman said the association is a long, historical one of neighborliness.

Until 1965 when CAS built its present headquarters at the north edge of the University campus, it had occupied a building on campus owned jointly with the university.

Staten said the Chemical Abstracts ticket allowance was among approximately 14,000 set aside at the special rate for faculty and staff.

ALUMNI AND others pay $30 for the season tickets to five home games.

Staten said publication of information the CAS gets staff tickets would hurt the program and "the faculty committee probably would knock these off," though he personally thought CAS is entitled to staff tickets.

But he took "this remark back" and said "I'll deny every word" if it was printed.

HIS ONLY "on the record comment" was that CAS has a building on campus and is classified as staff as far as tickets are concerned.

W. J. Griffith, director of campus planning at OSU, said there is no official relationship between the two organizations but a policy of cooperation like a "good neighbor policy" exists.

GRIFFITH SAID that since the campus and CAS headquarters are adjacent they try to plan together and work out mutual problems
CA to Dedicate New Office Building

By ROBERT W. REISS
Dispatch Business Editor

CA to Dedicate New Office Building

Formal dedication ceremonies for the recently completed $7 million Chemical Abstracts Service office building are scheduled for 3:30 p.m. Thursday.

Dr. Robert W. Cairns, Washington, D.C., executive director of the American Chemical Society, will preside. The ceremonies will be conducted in the plaza level parking area of the new structure at Olentangy River Rd. and Dodridge St.

SPEAKERS will include state, county and city officials together with representatives of the Columbus educational and business communities.

Ground was broken for the building in January 1971, and it was completed earlier this year. It contains 142,000 square feet of office space on five floors and a three level parking garage beneath.

The first three floors now house research and development and production operations divisions including a computer complex. The top two floors will be leased until needed by CAS.

CHEMICAL Abstracts director, Dale B. Baker, said the new building is expected to meet CAS's space requirements into the 1980s.

Brubaker Brandt, Inc., Columbus architectural firm, designed the building and Garwick and Ross Inc. was the general contractor. Financing was through tax-exempt industrial revenue bonds issued by Franklin County.

Chemical Abstracts Service is a division of the American Chemical Society, a non-profit scientific and educational organization headquartered in Washington, D.C.

ITS FUNCTION is to review the 400,000 reports of new research and developments in chemistry and related fields which are printed each year in scientific and technical periodicals around the world, in patents issued by various governments and in a variety of books.

These represent 125 different nations and more than 50 languages.

From these CAS prepares abstracts, indexes and other publications and lists for scientists and engineers throughout the world.

CAS is the largest organization of its type in the world.

Primary publication is a 600-page weekly Chemical Abstracts which contains more than 7,000 abstracts of articles.

CAS began in 1907 as a one man operation in an office in the National Bureau of Standards in Washington, D.C.

IN 1909 the first full time employee was hired and the offices moved to the campus of Ohio State University where they remained until 1965 when CAS moved to its own $6 million building north of the campus and adjacent to the new building.

Present employment in CAS's Columbus offices is 1,015 with more than half that number graduate scientists or engineers. Annual payroll is $12 million.

At the dedication ceremonies Thursday Dr. Allan C. Nixon, president of the American Chemical Society, will cut the ribbon. Speakers will include Dr. David Sweet, director of the Ohio Department of Economic and Community Development; Franklin County Commissioner Michael Dorian; Columbus Development director Jack Huddle; Dr. Harold Enarson, president of OSU Dr. John M. Batch, Battelle; Dr. Bryce L. Crawford Jr., chairman of the ACS Board Committee on CAS, and Dr. Herman S. Bloch, chairman of the board of the American Chemical Society.
Building Dedicated

Local and state officials joined with national officers of the American Chemical Society last month to dedicate a $7-million addition to the Chemical Abstracts Service Division. The new five-story office tower is to the east of the ChemAbstract headquarters on Dodridge St. and Olentangy River Rd., just north of the Fawcett Center for Tomorrow.

Dr. Alan C. Nixon, ACS president, cut the ribbon and President Harold L. Enarson was among those delivering congratulatory messages.

Director of Chemical Abstracts is Dale B. Baker, '42, '48, who is also national president of The Ohio State University Association.

DR. NIXON (center) cuts ribbon, aided (l-r) by: Dr. Bryce L. Crawford, Jr., members of American Chemical Society board; Dr. Herman S. Bloch, ACS Board Chairman; Dr. Robert W. Cairns, executive director of ACS; and Dale Baker, director of Chemical Abstracts Service.
There are no chemicals at Chemical Abstracts Service. No Bunsen burners, no glass tubing, no laboratories at all.

There are chemists — chemists who speak several languages working at computer terminals. And there are engineers, biologists, physicists, computer specialists and other professionals. Their task is to make the results of research already performed available to scientists, engineers, languages as Azerbaijani, Belorussian and Macedonian.

Preparing abstracts is only the first step in the refinement process. Each item also must be carefully indexed, so that a medical researcher wondering if a particular chemical has proved effective against tumors, for example, or an industrial chemist interested in a new process for manufacturing a particular chemical compound, can be led to locate a particular piece of information almost instantly.

Organizations around the world can search CAS computer files. For instance, scientists in Europe can go to computer terminals in their laboratories or offices, dial up a computer and have displayed on their own terminals almost immediately the titles of everything published on a particular chemical topic in the past eight years.
suoents, government officials and businessmen around the world.

Chemical Abstracts Services (CAS) is a nonprofit organization. Since it is not subsidized in any way, it depends upon revenues from sales of the publications and information services to meet operating expenses.

The 1,150 employees of this unique Columbus organization "refine" information — taking in 14,000 scientific journals in over 50 languages and the patents issued by 26 nations, and sending out English-language abstracts — summaries — of the new chemical information contained in them.

Over 8,000 of these concise summaries are published each week and sent to companies, libraries, universities and government laboratories around the world in weekly issues of Chemical Abstracts. Published continuously since 1907, the collected volumes of Chemical Abstracts now contain almost eight million abstracts.

More than three-quarters of the publications supplying information for Chemical Abstracts come from outside of the United States. Russian-language scientific literature accounts for almost a quarter of the information abstracted. Many articles are published in Japanese, German and French, and occasionally articles appear in such pertinent journal articles and patents.

Indexes are prepared for each weekly issue of Chemical Abstracts. More comprehensive indexes are published every six months. Every five years CAS compiles the semiannual indexes into a massive collective index to the period’s chemical publications.

The most recently published collective index, covering the years 1972 through 1976, totaled some 96,000 pages, in 57 volumes. CAS believes it may be the largest printed index ever published.

CAS also breaks down the nearly half-million abstracts published each year into smaller biweekly bulletins on particular chemical topics. These handy guides to the latest advances in over 76 specialties are called CA Selects, and include such medically oriented topics as anti-tumor agents; industrial topics, like coal science; subjects of interest to government, such as environmental pollution; information of interest in agriculture, such as herbicides; and booklets designed for theoretical and research chemists. In addition, CAS produces a variety of handbooks, special indexes and reference works for scientists and engineers.

CAS publishes well over one million words a week. The same information is also recorded in a form that a computer can scan.

CAS is a division of the American Chemical Society, a nonprofit scientific and educational association with headquarters in Washington, D.C. It is the only comprehensive abstracting and indexing service for chemistry outside of the Soviet Union.

Most of the world depends upon its publications and information services to keep up with chemical research and technology. Almost two-thirds of Chemical Abstracts’ circulation is outside of the United States. Organizations in the United Kingdom, West Germany, Japan and France provide part of CAS’ financial support and distribute its publications and information services in their nations.

The editorial offices of Chemical Abstracts arrived in Columbus in 1909, just two years after the publication’s birth, when Austin M. Patterson, of Xenia, became its second editor. E.J. Crane, a Columbus native and Ohio State University graduate, became editor in 1915. He remained at the helm for the next 43 years, becoming the first director of Chemical Abstracts Service in 1956, when the growing CA editorial organization was renamed and became a division of the American Chemical Society.

Crane was succeeded as CAS editor in 1958 by another Ohioan and Ohio State alumnus, Dale B. Baker.

At first, the organization was housed on (Continued)
Abstracts
continued

the Ohio State campus. By 1965 it had moved into its own $6-million building just north of the campus, near the intersection of Olentangy River Rd. and Dodridge St. A second building of almost equal size was completed in 1973.

In its first year of publication, 1907, Chemical Abstracts carried 12,000 abstracts of scientific reports. Today, CAS abstracts or cites about half a million documents each year.

As the size of the task has grown, so has the cost of performing it. The American Chemical Society budgeted $15,500 for Chemical Abstracts expenses in 1907. Now it takes more than $30 million a year.

The original staff of four has grown to 1,150, more than half of them graduate scientists or engineers. Since many of the positions require fluency in several languages, the editorial staff is a United Nations in miniature. It includes graduates of the Universities of Taiwan, Madras, Cairo and London, Rajshani University of Bangladesh, the Tokyo Institute of Technology, the Technical University of Prague and Timiriazev Agricultural Academy of Moscow — to name a few.

About 20 years ago, CAS turned to computers to help handle the ever-growing volume of information. Then, in 1961, CAS introduced the world’s first computer-produced periodical, Chemical Titles. A biweekly, it alerts chemists to the titles of newly published chemistry articles.

CAS specialists also developed techniques for translating chemical structure diagrams — two-dimensional pictures of molecules, a basic part of chemistry’s language — into codes that can be manipulated by computer. The result was a computerized Chemical Registry System, which contains the structure diagrams of all chemical substances mentioned in the scientific literature since 1965 — more than four million of them in all — and their various names.

The registry computer file lets CAS indexers find out whether a substance encountered today under one name has also been mentioned earlier under another name.

Each of the substances also has been assigned a registry number, which has turned out to be a compact and unambiguous identifier for chemical substances.

The Council on Environmental Quality recommended in a report to Congress last year that all U.S. government agencies use CAS registry numbers as standard identifiers for chemical substances. The Environmental Protection Agency, the National Cancer Institute, the National Institute of Occupational Safety and Health, the National Library of Medicine and several other federal agencies already use the numbers to identify substances, as do some large chemical companies and several organizations in Europe.

(Continued)
In this 1928 photograph, the Chemical Abstracts editorial staff is at work in its office in the McPherson Chemical Laboratory, at Ohio State University. The organization was housed on the OSU campus until 1965.

Most of the information processed by Chemical Abstracts Service is stored on magnetic tape in a form that can be manipulated and searched by computers.
Abstracts
continued

Recently, the Environmental Protection Agency turned to the CAS registry for help in listing chemicals being produced by U.S. industry.

Computer techniques similar to those developed for the registry are also the basis for the National Cancer Institute's drug research and development chemical information system, which CAS operates under contract.

The computer is central to almost every phase of operations at CAS. Abstracts and index entries dictated by CAS document analysts are transcribed onto magnetic discs by operators using special keyboards. This information is then read from the discs into the computer's memory.

The computer automatically checks the information for errors, abbreviates the appropriate words, inserts (?) after words that may be misspelled and displays the results on a terminal screen for review by analysts.

Then, the computer converts it into the proper form for publication, alphabetizes the index entries and composes the material on film from which plates for offset printing are produced.

Without the computer, it is doubtful that CAS could handle the volume of information it now processes. With the computer, CAS is able to make information available to scientists and engineers in whatever form best suits their needs — a printed publication or an individually constructed computer search.

The results of the billions of dollars worth of research carried out around the world would be of little use if scientists weren't aware of its existence or couldn't find it when they needed it.

Without Chemical Abstracts or its computer-searchable equivalent, the chances of finding, among the more than seven million reports published in all parts of the world since 1907, that one report which might contain the information necessary to solve a problem would be about the same as the chance of finding a particular pebble in an avalanche.

If the report weren't found, the research probably would be done over, possibly at considerable cost.

This isn't likely to happen in chemistry, because of Chemical Abstracts. Jean Horiszny is an employee of Chemical Abstracts.

Patricia Fitch uses a cathode-ray terminal to enter a chemical structure diagram into the computer's memory.
In the face of alarming telegrams from his partners in New York, begging him to call off the project, Cooke continued to grope in vain for financial backers.

The bubble finally burst on Sept. 18, 1873, when, after passing a pleasant evening in the company of President Ulysses S. Grant, Cooke walked into his Philadelphia office to learn that his associates, without consulting him, had closed the New York branch of Jay Cooke and Co. The doors of his other two offices swung shut minutes later. Jay Cooke, wiped out financially at age 52, wept openly.

The panic inside Cooke's mind, however, was nothing compared to the pandemonium on the floor of the New York Stock Exchange when word of the failure hit the streets. An angry mob of investors strained at a police cordon in front of the locked doors of Cooke's Wall Street office. In Philadelphia, a newsboy hawking the ominous headlines was quickly whisked off the curb by nervous police. The Panic of 1873 was on.

The failure of the Sandusky banker precipitated a five-year depression, the most severe up to that time. Stocks plummeted; three million people out of a total population of 40 million found themselves jobless; businesses with combined assets of half a billion dollars dissolved, including 40 percent of the nation's railroads; and annual interest rates in some places skyrocketed to over 500 percent.

Jay Cooke was humbled by the experience — but not for long. Within six years he had stumbled onto a silver mine in Utah, raised enough funds to lure a railroad into the area and sold out his interest for $1 million.

This time Cooke held onto his money and swore off speculation for the remainder of his days. He spent 26 years in retirement, fishing and hunting at his Lake Erie retreat, known as "Gibraltar." Many years before, he had built a 52-room mansion outside Philadelphia, which he christened "Ogontz" (the original name of Sandusky). But a palace festooned with 300 paintings, sculpture and fountains no longer suited Cooke, who sought a more simple life. He donated the structure for use as a girls seminary and moved into a modest home nearby.

Similar acts of philanthropy took up much of his time around the turn of the century. A deeply religious man, he contributed to countless churches scattered across the country and handed out Bibles and hymn books along with candy and fruit to visiting children. Each year he offered Gibraltar as a retreat for clergy who could not afford a vacation. In fact, long before he retired, he earmarked 10 percent of the profits of Jay Cooke and Co. for various charities.

"I look upon riches," Jay Cooke wrote at 19, "but as naught more than the means whereby one can display his social and generous spirit, and, if I should ere be the one I may be, I'll be a friend, a man."

Unlike most promises of youth, this one was kept. Perhaps as a result, it was a serene, content Jay Cooke who died quietly in 1905, midway into his 84th year.

Free-lance writer William A. DeGregorio lives in Massillon, Ohio.
In its efforts to chronicle everything that happens in the world of chemistry, Chemical Abstracts Service sometimes must evaluate research projects written in languages such as Azerbaijani, Macedonian, and Esperanto. In fact, three-quarters of the material CAS publishes originates outside the United States.

This puts unusual demands on the staff of almost 1,200. While some of the sifting is done by volunteers around the world, 90 percent of the abstracts are prepared in Columbus.

Some of the employees must be proficient in both chemistry and a foreign language. As a result, CAS boasts 170 doctorates on its staff which is probably the most diverse and specialized in the community. Its current payroll is more than $26 million.

"WE NEED nuclear chemists with reading knowledge in Japanese or Russian," said Donald Gibson, personnel director. "There are only a limited number of nuclear chemists in the United States, and there are a limited number of people with reading ability in Russian or Japanese. So you have a geometrical reduction in the availability of talent — really just a handful of people."

It is not always easy to get those people to resettle in Columbus. How did a high-technology giant like Chemical Abstracts Service, which has been offered free buildings in Texas, Florida and Pennsylvania, ever wind up in Columbus?

"I think we got here by accident," said Edward P. Donnell, manager of public information. The publication Chemical Abstracts, founded in Washington, D.C., in 1907, came to Columbus in 1909 because a Xenia, Ohio, man named Austin M. Patterson was named editor and because Ohio State University offered a free one-room office.

PATTERSON, a former chemical editor of Webster's Dictionary, remained editor of CA only until 1914, but the publication has been here ever since. The office remained on campus until 1965 when the first of the two current buildings on Olentangy River Rd. was completed. The second building was added in 1973.

"Columbus is an attractive location," said CAS Director Dale B. Baker. "In the '60s we about gave up recruiting from the East Coast and from the West Coast — no one wanted to come to Columbus. We do better now."

According to Gibson, recruiting is getting easier because of Columbus' growing reputation as a good place to live and as a center of high technology. The proximity of other high-tech outfits like the Online Computer Library Center Inc., the Battelle Memorial Institute, and CompuServe Inc. makes a move to Columbus less risky for a computer professional.
The abstract (bottom left) published in Chemical Abstracts, chemistry's bible for 75 years, played a role in the Manhattan Project. The structural diagram (left) is of a cortisone molecule.
CAS: chemistry's data base

By Loren Feldman

The esoteric paragraph reproduced above is the summary of a once-forgotten chemical experiment performed in 1926. Four University of New Hampshire researchers, experimenting with uranium and calcium, produced a 3-pound lump of metallic uranium that had absolutely no practical application. The process, nonetheless, was published in a scientific journal and ignored by the world — for 16 years.

In 1942, American scientists working with Enrico Fermi had been struggling with uranium in powder form. A metallic lump, they decided, might work better. But how do you get metallic uranium? It can be considered Columbus' contribution to the Manhattan Project that within minutes these scientists were able to locate an obscure process discovered and forgotten 16 years earlier by four faceless researchers.

THE LINK BETWEEN the dormant process and the burgeoning bomb was supplied by a Columbus publication entitled Chemical Abstracts. Since 1907, CA has been chemistry's bible, compiling and indexing summaries of anything new — new substances, new applications, new syntheses.

Celebrating its 75th anniversary this year, CA has become the most frequently used scientific data base in the world. It enjoys a market that is both thoroughly saturated and irrevocably addicted.

"You don't start a research project unless you look at CA, or else you'll be reinventing the wheel," said Dale B. Baker, director of Chemical Abstracts Service, which publishes CA.

Finding the uranium procedure wasn't a decisive factor in developing the atom bomb, but by consulting CA, Fermi's scientists avoided a potentially costly and time-consuming repetition. It is something chemists do reflexively every day all over the world.

THE PUBLICATION does no chemical research of its own. It chronicles the work of others, monitoring more than 12,000 scientific journals in 150 countries and 50 languages, so the research won't lie wasted on a library shelf.

For every advance, CA prepares an English summary, or abstract, which is published in a weekly journal. The metallic-uranium process was one of 29,201 abstracts published in 1926. CA is now up to 450,000 abstracts a year and has published a grand total of more than 9 million. It even has a place in the Guinness Book of World Records for printing the world's longest index — it's most recent five-year index fills 57 volumes, almost 100,000 pages, and weighs 251 pounds.

And yet, with all the success, both the publication — Chemical Abstracts — and the publisher — Chemical Abstracts Service — are in a period of dramatic transition.

Before long, publishing CA in printed form will cease to be the prime focus of Chemical Abstracts Service. The non-profit organization, a division of the American Chemical Society, is rapidly entering the vanguard of high tech. The future of Chemical Abstracts Service, which occupies two four-story buildings at 2540 Olentangy River Rd., lies with what it calls CAS Online — a computerized method of data dissemination.

THE NASCENT service will eventually allow chemists around the world to instantaneously tap an immense base of chemistry-related information. The ramifications for all forms of research and development are impressive.

A hypothetical research scientist in Iceland is on the verge of a dramatic breakthrough. He has found a substance that when fed to white mice induces them to speak English. The substance, however, has an unfortunate side effect: The mice insist on singing Barry Manilow songs. To the scientist's mind, this negates any value in his research.

With the hope of isolating the salutary effects of the substance, the scientist turns to his CAS Online terminal. Substances with similar structures are likely to have similar properties, and in a matter of moments the scientist can search the CAS registry in Columbus for any known substances similar to his.

The registry stores information on every substance referred to in scientific literature since 1965. Almost 6 million are now registered and more than 6,000 are added each week. There is no other way to evaluate that number of substances.

THIS SERVICE has been available for more than a year. For every substance registered, Online clients can learn what it looks like, what properties it offers, what it has been used for. Subscribers, who pay about $100 per search, are referred to any related abstracts published in CA.

With several hundred clients, mostly chemical and pharmaceutical manufacturers, Online now accounts for about 13 percent of Chemical Abstracts Service's total revenue. "We're very happy with that," said Richard G. Dunn, director of marketing. But this is only the tip of Online's vast potential.

Eventually, director Baker intends to give Online clients access to everything they'd ever want to know about chemistry — a registry of chemical reactions, surveys of ongoing research projects, statistics on the economics of chemistry.

THAT CHEMICAL Abstracts Service already employs a state-of-the-art computer system makes the task somewhat less formidable. "It's a heck of a data base if someone can build it right," said Baker. "And we can do that here. It goes far beyond chemical information itself."

Even CA itself could be searchable by computer within two or three years, although the firm is treading carefully here. In printed form, CA accounts for almost 70 percent of Chemical Abstracts Service's revenue (the rest of the revenue comes from CA Online and from miscellaneous publications).

The organization is self-supporting and, with an annual budget of more than $45 million, it does not intend to give away its top revenue source. The yearly subscription fee for CA in print is $6,200. "We want to do a good technical job (of putting CA online)," said director of marketing Dunn. "And we want to do it in a way that makes good business sense."

ALL OF THIS has Baker feeling a little cocky about Chemical Abstracts Service's role in a hi-tech world. He is not afraid to sound lofty. "We're not in an industrial age," said Baker. "We're not in a space age (yet). We're in an information age."

As a disseminator of information, Chemical Abstracts Service can influence research projects from nuclear physics to medicine. "We are a major part of the research behind the development of compounds that will save your life and your grandchild's life," said Baker. "This is very useful work, important work. How well we do our job affects the lives of all mankind."
The first issue of Chemical Abstracts was dated Jan. 1, 1907. The issues published that year contained not quite 12,000 abstracts, which are brief summaries of scientific papers and patents. Today Chemical Abstracts prints more than 450,000 abstracts annually.

That is a big change over 75 years, but then the world has witnessed big changes in that time — from horse and buggy to space shuttle, from leeching the sick to transplanting hearts, from plain cotton to wondrous synthetic fibers.

The earliest editions of Chemical Abstracts were produced in an office at the National Bureau of Standards in Washington, D.C. The editorial offices moved into space on the Ohio State University campus in 1909 and finally into the Chemical Abstracts Service's own offices at 2540 Olentangy River Rd. in 1965.

Chemical Abstracts summarizes and indexes the published results of billions of dollars worth of research and development done in university, government and industrial laboratories around the world. Almost two-thirds of the circulation is outside the United States. The Chemical Abstracts Service also provides computer hookups to its electronic files for chemists around the world. This is the only comprehensive abstracting and indexing service in chemistry outside the Soviet Union.

A series of programs is being held this year to commemorate the 75th anniversary of Chemical Abstracts Service. A highlight of these will be on June 3 when Chemical Abstracts Service employees, representatives of the parent American Chemical Society and invited guests will attend a reception in the Downtown Sheraton Hotel and then a special performance of the Columbus Symphony Orchestra in the Ohio Theatre.

Chemical Abstracts Service is one of the many organizations that is making Columbus great. We extend wishes for a happy 75th anniversary — and for many more.
Keyboard allows typed translation

By Dan Arnold
Lantern staff writer

A device has been invented that will make the job of typing Japanese, Chinese and Korean much easier.

The keyboard translator is the brainchild of Tag Moon, associate editor in patent services at the Chemical Abstracts Service in Columbus.

Moon was awarded a patent on hisJapanese language keyboard in April and will begin working on prototypes as soon as a second patent for the Chinese and Korean models is approved.

"The keyboard will be used to type languages that use a syllabic, rather than alphabetic, system," Moon said.

The keyboard is divided into two sections. The upper level is operated by the fingers and inputs the consonants of the designated language. The bottom level inputs the vowels and is operated by the thumbs.

"I got the idea for the device in 1981 while testifying in court for a former employer," Moon said. "I noticed the stenographic keyboard and later talked to the stenotypist about its operation."

"It worked by inputting syllables," Moon said. "Since Chinese, Japanese and Korean languages all use a syllabic system, I thought a similar device could be designed to facilitate the typing of these languages."

Moon then built a mock-up of the keyboard to be used for Japanese and applied for a patent in 1985.

"It was rejected at first because the patent office thought it was just another keyboard, so I flew to Washington to show them the system in person," Moon said.

"Once they saw it, it was approved."

Moon plans to build working prototypes once his second patent is granted. "I've waited so long already that a little more waiting won't hurt."

There are computer systems that allow languages to be typed.

Nikki Bado, administrative secretary in the East Asian Languages Department, said that such a computer can be found in Cunz Hall.

The advantage of Moon's keyboard is that it will be easy to use.