

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF RESEARCH ADMINISTRATION  
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Date: 14 September 1972

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GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF RESEARCH ADMINISTRATION  
RESEARCH PROJECT TERMINATION

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Sponsor: National Science Foundation

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C-12-501

1



UNIVERSITY SYSTEM OF GEORGIA



OMPUTER

NETWORK

*no 1 due*

FIRST ANNUAL REPORT  
to the  
NATIONAL SCIENCE FOUNDATION  
on Grant GJ-608

EXPERIMENT IN THE DEVELOPMENT OF A REGIONAL COMPUTER CENTER

April 1, 1970 - March 31, 1971

James L. Carmon  
I. E. Perlin  
Principal Investigators

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including the following reports (Appendices A, B):

<u>Grant No.</u>	<u>Institution</u>	<u>Principal Investigator</u>
GJ-1054	University of Georgia	James L. Carmon
GJ-1055	Georgia Institute of Technology	I. E. Perlin
GJ-1031	Abraham Baldwin Agricultural College	J. Dale Sherman
GJ-1032	Albany Junior College	John L. Baxter
GJ-1033	Albany State College	C. K. Dunson
GJ-1034	Armstrong State College	Donald D. Anderson
GJ-781	Berry College	Ouida W. Dickey
GJ-1035	Brunswick Junior College	D. M. Monroe, Jr.
GJ-1027	Fort Valley State College	William D. Moorehead
GJ-1025	Georgia College at Milledgeville	David G. Baarda
GJ-1036	Georgia Southwestern College	J. Hubert Greene
GJ-1038	Macon Junior College	Jack H. Ragland
GJ-1039	Medical College of Georgia	Russell W. Morse
GJ-1040	Middle Georgia College	Harry D. Crawford
GJ-1149	Paine College	Leonard E. Dawson
GJ-1042	Savannah State College	Martha Wilson
GJ-1043	South Georgia College	Robert R. Johnson
GJ-1044	Valdosta State College	Sam W. Brooks III

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## ABSTRACT

This annual report describes the work done within the State of Georgia by the University System Computer Network operating under the direction of Dr. James L. Carmon, Assistant Vice Chancellor for Computing Systems, University System of Georgia. A significant portion of this work was conducted under National Science Foundation Grant GJ-608, Dr. James L. Carmon and Dr. I. E. Perlin, Principal Investigators, and covers the period from April 1, 1970 through March 31, 1971.

The University System Computer Network is an organization of thirty-two institutions of higher learning within the State of Georgia under the technical direction of Robert R. Pearson, Coordinator. The purpose of the organization is to provide low-cost computing services and training to meet the academic needs of all Network institutions. This goal has been reached by establishing a network of terminals and telephone circuits which extend the computing power at the major institutions to the remote campuses. The training effort is a continuing project consisting of a series of meetings and workshops held throughout the State.

Two Central Sites, University of Georgia and Georgia Institute of Technology, and sixteen remote schools are receiving support from the National Science Foundation under eighteen additional grants. Their work during the past year is also described in this report. The NSF supported remote schools are Abraham Baldwin Agricultural College, Albany Junior College, Albany State College, Armstrong State College, Berry College, Brunswick Junior College, Fort Valley State College, Georgia College at Milledgeville, Georgia Southwestern College, Macon Junior College, Medical College of Georgia, Middle Georgia College, Paine College, Savannah State College, South Georgia College, and Valdosta State College.

Georgia State University also provides computing service to the Network and additional users are: Augusta College, Clayton Junior College, Clark College, Columbus College, Dalton Junior College, Floyd Junior College, Gainesville Junior College, Georgia Southern College, Kennesaw Junior College, Mercer University, North Georgia College, Wesleyan College, and West Georgia College.

First Annual Report To The National Science Foundation

On Grant GJ-608

Experiment In The Development Of A Regional Computer Center

INTRODUCTION

In the State of Georgia, overall control of all state-supported colleges and universities is vested in the Board of Regents. The fifteen members of the Board serve seven-year terms and are appointed by the Governor, subject to confirmation by the State Senate. The Board serves to establish policies for the University System of Georgia with executive direction provided by the Chancellor.

The University System consists of three universities, a medical college, twelve senior colleges and eleven junior colleges, each directed by a president reporting to the Chancellor. These units are geographically dispersed throughout the state as shown in Figure 1. This dispersion provides higher-educational facilities within commuting distance of most of the population, although fifteen units are residential. Seven additional junior colleges have been authorized by the Board and are expected to begin operations in the near future.

Recent enrollment increases within the University System have been dramatic. Fall enrollment in 1960 was 30,686 students. In 1970, enrollment had grown to 92,602 students.

Most of the research, graduate and professional work is conducted at the four major institutions: the University of Georgia, Georgia Institute of Technology, Georgia State University, and the Medical College of Georgia.

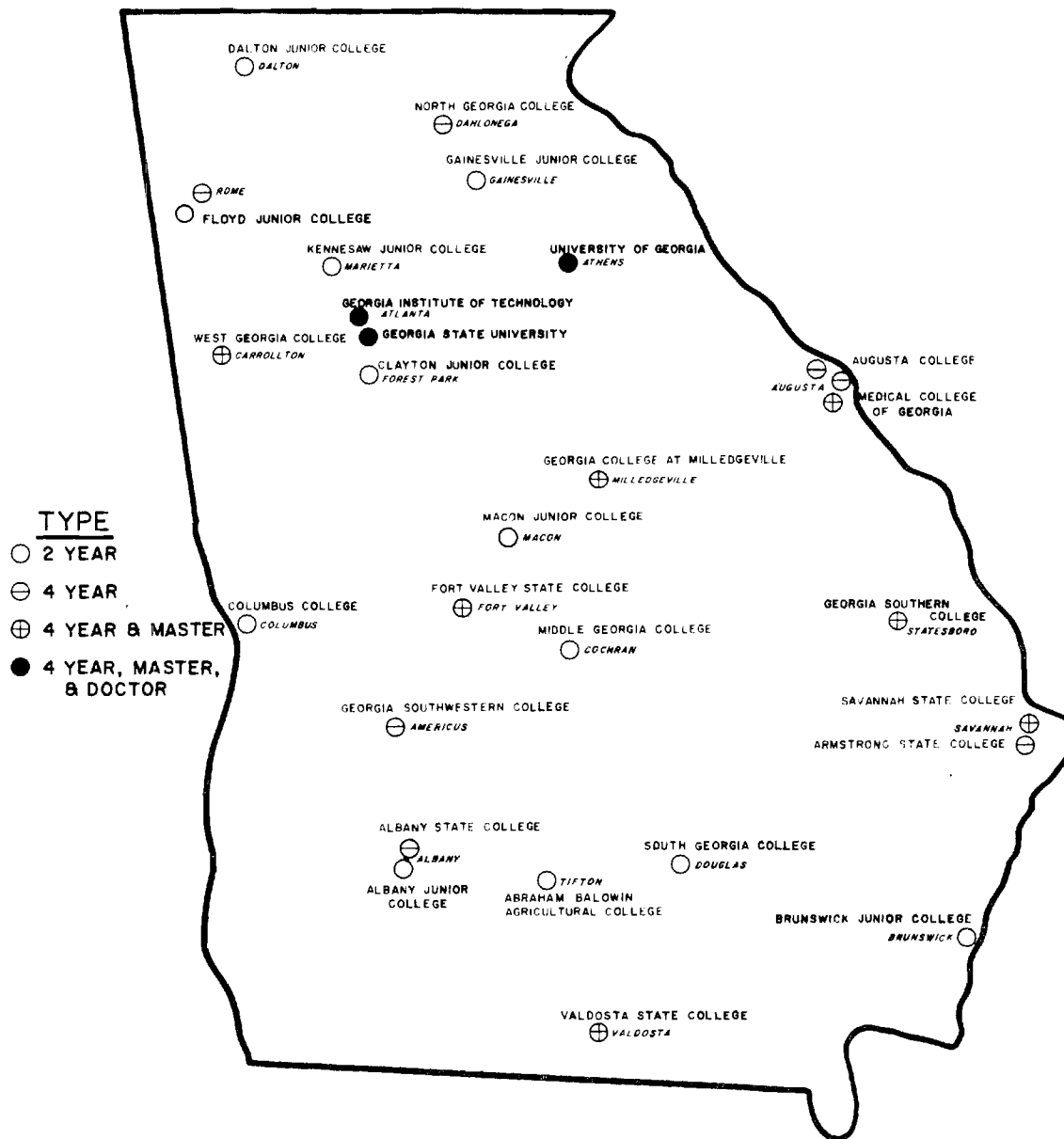


Fig. 1.-- UNIVERSITY SYSTEM OF GEORGIA

Six of the senior colleges offer masters degrees. They are: Fort Valley State College, Georgia College at Milledgeville, Georgia Southern College, Savannah State College, Valdosta State College and West Georgia College. The other senior colleges are: Albany State College, Armstrong State College, Augusta College, Columbus College, Georgia Southwestern College, and North Georgia College.

The junior colleges are: Abraham Baldwin Agricultural College, Albany Junior College, Brunswick Junior College, Clayton Junior College, Dalton Junior College, Floyd Junior College, Gainesville Junior College, Kennesaw Junior College, Macon Junior College, Middle Georgia College, and South Georgia College.

## SCOPE OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

On May 18, 1970, the University System Computer Network and the Office of the Coordinator were established within the University System of Georgia under the overall direction of Dr. James L. Carmon, Assistant Vice Chancellor for Computing Systems, and Dr. I.E. Perlin, Director of the Rich Electronic Computer Center, Georgia Institute of Technology. The purpose of the organization was to provide low-cost computing services and training to meet the academic needs of all Network members.

During its first year of operation, the Network has grown to include thirty-two institutions - all of the units in the University System plus five private institutions within the State of Georgia.

Over 65,000 students on twenty-nine remote campuses have access through forty-two installed terminals and small computers to the powerful computing facilities at three Central Sites - University of Georgia, Georgia Institute of Technology, and Georgia State University. Presently the Network contributes to the total program of higher education in Georgia by providing modern computer facilities to students and faculty of all member institutions.

### History of Data Communications Within The University System

The role of computers within the University System has been under close study for many years. At the same time, the use of computers has been increasing in all phases of instruction, research and public service. The result of this study was a plan to bring about Systemwide coordination of acquisition and utilization of computers.



In July, 1968, Dr. James L. Carmon was appointed to the post of Vice-Chancellor for Computing Systems to implement this plan. Through the collaboration of Drs. Carmon and Perlin and William H. Wells, Director of Computer Center, Georgia State University, the concept of the Computer Network was developed.

Under this plan, several remote schools established data communications links to the IBM 360/65 at the University of Georgia. During 1968, West Georgia College installed two remote terminals and the following year Clayton Junior College, Columbus College, Georgia Southern College, Kennesaw Junior College, and North Georgia College also installed remote terminals.

This initial period of experimentation by these six institutions revealed the feasibility of the Network approach. Once installation difficulties were overcome, the integrity of the terminals and the lines proved to be more than adequate to extend computing services to these schools. There were the obvious limitations of speed and type of service; but, in general, the terminals were very well received and in many cases heavily used.

#### Network Concept

The basic premise of the Network approach is that if students in all the universities and colleges of the University System are to be provided quality education in the computer field, the computer facilities available to them must be made comparable to those of the large universities. Obviously, it would not be feasible from a financial standpoint to install a large computing system at each of the institutions; and, aside from financial limitations, personnel to completely support large computer installations could not be obtained. Any plan to provide service to the System would have involved some additional resources, but the most economical appeared to be the Network.

Under the Network plan, a small upgrade of the facilities at the Central Sites would provide the computing power to support all schools. Relatively inexpensive terminals at the remote schools would serve the users, and standard voice-grade telephone circuits would connect the system. Depending on the availability of software and hardware interfaces, the remote user would have the capability of accessing more than one computing system. This flexibility would actually provide the remote user with better service than if he were at a major campus, because he would have access to more library programs to support his work. This multi-access approach would yield several interconnected networks (which have come to be known as the SuperNet).

From the beginning, it was realized that the success of the Network would require more than the installation of terminals. It would be necessary for at least a small group of faculty members on each remote campus to know how to use the computing facilities in order that maximum benefit be derived from the Network. A knowledge of the basics of programming was therefore considered essential to effective use.

Some of the schools were fortunate to have faculty members who had previous experience in data processing, but the exposure of others to computing had been very limited. To achieve this objective, a training program would have to be developed which would include discipline-oriented instruction as well as programming workshops.

The implementation of these plans received major impetus in April, 1970, with the award of the nineteen grants from the National Science Foundation. Their summary of the proposed work is as follows:

The University System of Georgia will establish a state-wide regional computer network which will extend the computing resources of the University of Georgia and the Georgia Institute of Technology to all of the institutions in the University System. This extension will greatly strengthen the educational tools available to both faculty and students at the institutions in the System which now have very limited computing facilities or no computing facilities at all. Two major institutions and twenty-one small colleges will initially be involved. The small colleges will be tied to the closest of the two major institutions via a variety of low, medium and high-speed terminals. The University System will establish a central staff of curriculum experts and computer specialists which will provide the technical support, assistance and faculty training programs required to implement the infusion of the computer into the academic curriculum of the participating institutions.

#### Network Organization

The two Principal Investigators, Drs. Carmon and Perlin, furnish overall guidance of the project. Technical direction and operational responsibilities rest with the Coordinator, Robert R. Pearson. He is assisted by William D. Brown and Miss Gainor E. Gunter in carrying out the tasks necessary for coordinating and administering the Network.

The Central Site Committee, composed of representatives from each of the Central Sites, meets regularly with the Coordinator and the Principal Investigators to consider questions of operational support from the host computers. These Sites provide a broad base of software and training support for Network users. Members are: Dr. Britain J. Williams, Associate Director of the University Computer Center, University of Georgia; Col. John P. McGovern, Associate Director of the Rich Electronic Computer Center, Georgia Institute of Technology; and William H. Wells, Director of the Computer Center, Georgia State University.

The key man in the organization is the Campus Coordinator. Each participating institution has one person appointed by its president to be

responsible for the installation, usage and development of the computer project on the campus. All external assistance is channeled through him, and all local training is organized by him. The Campus Coordinators meet quarterly with the Principal Investigators, the Coordinator and the Central Site Committee to review the progress of the Network and consider plans for future development. Possibly the most important aspect of these meetings has been the informal interchange between these key people with common concerns.

#### Summary of Participants

During the first year, the computing power of five large-scale systems has been made available to the remote users, and the number of users has grown from the original six schools which pioneered in this activity to twenty-nine institutions. The participating institutions are listed in Table 1. Their individual enrollments range from 464 to 4859 equivalent full-time students. Their geographic locations are shown in Figure 2.

Although some of these schools did not elect to participate in the Network at its inception, all units of the University System are currently active along with five private institutions. There has been no general canvassing of the private schools in Georgia; those that are currently active sought out computer assistance during the last few years. It is important to note that the private schools are being served on a non-profit basis by the University System.

TABLE 1  
LISTING OF PARTICIPATING INSTITUTIONS

<u>NAME</u>	<u>LOCATION</u>	<u>TYPE</u> <sup>1</sup>	<u>ENROLLMENT</u> <sup>2</sup>	<u>CODE</u>
Abraham Baldwin Agricultural College	Tifton	Jr. Pub.	1784	ABC
Albany Junior College	Albany	Jr. Pub.	1061	AJC
Albany State College	Albany	Sr. Pub.	1994	ALS
Armstrong State College	Savannah	Sr. Pub.	1609	ARS
Augusta College	Augusta	Sr. Pub.	2135	AUC
Berry College	Mount Berry	Jr. Priv.	1044	BER
Brunswick Junior College	Brunswick	Jr. Pub.	763	BJC
Clayton Junior College	Morrow	Jr. Pub.	1354	CJC
Clark College	Atlanta	Sr. Priv.	1096	CLK
Columbus College	Columbus	Sr. Pub.	2401	COC
Dalton Junior College	Dalton	Jr. Pub.	819	DJC
Floyd Junior College	Rome	Jr. Pub.	464	FJC
Fort Valley State College	Fort Valley	Sr. Pub.	1772	FVS
Georgia College at Milledgeville	Milledgeville	Sr. Pub.	1772	GCM
Georgia Institute of Technology	Atlanta	Univ. Pub.	(Note 3)	GIT
Gainesville Junior College	Gainesville	Jr. Pub.	798	GJC
Georgia Southern College	Statesboro	Sr. Pub.	4859	GSC
Georgia State University	Atlanta	Univ. Pub.	(Note 3)	GSU
Georgia Southwestern College	Americus	Sr. Pub.	2186	GSW
Kennesaw Junior College	Marietta	Jr. Pub.	1148	KJC
Medical College of Georgia	Augusta	Univ. Pub.	1214	MCG
Mercer University	Macon	Univ. Priv.	1929	MER
Middle Georgia College	Cochran	Jr. Pub.	2094	MGC
Macon Junior College	Macon	Jr. Pub.	1071	MJC
North Georgia College	Dahlonega	Sr. Pub.	1073	NGC
Paine College	Augusta	Sr. Priv.	672	PNC
South Georgia College	Douglas	Jr. Pub.	1028	SGC
Savannah State College	Savannah	Sr. Pub.	2304	SSC
University of Georgia	Athens	Univ. Pub.	(Note 3)	UGA
Valdosta State College	Valdosta	Sr. Pub.	2670	VSC
Wesleyan College	Macon	Sr. Priv.	528	WES
West Georgia College	Carrollton	Sr. Pub.	4654	WGC

Total 48,874

- Notes: 1. Some Senior Institutions have graduate programs.  
All University Institutions have doctoral programs.
2. Fall 1970 - Equivalent Full Time
3. A Central Site whose computers serve remote users.

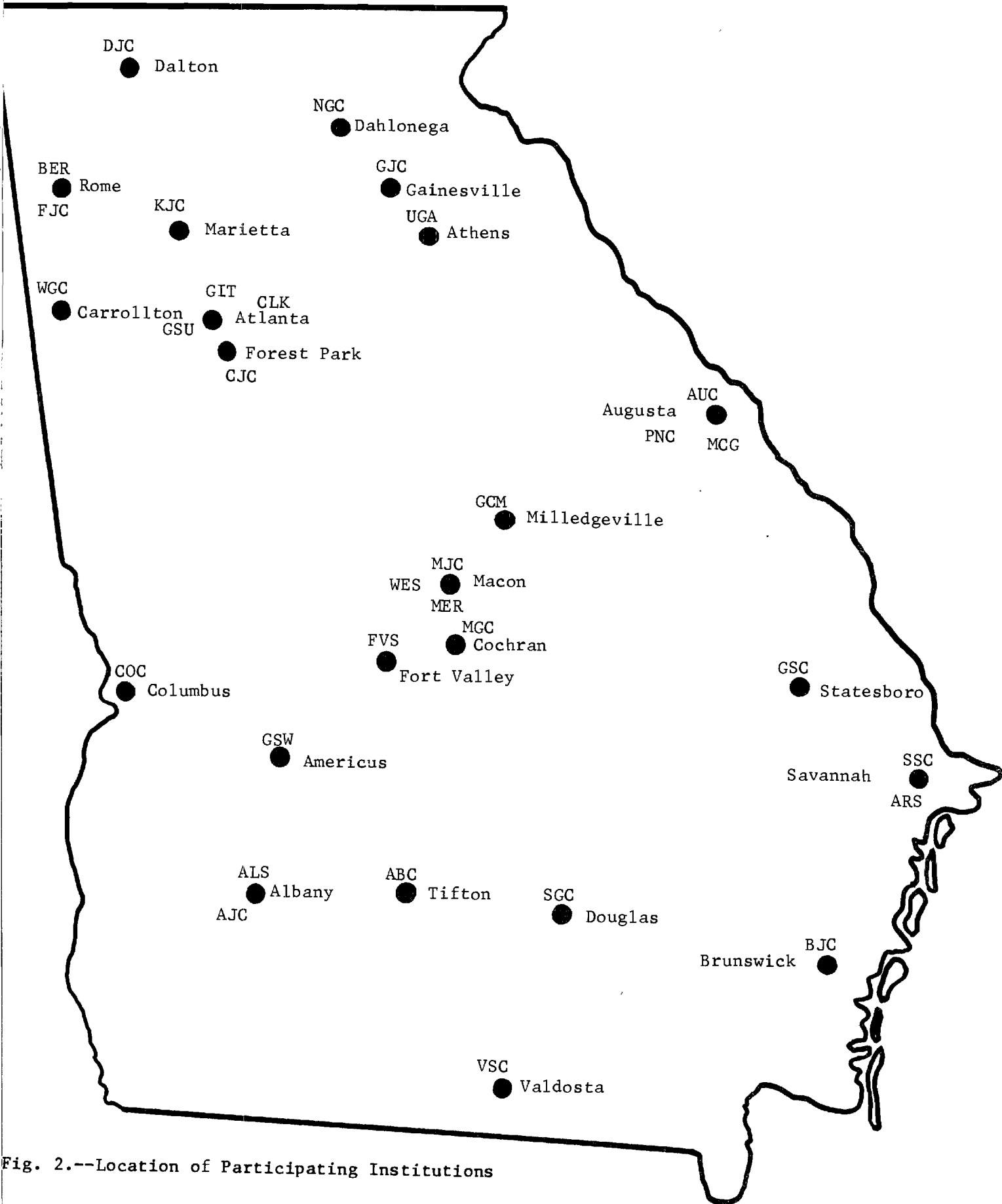


Fig. 2.--Location of Participating Institutions

## CONFIGURATION OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

A prime consideration during development of the Network has been that users at all remote sites be able to gain access to as many of the central computers as possible. Universal access, however, has proved to be unrealistic because of the great variety of equipment in the Network.

In all cases, computer access is accomplished over voice-grade telephone lines on a dial-up basis. The ability of the remote user to access more than one system depends on the availability of interfaces and the economics of the line costs.

### Central Site Hardware

The locations of the three Central Sites are shown in Figure 3. Two computing systems are physically located in Atlanta and two in Athens.

The Rich Electronic Computer Center (RECC) at Georgia Tech provides Network users with access to their Shared Processor System, Univac 1108 (196k of core), which operates under EXEC. 8. This machine is capable of both remote, demand and batch operations, supporting the Univac 9200's in the Network, and interactive or on-line conversational programing using the Univac Time Sharing system. The latter system supports ASR 33 teletypes and teletype-compatible devices at 110 baud and 300 baud.

The RECC also supports a limited amount of Network usage on their Burroughs B-5500 (32K) system. Most Network utilization of this system has been from low-speed devices.

The computer center at Georgia State University provides computer capability to the Network through their RCA Spectra 70/46 (256K of core) which operates under the Time Sharing Operating System (TSOS), supporting both teletype-compatible debices and the IBM 2741. Support for medium-speed terminals is contemplated in the near future.

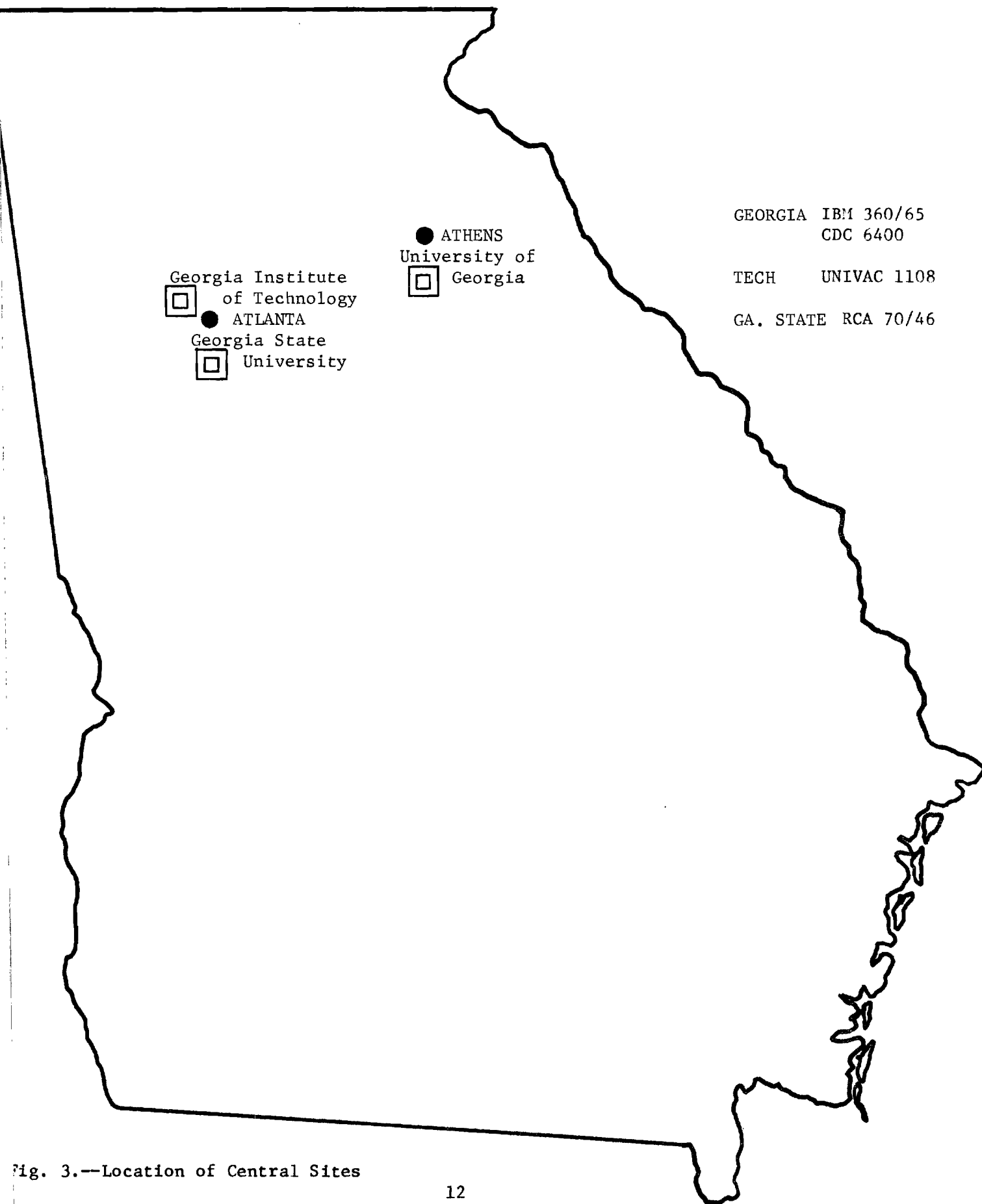


Fig. 3.—Location of Central Sites



The University of Georgia Computer Center (UGACC) presently has two large-scale systems which are available to the Network. An IBM 360/65 with 512K of high-speed core and 1m bytes of low-speed core offers both Remote Job Entry (RJE) and low-speed interactive capability through the Conversational Programming System (CPS). This computer system runs under OS/MVT with HASP-II and is capable of communications with all types of terminals presently operating in the Network.

The second system at the UGACC is a CDC 6400 with 65K words of core which operates under SCOPE 3.3. This system is supporting the IBM 1130 terminals in medium-speed (2000 baud) operation and teletype-compatible devices at 100 baud under INTERCOM 2.

#### Remote Hardware

Table 2 lists the remote installations and the hardware currently in use at each site. The terminals listed under "Keyboard" are low-speed\* terminals, and the "batch" terminals are medium-speed. Installation dates tended to cluster around September 1970 and January 1971, associated with the beginning of Fall and Winter quarters.

A breakdown of equipment at the remote installations follows:

Remote Computers: IBM 1130 (5)

IBM 360/20 (1)

Univac 9200 (3)

Remote Batch Terminals: IBM2780 (3)

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\*For the purpose of this report, low-speed will be defined as 110 baud through 300 baud. Medium-speed will be above 300 baud to 9600 baud.

TABLE 2  
REMOTE INSTALLATIONS

<u>CODE</u>	<u>KEYBOARD</u>	<u>DATE INSTALLED</u>	<u>BATCH</u>	<u>DATE INSTALLED</u>
ABC	ASR-33	5-70	U-9200	5-70
AJC	(IBM 2741) <sup>1</sup>	9-70	IBM 1130	3-71
ALS			IBM 1130	11-71
ARS	IBM 2741 & ASR-33	7-70, 11-70		
AUC	IBM 1050	2-71		
BER	ASR-33	10-70	IBM 360/20	4-71
BJC	IBM 1050	10-70		
CJC	IBM 2741	1969	IBM 2780	9-70
CLK	ASR-33	12-70		
COC	IBM 2741	1969		
DJC	ASR-33	3-71		
FJC	(ASR-33) <sup>2</sup>			
FVS			IBM 1130	1-71
GCM	ASR-33	10-70	U-9200	1-71
GJC	IBM 2741	1-70		
GSC			IBM 2780	1969
GSW			IBM 1130	12-70
KJC	NCR 260 (2) & ASR 33 <sup>3</sup>	3-71		
MCG	IBM 2741	4-70	IBM 2780	4-70
MER	ASR-33 (2)	3-71		
MGC	IBM 1050	9-70		
MJC	ASR-33 <sup>4</sup>	3-71		
NGC	ASR-33 (4)	1969		
SGC	IBM 1050	11-70		
SSC	IBM 2741	1-71	IBM 1130	10-70
VSC	ASR-33	6-70	U-9200	6-70
WES	ASR-33	3-71		
WGC	IBM 2741	1968		

Notes: 1. Interim. Replaced by IBM 1130.  
2. Scheduled for installation in spring '71.  
3. Replaced IBM 1050 installed in 1969.  
4. Replaced IBM 1050 installed in July, 1970.

Remote Interactive Terminals: ASR 33 (16)

IBM 2741 (7)

IBM 1050 (5)

NCR 260 (2)

In summary, there are thirty low-speed and twelve medium-speed devices at remote locations throughout the Network. No high-speed devices are presently contemplated.

Figures 4 and 5 illustrate the locations of Keyboard and Batch installations, respectively. It should be noted that several installations have both keyboard and batch capability. This was found to be a very workable combination, with the two terminals alternating use of the same line. In most cases, the keyboard device is an ASR 33 teletype, so that a student can be punching a program on paper tape while the batch terminal is using the line.

#### Data Communications

The variety of equipment in the Network creates obvious restrictions in communication to the central computers. In order for all users to have access to any computer capable of communicating with their terminal, all switching is done by telephone company switching equipment in the same manner as any other telephone call. In this arrangement, each computer port is assigned a telephone number. All ports of the computers located in Atlanta terminate in Atlanta. Whereas, the ports of the Athens machines are divided between Athens and Atlanta, so that remote users whose lines terminate in Atlanta can dial any computer with a local call.

Some terminals (i.e. IBM 1050, IBM 2780) can only communicate with the IBM 360/65. Therefore, the lines associated with these terminals

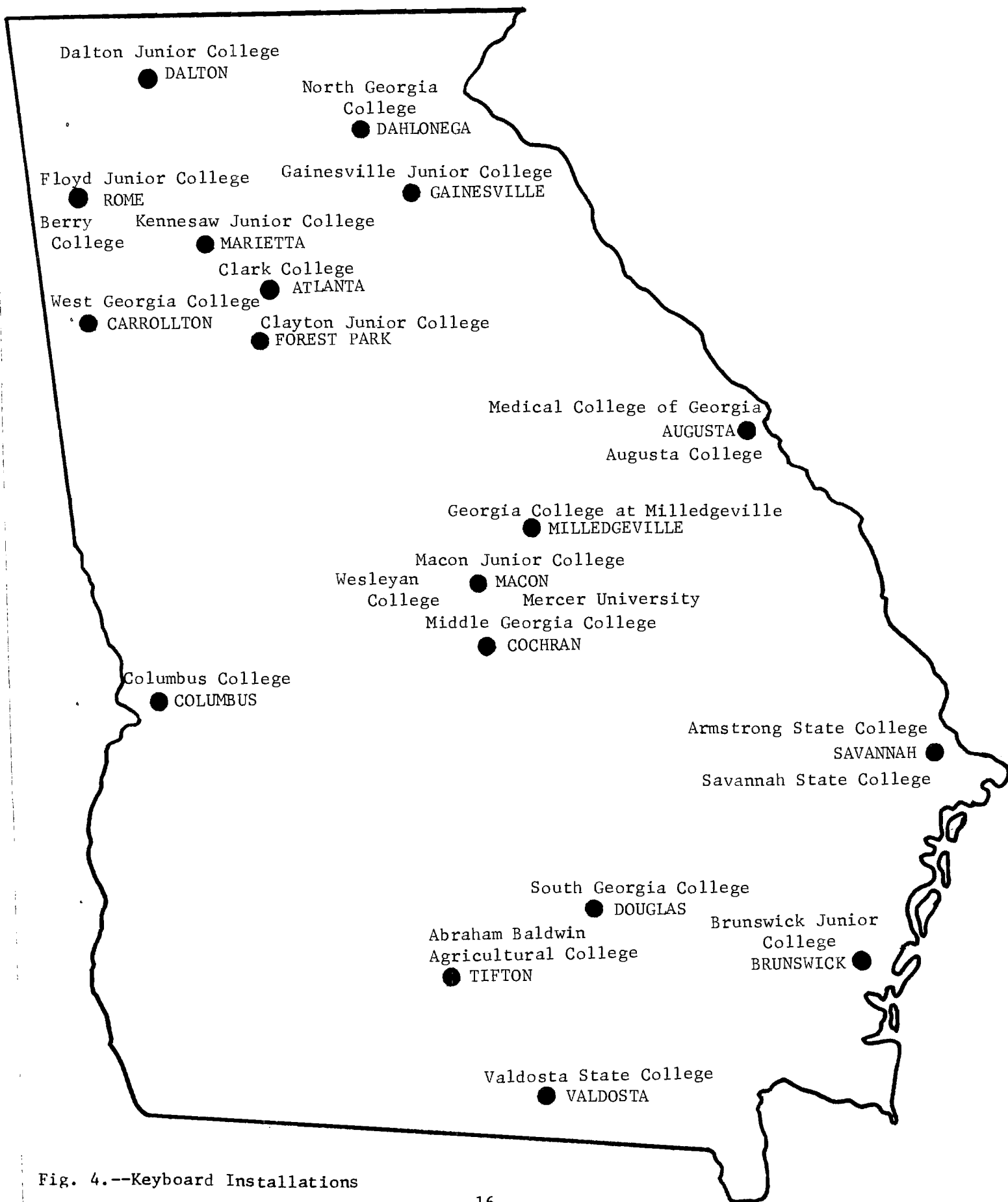


Fig. 4.--Keyboard Installations

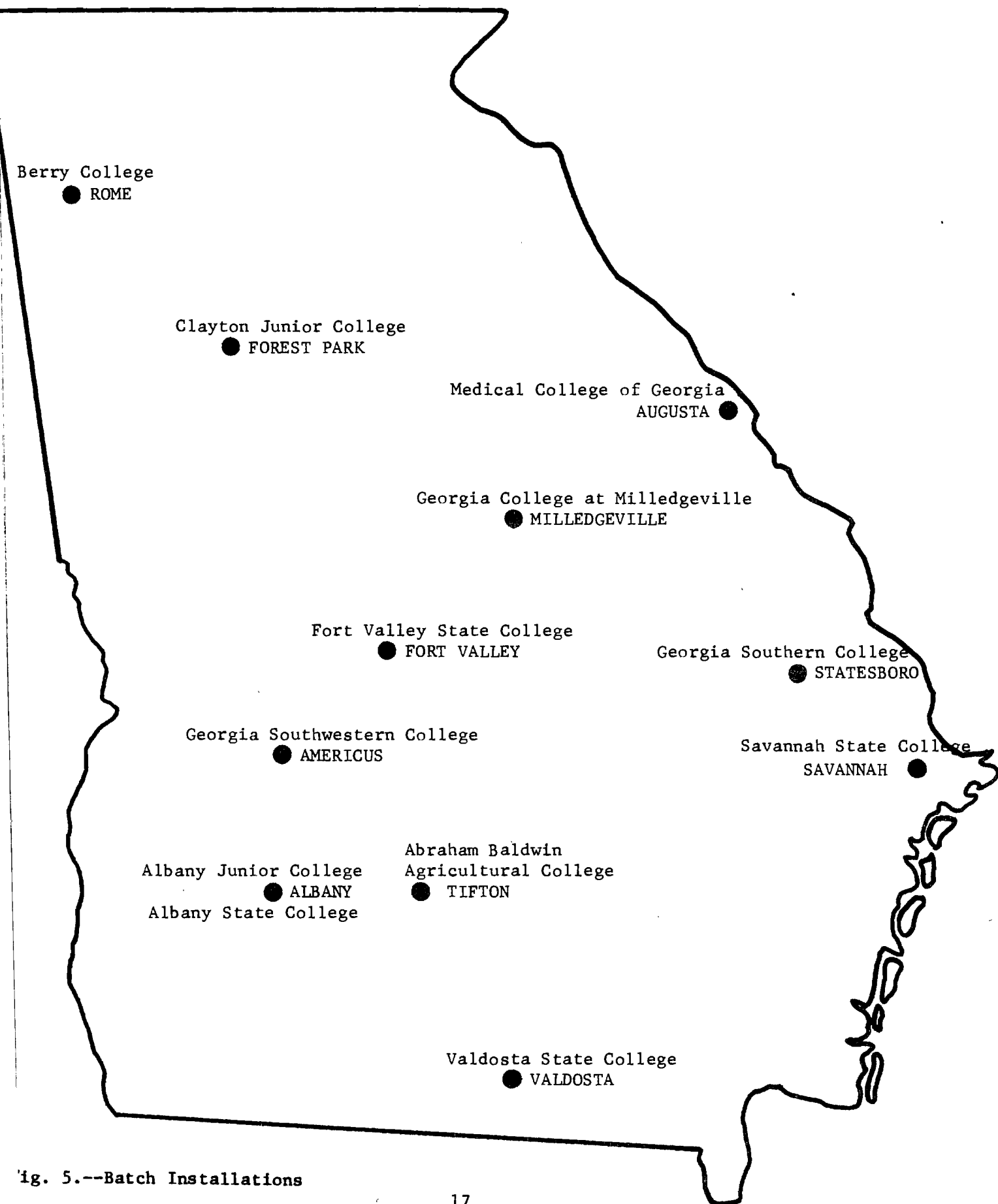


Fig. 5.--Batch Installations

have been terminated in Athens. In the future, these terminals may be replaced by units which can communicate with more of the systems.

Although all user circuits were initially terminated in Atlanta, the network was reengineered during December 1970, in an attempt to take full advantage of GSA-Shared Telpak facilities. The data communications circuits are summarized in Table 3. This arrangement allows a user to lease his foreign exchange data line from a portion of lines already leased by the Federal Government through the General Services Administration. The advantage is that the mileage rate is only \$0.62 per mile, as opposed to the \$3.00 per mile charge for a regular foreign exchange line.

At present, the services of several independent telephone companies are necessary to the operation of the Network. These companies do not all recognize the GSA-Shared Telpak arrangement. In which case, they will continue to bill at the full rate which is more than \$3.00 per mile.

The change in lines was an attempt to solve this problem for several schools located farthest from the Central Sites. It was arranged for Southern Bell to have billing control for any circuit terminating on a private exchange in their territory, thus allowing the Network to take advantage of GSA-Shared Telpak rates even if the service initiated in the territory of an independent company. To satisfy this condition, the lines of several schools were terminated on the State Centrex System.\* This configuration had the added advantage of giving these lines access to the OUTWATS lines on the Centrex. Therefore, several lines between Atlanta and Athens were discontinued, and the Centrex schools may now dial the Athens Computer

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\*All State Agencies in Atlanta consolidated their telephone circuits into a modern, private exchange in November of 1970, thus eliminating individual switchboards and providing greater efficiency in the use of OUTWATS arrangements.

TABLE 3  
DATA COMMUNICATIONS

<u>CODE</u>	<u>LOCATION</u>	<u>ACCESS POINT</u>	<u>TERMINATION</u>	<u>IXC MILES</u>	<u>TELPAC MILES</u>
ABC	Tifton	Albany	Atlanta <sup>1</sup>	40	150
AJC	Albany	Albany	Athens	--	170
ALS	Albany	Albany	Athens	--	170
ARS	Savannah	Savannah	Atlanta <sup>1</sup>	--	223
AUC	Augusta	Augusta	Athens	--	88
BER	Rome	Rome	Atlanta <sup>1</sup>	--	58
BJC	Brunswick	Brunswick	Athens	--	222
CJC	Atlanta	--	Atlanta	--	--
CLK	Atlanta	--	Atlanta	--	--
COC	Columbus	Columbus	Athens	--	139
DJC	Dalton	Rome	Atlanta <sup>2</sup>	40	58
FVS	Fort Valley	Warner Robbins	Athens	18	90
GCM	Milledgeville	Milledgeville	Atlanta <sup>1</sup>	--	81
GJC	Gainesville	Gainesville	Athens	--	35
GSC	Statesboro	Savannah	Athens	49	185
GSW	Americus	Albany	Athens	34	170
KJC	Atlanta	--	Atlanta	--	--
MCG	Augusta	Augusta	Athens	--	88
	Augusta	Augusta	Athens	--	88
MER	Macon	Macon	Athens	--	79
	Macon	Macon	Atlanta	--	77
MGC	Cochran	Warner Robbins	Athens	21	90
MJC	Macon	Macon	Athens	--	79
NGC	Dahlonega	--	Atlanta	59	--
	Dahlonega	--	Atlanta	59	--
SGC	Douglas	Alma	Athens <sup>3</sup>	23	171
SSC	Savannah	Savannah	Athens	--	185
VSC	Valdosta	Valdosta	Atlanta <sup>1</sup>	--	210
WES	Macon	Macon	Atlanta	--	77
WGC	Carrollton	--	Atlanta	--	--
Totals				343	2983

Total Network Mileage: 3,326 miles

- Notes: 1. State Centrex with OUT-WATS  
2. GSU Centrex  
3. UGA Centrex

ports through the switched network. This has proved to be effective, even for the medium-speed terminals operating at 2000 baud.



## SERVICES OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

A variety of services is available to the Network participant, ranging from personal visits by a "circuit-rider" or a teaching team to the computer facilities themselves and access to the curriculum projects of other participants.

### Consultation

During the past year, the Coordinator and Technical Assistant regularly scheduled visits to each school for the purpose of meeting with the Campus Coordinator to discuss questions, training requirements, or problem areas and solutions.

Prior to terminal installation on the remote campus, consultation was provided on such matters as selection and location of equipment, determining potential users, telephone circuits, etc. Many of the details involved with actual installation, including the processing of equipment contracts, were handled by the Coordinator's Office, in addition to the subsequent assignment of account and telephone numbers, distribution of log-on procedures, manuals, etc.

After an operational procedure had been established, orientation of faculty and students in machine utilization was initiated. A discussion of these efforts follows in a later section of this report.

In addition to the regularly scheduled visits to the remote campuses, concentrated assistance by the Coordinator's staff was given to Network institutions as individual needs arose. The type and amount of attention required by each school varied with the level of maturity of the installation. If major problems were revealed with increased usage at the remote installation, the limitations were studied by the Coordinator and Technical Assistant and consideration was given to the other equipment available which might better serve the school's computing needs.

As the campus computing experience matured, it became obvious that these two circuit riders could not keep abreast of all of the technical developments at all of the Central Sites. Therefore, with regard to "hard-core" training, their work has shifted to scheduling visits of computer and curriculum experts from the Central Sites to meet this need.

### Training

As previously stated, the existence of varied levels of computing experience among faculty members at Network institutions necessitated the creation of a formal training program. Although all of the instructors selected as Campus Coordinators for these schools possessed some experience in the field, it was felt that they should be exposed to a standard technical base. In an attempt to fulfill this objective, a series of statewide and regional workshops were conducted during August, September, and October.

#### Statewide Workshops at Georgia State University:

1. August 12-14 32 attendees
2. August 26-28 62 attendees

Each session consisted of twenty-four hours of lecture, discussions, and laboratory work. Lectures were provided by personnel from Georgia State University, Georgia Institute of Technology, the University of Georgia, Agram Baldwin College, and West Georgia College. Computing facilities were provided by Georgia State and the University of Georgia. Instruction content and time allotments were as follows: two days of programming concepts using FORTRAN; one day of interactive programming using CPS and BASIC; one day of orientation to special program packages--Biomedical Computer Programs (BMD), General Purpose Simulation System (GPSS), etc.; and one day of presentation of other languages--COBOL, PL/I, and CONTROL.

Because the background of the participants varied greatly, some of the technical material was not immediately applicable to all participants; however, it was felt that this broad survey of methods and applications would be a common base upon which to develop specific areas at a later time.

#### Regional Workshops:

These technical workshops were conducted for faculty members from neighboring schools by the local Campus Coordinators with support from Georgia State University, Georgia Institute of Technology, University of Georgia, and other Coordinators. The content of instruction was designed to familiarize and orient participants to some of the capabilities of the Network.

1. Abraham Baldwin Agricultural College	Sept. 9-11	65 attendees
2. Kennesaw Junior College	Sept. 17-18	24 attendees
3. Georgia Southern College	Sept. 17-18	30 attendees
4. Macon Junior College	Oct. 1-12	30 attendees

On almost every campus, a short training session has been conducted soon after installation. Some of these have attracted a large number of faculty members; others have concentrated on special interest groups.

Many of the schools have organized short workshops on their own initiative. In June, Albany Junior College arranged for a two-day computer concepts course which was attended by 49 representatives from the four schools in that area. In October, Abraham Baldwin Agricultural College held a two-day session on applications for agricultural scientists. Other training sessions have been held at Albany State College, Augusta College, Brunswick Junior College, Gainesville Junior College, South Georgia College, Savannah State College, and Paine College.

In February, Berry College held a two-day teletype workshop with 35 participants from four schools in that area, and in March, five user-group meetings were held. IBM 2780 users met in Atlanta, Teletype users met at North Georgia College. IBM 1130 users met at Georgia Southwestern College. Univac 9200 users met at Abraham Baldwin Agricultural College, and IBM 1050-2741 users met at Middle Georgia College.

In general, the training needs have been met on a demand basis, with more and more of the instructors coming from the Central Sites, as the users become more sophisticated. A catalog of short course presentations has been prepared and is included as Appendix C. The Campus Coordinator can select courses from this catalog according to his assessment of the local needs and interest. The presentations are then scheduled by the Coordinator's Office.

#### Interactive Software

Each computer system maintains a set of interactive programs in a public library which is available to all users. In addition to these public libraries, systems which have the necessary file space allow users to maintain their own private libraries on-line. Programs of general interest are accepted into the public libraries, subject to the restriction that they are fully documented.

At the present time, most of the programs in the interactive libraries are oriented toward instruction, rather than research. In addition to the standard mathematical and statistical routines, an increasing number of programs are being developed in direct support of specific courses.

The available languages and operating schedules of the four central systems are listed below.

RCA 70/46 - BASIC	Monday - Friday	8:00 AM - 11:00 PM (Systems time and maintenance from noon to 1:00 PM and from 5:30 - 6:30 PM)
	Saturday	8:00 AM - 4:00 PM
	Sunday	Noon - 3:00 PM
CDC 6400 - BASIC	Monday - Friday	8:00 AM - 3:00 PM, 5:00 PM - 7:00 AM
	Saturday - Sunday	24 hours
IBM 360/65 - BASIC, PL/I	Daily	10:00 AM - Midnight
U-1108 - BASIC, FORTRAN	Monday, Wednesday, Friday	8:00 AM - 2:00 AM
	Tuesday, Thursday	10:00 AM - 2:00 AM
B 5500 - WIPL	Monday - Friday	2:00 PM - 9:00 PM
	Saturday	8:00 AM - 12:00 Noon

#### Batch Software

The capabilities of smaller remote computers in the Network are greatly extended through the remote batch operations of the U-1108, CDC 6400 and IBM 360/65. In general, all of the software that is available to onsite users is also available to the remote users.

The operating schedules for remote batch work are the same as for interactive.

#### Program Libraries

Over nine hundred programs are currently available to Network users through the program libraries of the three Central Sites. Abstracts of the programs have been compiled into manuals and distributed to the

Campus Coordinators and other users. These programs include several programming packages - STAT-PACK, MATH-PACK, Scientific Subroutine Package (SSP), Biomedical Computer Programs (BMD) - as well as Management games, tests of hypotheses, and subroutines with financial and industrial applications.

## IMPACT OF UNIVERSITY SYSTEM COMPUTER NETWORK

At the participating institutions, the Network has met a locally-recognized need. As young faculty members began their teaching assignments, they often did not have access to the type of computing services that had assisted them in their education. Many students and other faculty members had also become aware of computing, but the cost of local facilities was prohibitive.

### Campus Coordinators

The growth and development of computing interest and usage has been the responsibility of the Campus Coordinators. They have traveled to state and regional workshops, learned about their equipment and the services of the Network, and supervised the local installation and training. A complete list of Campus Coordinators is shown in Appendix D. Besides carrying out the work of coordination on their own campus, many have visited other schools as guest lecturers and workshop leaders. This interchange of Coordinators has proven to be very effective.

### Faculty Involvement and Student Participation

As might be expected, most of the faculty interest comes from the mathematics and science departments. However, the enthusiasm and work from these disciplines has begun to generate efforts from others as well.

Faculty from every remote campus in the Network have participated in terminal user seminars, statewide and regional technical workshops to learn terminal usage, applications, and languages. In addition to these training sessions structured by the Coordinator's Office, approximately 14 Campus Coordinators have either led their own series of internal

workshops designed for faculty or requested instructors from the Central Sites to give short course presentations on their campuses. The approximate total number of faculty participating in these combined sessions is 1,057.

The total number of individual faculty employing the use of the terminal as an aid to instruction and problem solving is 106. These faculty members represent a total of 172 computer science and other curricular courses taught to a combined total of over 6,584 students. Of the students who have learned applications in courses designed to utilize the terminal, many are independently employing it in other courses.

One hundred and eleven faculty members are conducting research projects ranging from the evaluation of degree programs to statistical analysis and experimental modeling. For a distribution breakdown of these figures by schools, see Table 4.



TABLE 4

FACULTY AND STUDENT PARTICIPATION FIGURES\*

	<u>Faculty Attendance at Workshops</u>	<u>Faculty Engaged in Research</u>	<u>Instructors Utilizing Computer in Courses</u>	<u>No. of Computer Science Courses Taught</u>	<u>Students Enrolled in Courses</u>
ABC	119	10	5	6	522
AJC	26	-	3	4	117
ALS	80	2	2	2	62
ARS	2	-	5	12	200
AUC	38	12	2	3	68
BER	37	2	3	6	93
BJC	16	1	4	7	210
CJC	2	1	6	8	428
CLK	2	-	3	3	200
COC	1	4	4	7	415
DJC	2	-			
FJC	3	-			
FVS	1	3	2	5	58
GCM	3	1	2	14	255
GJC	14	1	3	3	100
GSC	30	20	6	8	850
GSW	75	6	5	6	378
KJC	30		8	9	234
MCG	6	14	3		60
MER	7	2	4	3	105
MGC	49	-	7	9	531
MJC	24	-	4	6	144
NGC	39	6	8	14	375
PNC		-			
SGC	42	-	1	2	50
SSC	57	3	2	12	449
VSC	27	6	5	7	177
WES	2	2	4	4	47
WGC	<u>323</u>	<u>15</u>	<u>5</u>	<u>12</u>	<u>456</u>
TOTALS	1057	111	106	172	6,584

\*The figures in this table have been reported by the participating institutions and in several cases, represent estimates - not absolute accuracy.

### Curriculum Efforts

The first year's work was primarily concerned with installations and initial training. However, curriculum development, the major task facing the Network, has already begun in a number of areas, indicating the direction of next year's work.

For the most part, those schools which have participated in the Network from the time of its establishment have been the most active in the area of curriculum development. Two schools, Kennesaw Junior College and North Georgia College have developed several terminal demonstrations, exercises and class assignments to aid curricular instruction. Kennesaw has a series of programs running in support of their physics courses. Columbus College has produced a number of programs for support of chemistry and biology courses. Both Macon Junior College and Valdosta State have developed chemistry courses around use of the terminals. Several other schools have also begun these efforts.

As they have had computer capability longer than any of the Network schools, the Central Sites already have a number of courses built around terminal usage. Incorporation of the computer into as many additional disciplines as possible is the goal for the coming year. Plans are presently being formulated to initiate discipline groups at the remote schools with the objective of implementing dissemination of user-developed programs throughout the Network. It is hoped that all programs currently used with course work at any school will soon be documented and available in public files to all Network users.

### Amount of Usage

Network utilization by participating institutions is tabulated in this section. Table 5 shows total connect-time (in hours) per school

TABLE 5  
COMPUTER NETWORK UTILIZATION:  
TOTAL LOW-SPEED CONNECT HOURS  
(October 1970-March 1971)

<u>Institution</u>	IBM 360/65	RCA 70/46
ABC	85.57	19.01
AJC	23.75	
ALS		
ARS	385.14	98.81
BER	27.59	4.05
BJC	266.45	
CJC	348.68	38.09
CLK		98.73
COC	186.21	
GCM		325.93
GJC	32.27	
GSC		0.23
KJC	274.15	15.14
MCG	172.10	
MER	60.26	50.79
MGC	446.02	0.08
MJC	1468.82	2.36
NGC	113.90	265.03
SGC	97.11	0.08
SSC	79.46	
VSC	126.95	245.54
WES		5.82
WGC	<u>793.48</u>	<u>67.97</u>
TOTALS	4978.91	1232.66

NOTE: Figures for connect-time on Univac 1108 not available.

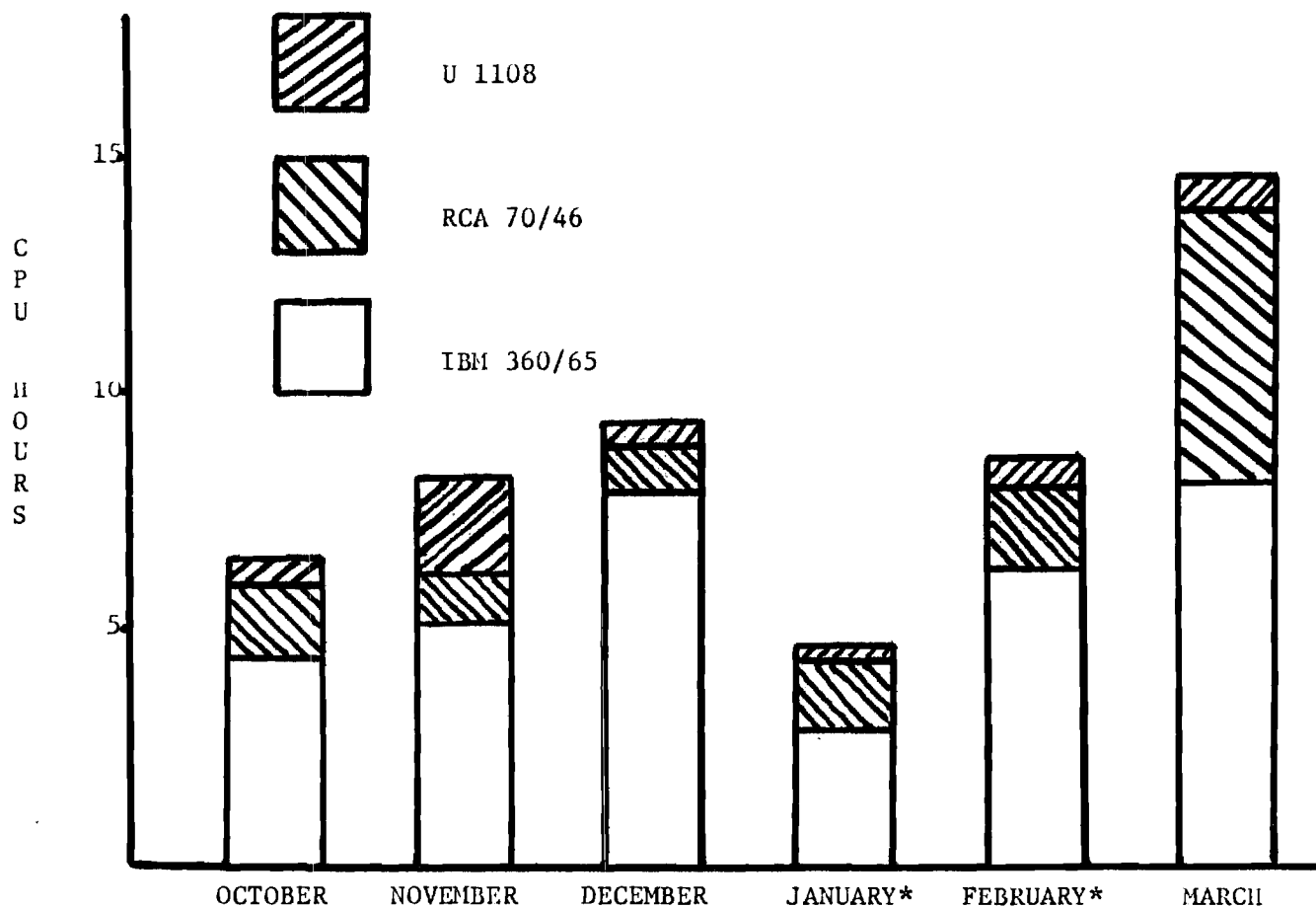
for the months October 1970 through March 1971 on each major system at the Central Sites. Table 6 gives the same breakdown for CPU hours.

TABLE 6  
COMPUTER NETWORK UTILIZATION

TOTAL CPU HOURS

(October 1970-March 1971)

<u>Institution</u>	IBM 360/65	RCA 70/46	U-1108
ABC	2.550	0.138	0.617
AJC	0.034		
ALS	0.008		
ARS	0.411	0.947	
BER	0.083	0.012	0.066
BJC	0.765		
CJC	5.283	0.145	
CLK		4.496	
COC	0.344		
GCM		2.294	0.561
GJC	0.114		
GSC	15.190		
KJC	0.602	0.128	0.040
MCG	4.818		
HER	0.115	0.319	
MGC	0.688		
MJC	2.573	0.007	
NGC	0.368	1.278	0.234
SGC	0.198	0.001	
SSC	0.153		
VSC	0.238	1.767	2.965
WES		0.015	
WGC	<u>1.662</u>	<u>0.482</u>	
TOTALS	36.197	12.029	4.483



\* During January and February the network was partially down for four weeks to reconfigure the communication lines.

Fig. 6 -- Total CPU Usage by Months

**APPENDIX A**  
**ANNUAL REPORTS FROM CENTRAL SITES**

# UNIVERSITY OF GEORGIA

Grant GJ-1054

James L. Carmon, Principal Investigator

The University of Georgia, founded in 1785 and opened in 1801, is the oldest chartered state university in the United States. Enrollment as of Fall Quarter, 1970, totaled 18,286.

A coeducational, residential institution, its programs fill three primary functions: 1) instruction, leading to baccalaureate and advanced degrees through the doctorate level; 2) research, both applied and basic; and 3) service, which extends University resources throughout the state.

The academic programs and degrees of the University are offered through 12 colleges and schools: College of Agriculture, College of Arts and Sciences, College of Business Administration, College of Education, School of Forest Resources, School of Home Economics, School of Journalism, School of Law, School of Pharmacy, School of Social Work, School of Veterinary Medicine, and the Graduate School. Masters degrees are offered in 26 disciplines and doctorates in 37 disciplines.

The University of Georgia Computer Center (UGACC) began operations in 1957 as the Department of Experimental Statistics in the School of Agriculture with a 602A Punch Card Calculator and a staff of two, with the function of analyzing data collected by the College Experiment Station.

Subsequent growth of the Computer Center parallels that of the University's entire research and instructional program. Services were soon extended to other agricultural experiment stations in Georgia and to the staff of the School of Agriculture, and a stored program computer was added.



Since 1959, hardware capabilities at the Computer Center have grown from an IBM 650 to two major computing systems--an IBM 360/65 and a CDC 6400--and an IBM 7094. Two IBM 1401 systems serve as input/output peripheral units for the 7094. In addition to these computers, current hardware also includes an IBM 1130, used by the AMTRAN group, an IBM 1620, and 35 remote terminals on the University campus.

The present UGACC staff of over one hundred consists of programmers, analysts, consultants, researchers, clerks, machine operators and administrative personnel. Most staff members are classified, by their particular jobs, into one of the following groups: Research, COSMIC, Information Sciences, Systems, Applications, Operations, Consulting, User Services and Educational Services.

The most significant changes made at the Computer Center during the past year to accommodate Network users have been in the areas of hardware and services.

As an upgrade to the IBM 360, an IBM 2703 communications controller was installed in July, 1970, to provide 360 dial-up capability up to 2000 baud to terminals throughout the Network. This hardware upgrade extended access to the 360 to U9200's, IBM 1130's and MOD 20's and permitted simultaneous dial-ups by these machines as well as the IBM 2780's and Models 33 and 35 teletypewriters.

In November, 1970, installation of a second major system, the Control Data 6400-65K words (60 bits) greatly increased the power of the UGACC to handle the increasing work load created by Network users. Monthly utilization of the 360 by Network users for October, 1970 - March, 1971, is shown in Table 1.

TABLE 1

## IBM 360/65 MONTHLY NETWORK UTILIZATION

## CPU HOURS

(October 1970 - March 1971)

	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>
ABC	0.11	0.48	0.28	0.37	0.14	1.15
AJC		0.13	0.02			
ALS					0.04	0.01
ARS	0.03	0.55	0.04	0.01		0.03
BER					0.08	0.01
BJC		0.14	0.11	0.10	0.23	0.18
CJC	0.37	0.82	0.83	0.78	1.16	1.03
COC		0.06	0.11	0.02	0.11	0.04
DJC						
FVS						
GJC		0.08	0.08		0.05	0.06
GCM			0.07			0.02
GSC		2.76	4.74	1.11	2.30	3.84
KJC		0.17	0.13	0.14	0.17	
MCG	0.82	0.51	0.09	0.10	1.24	1.06
MER				0.01	0.10	0.01
MGC		0.14	0.19	0.05	0.16	0.14
MJC	1.97	0.11	0.13	0.07	0.21	0.09
NGC	0.25	0.05	0.04	0.02		
SGC				0.01	0.06	0.12
SSC					0.12	0.03
VSC	0.02	0.03	0.10	0.03	0.06	0.01
WGC	<u>0.72</u>	<u>0.14</u>	<u>0.14</u>	<u>0.18</u>	<u>0.20</u>	<u>0.33</u>
	4.56	6.17	7.10	3.00	6.39	8.16

Configuration for the 6400 is listed in Table 2. This machine operates under SCOPE 3.3. Currently supported software includes COBOL 3.0, FORTRAN EXTENDED 3.0, COMPASS, SORT/MERGE, BASIC II, INTERCOM II, and ALGOL 2.

A manual containing abstracts of 134 programs available to remote users through the CPS and UGA Public Libraries, including the programming packages Biomedical Computer Programs (BMD) and Scientific Subroutine Package (SSP), was compiled and distributed to Campus Coordinators in January. In addition to the capability of each routine, these abstracts list such information as index terms, documentation source and language(s) or machine(s) on which the programs are available. Updates to this manual have also been transmitted, as a number of programs have been converted for use on the 6400 since date of publication.

WATFIV--a high-speed, single-step FORTRAN compiler which minimizes the cost of remote terminal operation--was made available to 360 users in February, 1971. Because of its capability to process many FORTRAN programs in the same jobstep, WATFIV allows optimum use to be made of communications lines through reductions in time and costs.

The Systems Group at the Computer Center has been constantly involved in configuration changes necessitated by growth of the Network and in development of procedures required for these alterations. Local changes have been made to INTERCOM 2.0, and UNIHASP has been extensively modified to support the U9200's in the Network. Management of the Network from the Systems standpoint has included such activities as designing forms for remote user requests, accumulating Network passwords, providing direct access and file spaces for remote users, and planning with the Central Office for future development. The manager of this group serves as an interface with telephone company representatives in the acquisition, maintenance and change of communications lines which link Network users to the UGACC systems.

TABLE 2

CONFIGURATION OF CDC 6400 - 65k WORDS (60 BITS)

<u>Description</u>	<u>Number of Units</u>
Central Processor	1
Peripheral Processor	7
65k Core Storage	1
7 Track Tape Drives	2
9 Track Tape Drives	2
6603 Discs	2
Channels	9
Card Reader	1
Line Printer	1
6671 Multiplexer	1

The function of the User Services Group has expanded from assisting users in the Computer Center on an individual basis to training faculty and data center personnel on the remote campuses in formal workshops. Staff members from this group and the Systems Group conducted or assisted in Network training sessions at the sites listed below.

A. Savannah State College - Aug. 7-10, 1970

Checkout of IBM 1130 as RJE device to the 360 and demonstration for Network small computer users

B. Georgia State University - Aug. 12-14, 26-28

Lectures and computing facilities provided to Central Workshops

C. Abraham Baldwin Agricultural College - Sept. 9-11

Instruction for class in intermediate FORTRAN at Regional Workshop

D. Georgia Southern College - Sept. 17-18

Instruction for class on JCL and the 360 at Regional Workshop

E. Macon Junior College - Oct. 1-2

Orientation in CPS for Regional Workshop

F. Savannah State College - Oct. 27-28

Checkout of 1130-6400 communications package and informal classroom instruction for campus users

G. Medical College of Georgia - Nov. 11

Presentation of resources available through the Network

H. Middle Georgia College - Nov. 17

Consultation with a group of CPS users: 'hands-on' instruction demonstrating capabilities of the 360 via terminals

I. Mercer University - Jan. 26, 1971

Orientation and "hands-on" demonstrations to a group of CPS users

J. Gainesville Junior College - Feb. 11

Orientation for CPS users

K. Augusta College - March 2

Orientation for CPS users

L. Albany State College - March 3-4

Lectures given to staff and users on remote job processing via the

1130 to the 360 and the 6400; FORTRAN; running BMD's, SSP's; capabilities

of local facilities; "hands-on" lab session also conducted

## GEORGIA STATE UNIVERSITY

Georgia State University, founded in 1913, has grown to be one of the largest urban, nonresidential, coeducational institutions in the South. Located in downtown Atlanta within commuting distance of over 1,500,000 people, Georgia State's full range of academic programs offered during the day is also offered at night. Spring Quarter enrollment totaled 15,315 students.

Developed on the broad concept of a modern urban institution, built upon a sound base of faculty and basic programs, Georgia State University is dedicated to bringing the fruits of learning to the community at large through formal and informal programs utilizing all communication media.

Academic programs are administered through 6 schools: Allied Health Sciences, Arts and Sciences, Business Administration, Education, General Studies, and Special Studies. The baccalaureate programs offer the Bachelor degree in 26 disciplines while the Masters degree is offered in 20 fields and the doctorate in 6.

The Computer Center in the School of Business Administration at Georgia State was founded July 1, 1959, with Professor William H. Wells as the first Director. The first computer arrived on the site in mid-December and became operational on January 1, 1960. The computer installed was an IBM 305 RAMAC which was used until installation in 1962 of an IBM 1620 Model 1. The 1620 was replaced on July 1, 1964, with an IBM 1620 Model 2, which in turn, was replaced on June 1, 1965, with an IBM 7040. An IBM 1401 was soon added as an I/O device to the 7040 which was the only computer on site until installation in October, 1970, of the RCA Spectra 70/46. The IBM 7040 was removed in 1970 and replaced by an IBM 7094.

While the IBM 7094 is a more powerful piece of equipment, the RCA Spectra has, in light of the demands of time-sharing, become the primary computer in the Georgia State University Computer Center. There are 51 terminals installed at Georgia State making use of this computer. Most of these terminals are teletypewriters, although there are a few IBM 2741 and CRT terminals among the group. No higher speed devices are supported at this time, but it is the intention of the Computer Center to begin supporting remote job entry terminals with higher baud rates as soon as possible. The Communications Controller was updated in Winter Quarter of 1971 to a capacity of 48 lines. Forty-one of these lines are now in use with plans for installing 7 additional lines in the near future.

Use of this system by the University System Computer Network members has grown rapidly since July 1 of last year. As of mid-May, 18 of the Network schools had made use of this system. As of May 7, 1971, 8.4% of the total connect-time on the Spectra 70/40 was attributable to schools in the Network.

Georgia State University, as a Central Site member of the University System Computer Network, has made every effort to encourage and assist the instructors at the remote schools in the Network. The University has been host to two statewide technical workshops: one August 12-14 and one August 26-28, 1970. These workshops covered the languages available in the Network and the necessary control languages to operate into the different systems available in the Network. Emphasis was placed on training one or two representatives from each remote campus so they might in turn train the users in their school.

Georgia State was also host to a Campus Coordinators' conference on October 16. This conference covered new facilities, new control languages, uses of programs, and management of information systems.



Staff of the Georgia State Computer Center have assisted in instruction at technical workshops held at Berry College, February 18-19, and at Wesleyan College on April 22, 1971. They also assisted in the start-up program for Clark College in December 1970. Plans are currently being made for staff of the Computer Center and the University's faculty to instruct technical seminars during the summer months on specific academic disciplines which will be offered to all Network members.

Georgia State has a person available from 9:00 A.M. to 6:00 P.M., Monday through Friday, to answer questions from the Network users. At the present time, this person spends about two thirds of his time answering questions about programs, system commands, and programming methods.

There are over 600 programs available to users of the Spectra system. The areas covered by these programs are: test of hypothesis, statistical, management science, financial, mathematical, industrial applications, engineering and miscellaneous. Georgia State has published a list of a large portion of these programs in major application areas. A BASIC program also is available for listing current programs. A number of programs are in the process of being converted to the Spectra system and others written at Georgia State are being documented and placed in the library.

Many courses are being developed at Georgia State that use programs and models that use the time sharing system. These course outlines and programs are made available to the Network. Some of the departments using the system include: Accounting, Finance, Management, Quantitative Methods, Information Systems, and International Business in the School of Business Administration. In the School of Arts and Sciences, the departments include Chemistry, Geography, Physics, Political Science, Psychology,

and Mathematics. All programs developed by these departments are made available to the Network users. In addition to programs, several texts have been published by these departments: Time Sharing System Applications in Quantitative Methods by the Department of Quantitative Methods and Time Sharing Systems Applications in Accounting by Elbert B. Greynolds, Jr. Along with these texts, the RCALIB, BMD, and SSS Library Manual and Dumps and Their Meaning: An Explanation of RCA Spectra 70/46 TSOS User Dumps have been distributed to Network members.

The use of the time sharing can best be shown by the attached chart, Exhibit A, which lists only users remote from Georgia State University. "Tasks" are the number of times a user has entered the system; "connect-time" is the time in hours that a terminal is connected to the system.

SPECTRA 70/46

## TASKS

## CONNECT TIME (Hrs.)

USERS	MONTHS:													
	J-S	O	N	D	J	F	M	J-S	O	N	D	J	F	M
701 Clayton Jr. Col.	11	0	0	0	0	0	0	0.80	0.00	0.00	0.00	0.00	0.00	0.00
703 North Ga. Col.	20	30	26	78	191	225	372	4.55	6.13	6.0	15.32	47.93	66.8	122.85
704 Valdosta State	32	47	62	68	119	50	100	13.13	34.07	26.85	42.55	95.82	17.20	29.05
705 Abraham Baldwin	12	2	13	24	14	7	3	4.32	0.12	4.07	3.92	2.60	5.83	2.47
706 Ga. Tech.-Sou. Tech.	44	123	161	6	7	10	34	9.87	41.55	52.5	3.53	0.82	7.45	21.10
707 Network Seminars	38	0	0	0	0	27	11	11.13	0.00	0.00	0.00	0.00	12.82	1.73
708 Armstrong State Col.	12	32	92	27	41	84	106	3.02	11.02	15.87	5.20	10.97	26.83	23.92
709 West Georgia Col.	0	59	28	10	23	39	30	0.00	23.05	10.12	.43	5.62	12.07	16.68
711 Ga. Col. Milledgeville	9	163	131	95	111	138	101	5.02	67.83	61.35	54.63	39.03	58.32	44.77
713 Albany Jr. College	0	0	2	0	0	0	0	0.00	0.15	0.00	0.00	0.00	0.00	0.00
714 Augusta	0	0	1	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
717 Dalton Jr. College	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
721 Georgia Southern	0	0	0	0	3	0	0	0.00	0.00	0.00	0.00	0.23	0.00	0.00
723 Kennesaw Jr. Col.	7	0	5	0	0	12	24	3.03	0.00	1.48	0.00	0.00	9.08	4.58
725 Middle Georgia Col.	0	0	0	3	2	0	0	0.00	0.00	0.00	0.08	0.00	0.00	0.00
726 Macon Jr. Col.	6	2	0	0	6	0	0	1.37	1.25	0.00	0.00	1.12	0.00	0.00
727 South Georgia Col.	0	0	0	4	2	0	0	0.00	0.00	0.00	0.08	0.00	0.00	0.00
729 Berry Jr. College	0	0	0	0	0	5	0	0.00	0.00	0.00	0.00	0.00	4.05	0.00
731 Mercer University	0	0	0	0	14	42	46	0.00	0.00	0.00	0.00	4.52	20.77	25.50
732 Clark College	0	0	0	0	0	27	238	0.00	0.00	0.00	0.00	0.00	4.53	89.20
733 Wesleyan College	0	0	0	0	0	0	8	0.00	0.00	0.00	0.00	0.00	0.00	5.82
724 Medical College	0	29	0	0	0	0	0	0.00	6.50	0.00	0.00	0.00	0.00	0.00
TOTALS	191	487	521	315	533	666	1073	56.24	191.67	178.24	125.74	228.66	245.75	387.67
	3786							1413.47						

# GEORGIA INSTITUTE OF TECHNOLOGY

Grant GJ-1055

I. E. Perlin, Principal Investigator

Georgia Institute of Technology, founded in 1885, opened with an enrollment of 85 men in the fall of 1886 as the area's first technical college. Today a coeducational, residential institution, Tech's enrollment for Fall Quarter 1970 was 8,292.

Schools of academic study are: Aerospace, Ceramic, Chemical, Civil, Electrical, Industrial and Systems, Mechanical, and Textile Engineering; Engineering Science; Applied Biology; Applied Mathematics; Applied Psychology; Architecture; Building Construction; Industrial Design; Chemistry; Physics; Industrial Management; Textile Chemistry; and Textiles. Through these 18 schools, a total of 60 degree programs are offered; 20 on the Bachelor of Science, 27 on the Masters, and 13 on the doctorate levels.

The Rich Electronic Computer Center (RECC) began operation in 1955 as the result of a planning committee's study conducted with the cooperation of the Richard E. Rich Foundation, the Georgia Tech Research Institute, the Engineering Experiment Station, and the Board of Regents of the University System of Georgia.

The initial staff numbered fifteen and the initial equipment was a UNIVAC Scientific ERA 1101. Since that time the Center's staff has gained considerable experience in all phases of digital computer applications and operation and has grown to approximately 65 persons including about 20 professional analysts and programming analysts.

Seven different computer systems have been used over the years for varying periods of time. These include the original UNIVAC Scientific ERA 1101, NCR 102D, IBM 650, Burroughs 220, Burroughs B5000, Burroughs B5500, and UNIVAC 1108. The Center presently operates the UNIVAC 1108 and the Burroughs B5500. The UNIVAC 1108 is in the Shared Processor System configuration with batch, demand, and remote time-sharing facilities. The Burroughs 5500 is a multi-programming and multi-processing system with both batch and remote time-sharing capabilities. A CalComp digital plotter system and an analog digital conversion system are also available.

RECC provides a wide range of computer services in the general fields of instruction, research, and administration. Its primary mission is to provide computer facilities and services for Georgia Tech; however, the Center provides computer support to other schools within the University System Computer Network directed by the Board of Regents. Previously, this support had been rendered to the schools on an individual basis.

Objectives of the Computer Center are as follow:

- a. To provide computer support for the advancement of Georgia Tech objectives in instruction, research and administration.
- b. To make available to every student at Georgia Tech instruction in computing and necessary computing support in order to advance and insure his full professional development.
- c. To study and evaluate advances in computer applications and technology in order to insure that the most modern productive tools are used by Georgia Tech.

- d. To play a primary role in the state program for advancing higher education through the concept of information processing and computer applications including the University System Computer Network.
- e. To provide the best possible computer facility for the solution of research and development problems in government and industry for which Georgia Tech is given responsibility.

Computing for instruction in general (non-sponsored) research represents about 80% of the computing work load. Extensive use is made of the Center's facility in undergraduate courses as well as the Masters thesis and Ph.D. dissertation work. Approximately 40% of the students at Tech are now using computers regularly in their academic work in over 100 courses. Sponsored research constitutes about 15% of the computing work load. Administration and service activities represent about 5% of the work load. In the administrative and service area, computer facilities are used extensively by the Georgia Tech library, the Alumni Association, and the football station seat assignment system.

The most recent and significant events affecting the Computer Center have been the transfer of the Center from the Engineering Experiment Station to the Office of the Vice President for Academic Affairs on July 1, 1970, the upgrading of the UNIVAC 1108 to the Shared Processor System configuration to support the University System Computer Network, and the current construction of the new Computer Center building. Upon completion of the \$2,000,000 structure some time in the spring of 1972, the Computer Center will finally have adequate space and facilities.

## A. Equipment Enhancements

1. In order to support the University System Computer Network, the UNIVAC 1108 was upgraded from a single processor system to a Shared Processor System.

a. The principal items added by installation of the Shared Processor System are an additional processor, an additional 65k of core memory, four additional UNISERVO VIII-C tape units, three 432 drums, one 1782 drum, and additional data communication capabilities.

b. Installation of the additional processor has increased Georgia Tech's 1108 system from 131,000 to 196,000 words of core memory. By taking advantage of the concept of two processors sharing common high-speed memory, roughly two-thirds more computational power is available than previously. The system is organized to allow a number of tasks to be performed simultaneously under the direction of a common Executive Control System.

c. In the two processor configuration, one of the processors incorporates all of the input/output of the system while the other is dedicated to processing. During idle cycles, the Input/Output Processor has the ability to perform computational activity, thereby increasing the system's total performance and providing a balanced system.

d. The installation of the FH1782/FH432 drum sub-system appreciably increases the throughput performance. The 240,000 words per second transfer rate of these drums results in a very responsive fulfilling of main memory demands for data transfers and language processor loading. There are 2,100,000 words capacity available on the FH1782 drum with an average access time of 17 milliseconds. There are 786,000 words capacity available on the FH432 drums with an average access time of 4.25 milliseconds.

e. The Shared Processor System has 12 high speed (2400 baud) ports, 18 low speed (110 baud) ports, and two low speed (300 baud) ports.

2. With the addition of this equipment, the current configuration of the UNIVAC 1108 Shared Processor System is as follows:

- 2 Processors - In the Shared Processor System configuration, the main processor handles all the I/O functions as well as processing during idle I/O time. The second processor is dedicated to processing only and does not have any I/O capability.
- 3 Core memory modules, 65,536 each, with a total of 196,608 words (36 bits per word).
- 3 FH880 magnetic drum units, 4,718,592 characters each, with a total of 14,155,776 characters.
- 2 FASTRAND II mass storage units, 132,120,576 characters each, with a total of 264,241,152 characters.
- 3 FH432 magnetic drum units, 1,572,864 characters each, with a total of 4,718,592 characters.
- 1 FH1782 magnetic drum unit with 12,582,912 characters.
- 12 I/O channels, connecting peripheral devices to the central processor.
- 2 U 1004 peripheral subsystems, each capable of reading 615 cards per minute (cpm) and printing 600 lines per minute (lpm), with one unit having a paper tape reader (400 cps) and card punch (200 cpm) attached. The other unit has a card punch (200 cpm) attached.
- 8 Seven track magnetic tape units (UNISERVO VIII-C) with selectable packing densities of 200, 556, and 800 bits per inch (bpi).
- 1 Line Printer, 700-922 lines per minute (lpm).
- 1 Communications Terminal Module Controller (CTMC) with 12 high speed Communications Terminal Modules (CTM) and 20 low-speed CTMs (eighteen 110 baud and two 300 baud).



## B. Personnel

One high level systems programmer-analyst was employed July 1, 1970, to work specifically on the data communication network.

Other staff members have worked on a part-time basis in the areas of software, checkout and implementation, and training of network users.

## C. Publications Produced by RECC for Network Users

As needed, RECC publishes manuals, memoranda, newsletters, etc., to inform its users of changes in systems, procedures, or to inform new users of the facilities and how to obtain and use the facilities. The following are examples of the types of information which were published and sent to network users.

### 1. Manuals

a. A Demand Terminal User's Manual for the UNIVAC 1108 was published and distributed in December 1970.

b. The manual BASIC for the UNIVAC 1108 was published and distributed in January 1971.

c. A 130-page Program Library Manual containing information on the program libraries for both the UNIVAC 1108 and the B5500 was published and distributed on March 19, 1971. This manual includes STAT-PACK Abstracts (91 subroutines and subprograms) and MATH-PACK Abstracts (78 subroutines and subprograms) which had previously been distributed by memorandum in January 1971. The memorandum in January also included a compilation of about 40 other abstracts in various fields, 30 of which are Biomedical Routines and 10 miscellaneous; these plus some additional abstracts are included in the Program Library Manual.

## 2. Memoranda

a. A memorandum containing an abbreviated control card set for both batch and remote operations on the UNIVAC 1108 computing system was prepared specifically for beginning users of the system. The memorandum was published on August 13, 1970.

b. A new level of the GPSS II program for the UNIVAC 1108 was implemented. Information pertaining to this implementation of GPSS, Version F, Level 2, was published on November 2, 1970, and distributed.

c. Information on computing facilities at Georgia Tech was published on January 15, 1971, and forwarded to the Campus Coordinators of the University System Computer Network. This memorandum contains information on the following:

(1) The procedures to be followed for requesting access to Georgia Tech computing facilities.

(2) Operating schedules for RECC facilities.

(3) Configurations of computing and associated systems in the Rich Electronic Computer Center at Georgia Tech.

(4) Languages, application programs, and subroutines available on the U 1108.

(5) A partial list of abstracts of programs which can be accessed on the U 1108. Similar information on the B5500 is made available on request.

(6) A list of UNIVAC 1108 manuals available at the Georgia Tech Book Store. Also included in this section is a list of U 1108 manuals which have been published by the Rich Electronic Computer Center and which are available either at the Georgia Tech Book Store or by request to the Director, RECC. Similar information on the B5500 is made available on request.

d. A memorandum pertaining to the security of mass storage files on the UNIVAC 1108 was published and distributed on February 24, 1971.

e. A memorandum pertaining to the List Files Processor LF for the UNIVAC 1108 was published and distributed on March 18, 1971.

### 3. Newsletters

Several editions of a newsletter have been published. These newsletters contain some articles pertinent to the Network.

### 4. Letters

Letters summarizing much of the activity of the Computer Center as well as progress on the new Computer Center building have been written for distribution to network members during the past year.

## D. Training for Network Users

Several computer workshops have been held around the state in order that the Network users could effectively and efficiently use the computing facilities available to them. Several of the Computer Center staff either conducted or participated in the training. These workshops in which Georgia Tech participated are listed below chronologically.

a. August 12-14 and 26-28 - At Georgia State University, three personnel from the Computer Center participated in a technical workshop to the extent of teaching some FORTRAN to the users along with demonstrating ALGOL via a special Demand Mode problem. Users were also given information on how to use such library routines as STAT-PACK and MATH-PACK.

b. September 9-11 - Personnel from the Computer Center participated in a Regional Workshop held at Abraham Baldwin Agricultural College, Tifton, Georgia. Applications programming in the new version of U 1108 GPSS was presented.

c. September 17 and 18 - Personnel from the Computer Center participated in a Regional Workshop at Kennesaw Junior College, Marietta, Georgia. Demand terminals for use with the U 1108 were demonstrated as were simple applications for Demand use.

d. September 16-18 - A representative from the Computer Center attended the Regional Workshop at Georgia Southern College, Statesboro, Georgia.

e. October 1 and 2 - A representative from the Computer Center attended a workshop on Demand Mode use of U 1108 at Macon Junior College, Macon, Georgia. At this time some of the features of the U 1108 and a demand terminal were demonstrated.

f. February 18 and 19 - Science workshop was held at Berry College, with Georgia Tech personnel conducting a seminar on FORTRAN programming from a Demand terminal.

g. March 1 - A representative from the Computer Center attended and IBM 1130 users conference at Georgia Southwestern College, Americus, Georgia.

h. March 8 - Personnel from the Computer Center attended a UNIVAC 9200 users conference at Abraham Baldwin Agricultural College, Tifton, Georgia. The past and future use of the U9200 as a remote batch terminal to the U 1108 was discussed.

#### E. Future Plans

1. A BASIC programming seminar will be conducted by a Computer Center staff member at Mercer University, Macon, Georgia, on April 7, 1971.

2. Plans have been completed for a two-day symposium on applications of computing for instruction and general research. This symposium will be held at Georgia Tech on April 15 and 16.

3. Two training courses are planned for implementation in June 1971. Information and materials for these courses have been distributed to the Network schools.

a. One is a five-day general computing course which will be presented at Georgia Tech.

b. The second is a three-day programming course which could be presented at any Network school desiring it. Such a course could also be conducted on a regional basis or at Georgia Tech.

**APPENDIX B**

**ANNUAL REPORTS FROM REMOTE INSTALLATIONS**

ABRAHAM BALDWIN AGRICULTURAL COLLEGE

J. Dale Sherman, Principal Investigator

Abraham Baldwin Agricultural College is a two-year, coeducational, residential institution located in Tifton, Georgia. Established in 1908, its current enrollment is over 1700 students. J. Dale Sherman is the Campus Coordinator.

In May 1970, the school began remote processing from a Univac 9200 and a teletype. These two terminals share one telephone circuit to Atlanta which terminates on the State Centrex system. This provides low-speed interactive and batch access to all of the central sites; medium-speed hardware and software interfaces are operational with the Univac 1108 and the IBM 360/65. Present usage of the Network is approximately 100 hours connect-time per month.

Abraham Baldwin Agricultural College hosted two regional workshops in Fall 1970 with over 100 faculty participants. Other local orientation sessions have also been held, and in March 1970, representatives from all of the schools with Univac 9200's met in Tifton. More than 30 local faculty members have become involved with computing--both for research projects and instruction. Five faculty members are using the terminals in direct support of classroom work.

Two programs are offered in Accounting and Data Processing, a one-year certificate and a two-year Associate Accounting and Data Processing Degree. Six different courses were offered during the year in support of these programs and as service courses to other programs.

ADP 100	Introduction to Data Processing	200 Students
ADP 131	Assembler Programming	36 Students
ADP 217	Systems Analysis	89 Students
ADP 221	Computing Programming I	52 Students
ADP 222	Computing Programming II	121 Students
ADP 223	Computer Programming III	<u>24 Students</u>
TOTAL		522 Students

In addition to college faculty and student utilization of Network facilities, Abraham Baldwin offers time on their terminals to The Coastal Plains Experiment Station, an extension of the Agricultural College of the University of Georgia. Most of this usage is in statistical applications and modeling by agricultural scientists.

With the increase of faculty and students involved with computing on campus, plans are formulating to integrate programming and research applications into the general curriculum in the coming year.



ALBANY JUNIOR COLLEGE

Grant GJ-1032

John L. Baxter, Principal Investigator

Albany Junior College is a two year, coeducational institution located in Albany, Georgia. Chartered in 1963, its enrollment totals nearly 1300. John L. Baxter is the Campus Coordinator. Under his direction the school began remote processing from an IBM 2741 terminal in September of 1970. With the anticipated growth of curriculum applications, the 2741 was replaced in March 1971 by an IBM 1130. The 1130 accesses the IBM 360/65 and CDC 6400 at the University of Georgia via a telephone circuit which terminates in Athens, providing medium-speed, interactive and batch processing to both computers. Average monthly connect-time for both terminals has been 20 hours.

Two courses are currently offered in computer science and two other curricular courses are utilizing programming as follow:

BA 275	Introduction to Data Processing	45 students
DP 150	FORTRAN Programming	25 students
MS 121	College Algebra	31 students
PS 228	General Physics	<u>16 students</u>
TOTAL		117 students

In order to familiarize faculty members in the Albany area with the possibilities of computer use in classroom instruction, Albany Junior College arranged a two-day computer concepts course which was attended by 49 representatives from the four nearby colleges. Albany Junior's faculty members have attended all Campus Coordinator Conferences, statewide and regional workshops on programming and academic applications, 1130 user seminars and campus faculty training meetings designed by and offered through the Network Coordinator's Office.

ALBANY STATE COLLEGE

Grant GJ-1033

Henry F. Gilmore, Principal Investigator

Albany State College, located in Albany, Georgia, was established in 1903 and became a four-year, residential, coeducational liberal arts institution in 1943. Degree programs offered are the A.B., B.B.A., and B.S. degrees with combined enrollments of 2000 students. Mrs. Rosa Johnson is the Campus Coordinator.

In November 1970, the school acquired an IBM 1130 for both remote and in house processing. The 1130 is connected to the University of Georgia via an Athens business line, installed in late January 1971 which provides medium-speed access to both the CDC 6400 and the IBM 360/65. Network usage has been 6 hours.

Three classes of 270 Introduction to Computer Science have been taught during the year involving a total of 62 students. Some of these students are independently programming to solve problems in their accounting and marketing classes. Two faculty are using the terminal to support their course work and two are utilizing the 1130 as a research tool. In November 1970, a group of enthusiastic students under faculty sponsorship organized a computer club to promote interest and applications of their computer.

Faculty members have attended all Campus Coordinators Conferences, and statewide and regional technical workshops on programming and applications offered by the Coordinator's Office. Short course presentations on applications to education have been conducted on campus by instructors from the University of Georgia.

**ARMSTRONG STATE COLLEGE**

**Grant GJ-1034**

**Donald D. Anderson, Principal Investigator**

Armstrong State College is a four-year, coeducational, residential institution founded at Savannah, Georgia in 1935. Current enrollment is over 1600 students. Degrees offered are the B.A., B.B.A., and B.S. Dr. Donald Anderson is the Campus Coordinator.

In July 1970, Armstrong began remote processing from an IBM 2741 teletype terminal; and, in November of the same year, also acquired an ASR 33. These two terminals share one telephone circuit to Atlanta which terminates in the State Centrex System. This line provides low-speed access to all three Central Sites. Network usage for the two terminals combined is approximately 10 hours connect-time per month.

Armstrong State has had a number of faculty and students participate in a campus in-service seminars, state and regional workshops and terminal user conferences to learn programming and applications.

One computer science course, BA 205 - Data Processing, has been offered Fall and Winter quarters with an enrollment of 74 students. Two additional programming courses, BA 440 and Math 251, will be taught spring quarter. A number of other curricular courses integrate problem solving and research programming in their course study:

BA 320	Business Finance	6 students
BA 465	Business Policy	18 students
BIO 370	Genetics	1 student
CHEM 491	Physical Chemistry	36 students
CHEM 492	Physical Chemistry	21 students

ECON 327	Money and Banking	7 students
Econ 431	Investments	4 students
MTH 106	An Introduction to Modern Mathematics II, Abstract Algebra	19 students
MTH 201	Analytic Geometry and Calculus	2 students
MTH 211	Elementary Statistics	4 students
ZOO 435	Comparative Physiology	<u>8 students</u>
	<b>TOTAL</b>	<b>200 students</b>

## AUGUSTA COLLEGE

Augusta College was originally established as a junior college in Augusta, Georgia in 1926 and became a four-year, coeducational, non-residential institution offering the B.A., B.S., and B.B.A. degrees in 1963. Current enrollment is nearly 2,900 students.

Dr. Frank Chou is the Campus Coordinator who has been working with an IBM 1050 terminal since its installation in February 1971. The 1050 communicates with the IBM 360/65 at the University of Georgia over an Athens business exchange line. Total connect-time for the one month period was 47 hours. Augusta College also continues to access the IBM 2780 located at the Medical College of Georgia.

One computer science course, Math 335 - FORTRAN IV Programming, is currently offered. Three classes of Math 335 have been taught this year with an enrollment of 60 students. Other courses utilizing the terminals in classroom study are: PHS 309 Modern Physics with 3 students, CHEM 373 Physical Chemistry with 5 students, for a total of 68 students.

Faculty and students from Augusta College have participated in a local seminar on BASIC, all state and regional technical workshops on programming languages and applications, Campus Coordinators Conferences, and 1050 terminal user seminars.

# **BERRY COLLEGE**

**Grant GJ-781**

**Quida W. Dickey, Principal Investigator**

Berry College is a private, four-year, coeducational institution offering the A.B., B.S., and B. Mus. degrees. The school was founded near Rome, Georgia by Miss Martha Berry in 1902. Current enrollment is over 1000 students.

Berry College began its participation in the Network during the summer of 1970 when a teletype was used to communicate with the Burroughs 5500 at the Georgia Institute of Technology, and in late 1970, the Spectra 70/46 at Georgia State and the IBM 360/65 at the University of Georgia. The average monthly connect-time is approximately 28 hours.

In March 1971, an IBM 360/20 was installed at Berry which will be used for local processing and for communication with the IBM 360/65 at the University. This machine will allow a significant expansion of computer related courses in the Berry curriculum. (A minor in computer science has been approved and will be implemented over the next two years.) At present, there are two computer science courses in the school's curriculum:

Computer Science 130	Introduction to Computer Principals and Programming	12 students
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Computer Science 131	Computers and Programming	11 students
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Other courses which utilize Network facilities are:

Business Admin. 203	Management Mathematics	24 students
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Math 103	Fundamental Mathematics for General Education	34 students
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Physics 406	Senior Laboratory	8 students
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Physics 407	Senior Laboratory	4 students
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TOTAL		93 students
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Berry's faculty has been enthusiastic participants in all workshops and seminars offered through the Network Coordinator's Office. They planned and executed a language-applications seminar which was offered to schools in their region and are currently formulating a campus computer club.

BRUNSWICK JUNIOR COLLEGE

Grant GJ-1035

Dougland M. Monroe, Jr., Principal Investigator

Brunswick Junior College is a two year, coeducational institution located in Brunswick, Georgia. Founded in 1961, its current enrollment totals nearly 800 students. John Hamilton is the Campus Coordinator. In October of 1970, the school acquired an IBM 1050 terminal which re-motes into the IBM 360/65 and the CDC 6400 at the University of Georgia over an Athens business phone line. Current usage of the Network is approximately 100 hours-connect time per month.

At present, there are no computer science courses per se in the curriculum; however, Mathematics 180-Use of the Computer is planned to be offered in the fall and a number of other curricular courses are now using programming in their class study:

CHEM 121	General Inorganic	10 students
MATH 101	Algebra and Trigonometry	80 students
MATH 108	College Algebra	20 students
Math 201	Analytic Geometry and Calculus	5 students
PHS 110	The Physical Universe	68 students
PHS 130	Microphysics	<u>27 students</u>
TOTAL		210 students

Brunswick Junior has participated in all Campus Coordinators Conferences, state and regional technical workshops and terminal user seminars offered through the Network Coordinator's Office. In addition, two orientation seminars have been held on campus.



## CLARK COLLEGE

Clark College is a four-year, liberal arts college located in Atlanta and associated with the Atlanta University Complex. Its current enrollment is approximately 1100 students. Mrs. Carolyn Harris is the Campus Coordinator.

In December 1970, a teletypewriter was installed under the auspices of the Thirteen College Program at Clark with usage to date restricted to participants in this program. This terminal accesses both the Spectra 70/46 at Georgia State University and the Univac 1108 at Georgia Institute of Technology.

During the first three months of activity, three courses have begun utilizing the terminal in course study:

MATH 101	Quantative Thinking	65 students
MATH 102	Analytical Thinking	35 students
PHY SCI 107	Physical Science	<u>100 students</u>
TOTAL		200 students

Mrs. Harris and other faculty members have participated in the Network's more recent meetings and seminars.

## CLAYTON JUNIOR COLLEGE

Clayton Junior College is a two-year, coeducational institution in Forest Park, Georgia which offers the Associate of Arts degree. Established in 1968, its current enrollment is in excess of 1500 students. Dr. Leonard R. Daniel is the Campus Coordinator.

The school began remote processing in October, 1969, an IBM 2741 and an IBM 2780 was added in September of 1970. These two terminals operate over two Atlanta phone circuits which provide access to the Spectra 70/46 and the IBM 360/65. Present usage of the Network is approximately 72 hours connect-time per month.

One computer science course, COMP 201-Introduction to Computing, has been taught for three quarters with an enrollment of 101 students. Other courses offered which use the terminals in direct support of course work are:

ACCT 111	Principals of Accounting I	50 students
ACCT 112	Principals of Accounting II	50 students
CHEM 151	Principals of Chemistry	31 students
CHEM 152	Principals of Chemistry	10 students
MATH 105	Introduction to College Math	120 students
PHYS 111	Introductory General Physics	30 students
PHYS 112	Introductory General Physics	<u>36 students</u>
TOTAL		428 students

Clayton's faculty and students have participated in all workshops, both regional and state-wide, user group seminars, and conferences offered through the Network Coordinator's Office. In addition, they have held orientation workshops on the Clayton Junior College campus.

## COLUMBUS COLLEGE

Columbus College is a four-year coeducational institution which offers the Associate in Arts and Science, B.A., and B.S. degrees and is located in Columbus, Georgia. Established in 1958, its current enrollment is over 2400 students.

Neal S. Coulter, Campus Coordinator, is currently working with an IBM 2741 terminal on-line to the IBM 360/65 via an Athens business phone line. One computer science course, MS 400-Computer Concepts, has been taught for three quarters this year with an enrollment of 341 students in nine classes. Other courses taught which require student use of the terminal for assignment and research are:

BY 400	Entomology	23 students
BY 385	Evolution	14 students
BY 420	Ecology	15 students
CY 411	Physical Chemistry	4 students
CY 491	Senior Seminar (Chemistry)	6 students
PS 218	Physics-Light, heat, sound	<u>10 students</u>
TOTAL		413 students

Some excellent programs that serve as aids in Biology and Chemistry courses have been written by faculty who are also utilizing the terminal as a research tool. Current usage of the Network is approximately 100 hours per month.

Columbus College faculty have participated in 2741 terminal users seminars and all of the statewide and regional workshops offered through the Coordinator's Office, in addition to conducting on-campus orientation courses.

## DALTON JUNIOR COLLEGE

Dalton Junior College is a two-year, coeducational institution located in Dalton, Georgia. Chartered in 1963, its current enrollment totals over 800 students. Bill Smith is the Campus Coordinator.

Dalton did not have a terminal until March 1971, when line connection into the Network was made on the Georgia State University Centrex System, affording access to all three Central Sites. Dalton Junior College faculty have already begun to show interest in the Network by participating in all workshops, seminars and conferences offered through the Coordinator's Office.

## FLOYD JUNIOR COLLEGE

Floyd Junior College, a two-year, coeducational institution, located in Rome, Georgia, opened in September 1970, with an initial enrollment of 464 students. Dr. Daniel C. Pantaleo is the Campus Coordinator.

Present plans call for the installation of a teletype in May 1971 which will remote to all three Central Sites. This terminal will be used by students in Chemistry 121-122 and Physics 127-128 beginning Summer quarter 1971 and Calculus 253 beginning Fall quarter 1971.

Floyd has been represented at all Campus Coordinator Conferences, technical workshops, seminars, and teletype user group meetings sponsored by the Coordinator's Office,

**FORT VALLEY STATE COLLEGE**

**Grant GJ-1027**

**William D. Moorehead, Principal Investigator**

Fort Valley State College located in Fort Valley, Georgia was established as a coeducational, state institution in 1938. The B.A., B.S., and M.S. Ed. degrees are offered with a current enrollment of nearly 2400 students in these programs.

Dr. Bill Dalton is the Campus Coordinator. In January 1971, the school began medium-speed remote processing with an IBM 1130 over an Athens business line into both the IBM 360/65 and CDC 6400 at the University of Georgia. Present Network usage is 30 hours connect-time per month.

Several faculty members are using the 1130 in research projects evaluating degree programs at the college. Computer science courses taught are as follows:

BA 314	Introduction to Data Processing	35 students
CS 300	FORTTRAN I	9 students
CS 301	FORTTRAN II	4 students
CS 302	COBOL I	9 students
CS 303	COBOL II	<u>1 student</u>
TOTAL		58 students

The administration has appointed a computer service committee to formulate budget proposals for equipment and the appointment of new faculty to the Computer Science Department.

Fort Valley State has been represented at all state-wide and regional technical workshops, Coordinators Conferences, 1130 user group seminars, and on-campus training sessions coordinated through the Network's Coordinator's Office.

## GAINESVILLE JUNIOR COLLEGE

Gainesville Junior College is a two-year, coeducational, community college which offers the Associate in Arts and Science Degrees. Located in Gainesville, Georgia, the college opened in 1964 and has a current enrollment of nearly 800 students. Dr. Daniel B. Kelley is the Campus Coordinator.

In February 1971, the college installed an IBM 2741 and an Athens business phone line which affords low-speed access to the IBM 360/65 at the University of Georgia. For the first month's operation, connect-time has been 10 hours.

One faculty member is involved in a research project while three others are utilizing the terminal to support class work in the following courses:

BA 215 Data Processing	30 Students
MATH 99	35 Students
MATH 253-4-5 Calculus	<u>35 Students</u>
TOTAL	100 Students

Gainesville faculty have been active participants in all state and regional technical workshops on programming applications and languages, terminal user seminars, and Campus Coordinators Conferences.

## GEORGIA COLLEGE AT MILLEDGEVILLE

Grant GJ-1025

David G. Baarda, Principal Investigator

Georgia College at Milledgeville began as a normal and industrial college in 1917 and became a unit of the University System in 1932. As a four-year, coeducational, residential institution with an enrollment of nearly 1800 students, scholastic programs include the B.A., M.S., B.B.A., M.B.A., and M.S. Ed. degrees. Edward Spenser is the Campus Coordinator.

Georgia College began remote processing the end of September 1970 using an ASR 33. In January 1971, a Univac 9200 was also installed. Both terminals share a line of the State Centrex System which provides low-speed to all of the central sites: medium-speed hardware and software interfaces are operational with the Univac 1108 and IBM 360/65. Present usage of the Network is approximately 75 hours connect-time per month.

Faculty of Georgia College have participated in state and regional workshops and 9200 user group conferences held on basic languages and academic applications. Several are using the terminals for independent research projects, while others utilize them in direct support of their course work:

CHEM 201	Introduction to Computer Applications	41 students
CHEM 101	General Chemistry	40 students
CHEM 104	General Chemistry II	8 students
CHEM 104	Chemical Equilibrium	19 students
CHEM 337	Organic Chemistry	38 students
CHEM 336	Organic Chemistry	15 students



CHEM 491	Thermodynamics	18 students
CHEM 451	Biochemistry	7 students
CHEM 452	Indepent Study	4 students
CHEM 491	Physical Chemistry	13 students
CHEM 492	Physical Chemistry	45 students
BIO 340	Plant Physiology	1 student
BA 212	Mathematics of Finance	2 students
ECON 676	Managerial Economics	<u>4 students</u>
TOTAL		255 students

## GEORGIA SOUTHERN COLLEGE

Georgia Southern College, founded in 1908 in Statesboro, Georgia, is a four-year, coeducational, residential, liberal arts institution. Degree programs include the A.B., B.S., and B.B.A., with Masters offered in Business, Education, Math and Biology. Combined enrollment in these programs totals over 5,700 students. Dr. Russell Helm is the Campus Coordinator.

The rapid growth of both the student body and the field of Computer Science lead to the installation of an IBM 2780 at Georgia Southern in November, 1969. An Athens business line affords medium-speed access directly to the IBM 360/65 at the University of Georgia.

Average monthly usage has reached 750 jobs requiring 120 hours connect-time to support course work and faculty research. Approximately 20 faculty members are involved in research projects comprising 10% of the current usage with several of these projects running daily.

An NCR 100 will replace the IBM 2780 in July 1971 and provide some local capability and access to additional Network facilities. This upgrade is required to support the larger number of current courses offered and additional ones planned for the coming fall quarter.

### Current computer science courses offered are:

MGT 151	Introduction to Data Processing	650 students
MATH 350	Introduction to FORTRAN	60 students
MATH 380	Computer Concepts	10 students
MATH 480	Scientific Programming	10 students

Other courses utilizing the computer facilities are:

BA 973	Financial Problems	23 students
CHEM 499	Special Problems in Chemistry	8 students
ED RSH 855	Educational Research Methods	15 students
FIN 351	Corporation Finance I	58 students
FIN 355	Investments I	6 students
MGT 474	Management Information Systems	10 students
TOTAL		850 students

The following computer science courses will be implemented in the curriculum next fall:

MATH 230	Introduction to FORTRAN
MATH 232	Introduction to COBOL
MATH 352	FORTRAN Applications
MATH 385/MGT 385	System Design I
MATH 460/MGT 460	Programming Languages
MATH 480/MGT 480	Scientific Programming
MATH 481	Advanced Scientific Programming
MATH 488/MGT 488	System Design II

Georgia Southern's faculty have participated in all Campus Coordinators Conferences, state and regional technical workshops, and terminal user seminars. Dr. Helm has also conducted on-campus workshops for the local faculty.

GEORGIA SOUTHWESTERN COLLEGE

Grant GJ-1036

J. Hubert Greene, Principal Investigator

Georgia Southwestern College is a coeducational, residential, liberal arts institution located in Americus, Georgia. Established in 1962 as a junior college, it became a senior college in 1964. Nearly 2200 students are currently enrolled in the B.S. or A.B. degree programs. Dr. Hubert Greene is the Campus Coordinator.

In January 1970, the school began remote processing with an IBM 1130 over an Athens business line which affords medium-speed access to both the CDC 6400 and the IBM 360/65. Network usage is approximately 25 hours connect-time per month.

In addition to Network regional and state technical workshops, user group seminars and Campus Coordinators Conferences, Georgia Southwestern faculty have attended the North Florida Junior College Computer Workshop. As an outgrowth of these training sessions, the Campus Coordinator organized a series of orientation workshops for faculty interested in the utilization of the 1130 for course work applications and research. At least 6 faculty members are presently engaged in research projects.

Computer Science courses and enrollment are as follow:

BUS 322	Computer Applications in Business	159 students
BUS 305	Data Processing I	76 students
BUS 306	Data Processing II	12 students

Other academic courses employing the use of the 1130 in class work are:

ACT 205	Accounting Principles I	75 students
ACT 206	Accounting Principles II	26 students
MKT 340	Retail Management	<u>30 students</u>
	TOTAL	378 students

## KENNESAW JUNIOR COLLEGE

Kennesaw Junior College is a two-year, coeducational, nonresidential institution offering the Associate of Art and Science Degrees. Located in Marietta, Georgia, the college opened in 1966 and has a current enrollment of nearly 1,200 students. Charles G. Dobson is the Campus Coordinator.

In July 1970, Kennesaw began remote processing with an IBM 1050 which was replaced in March 1971 by an ASR 33 and two NCR 260's. These terminals are acoustically coupled to three Atlanta business lines which provide access to all three Central Sites. Present Network usage is approximately 95 hours connect-time per month.

Faculty of the college have participated in all state and regional technical workshops, terminal user seminars, and Campus Coordinators Conferences. Mr. Dobson has also been asked to give lectures and demonstrations on terminal usage and curriculum applications to faculty and students of two other remote campuses in the Network.

Courses offered at Kennesaw which rely on terminal usage to study basic concepts, solve problems and for research are:

CHEM 122	General Chemistry	20 Students
MATH 102	Trigonometry	24 Students
MATH 103	Analytical Geometry and Calculus	44 Students
MATH 201	Calculus	15 Students
MATH 202	Calculus	14 Students
PHYS 101	Introductory Physics	49 Students

PHYS 102	Introductory Physics	23 Students
PHYS 201	General Physics I	37 Students
	General Physics II	<u>8 Students</u>
	TOTAL	234 Students

Two additional courses have been formulated and are to be introduced into the curriculum next fall: MATH 111 - Mathematical Ideas, which includes two hours of laboratory for problem solving and computer usage and MATH 236 - Principles of Decision Mathematics, which will concentrate on computer applications.

A number of students who have learned the use of computer facilities in one course use them for special projects in other courses where the terminals are not normally used. These courses include sociology, psychology, and biology.

MACON JUNIOR COLLEGE

Grant GJ-1038

Jack H. Ragland, Principal Investigator

Macon Junior College, a two-year, coeducational, nonresidential institution, was authorized in 1965 and opened in the fall of 1968 in Macon, Georgia. Enrollment totals nearly 1100 students, Dr. W. T. Bass is the Campus Coordinator.

In July 1970, the school began interactive processing with an IBM 1050 which was replaced by an ASR 33 in March of 1971. This terminal remotes to the IBM 360/65 and CDC 6400 at the University of Georgia over an Athens business phone circuit. Network usage averages 47 hours connect time per month.

One computer science course, MATH 140-Computer Terminal Usage, has been offered this past year to a total of 37 students. Other courses programming on the terminal are as follows:

CHEM 121	Principles of Chemistry I	40 students
CHEM 122	Principles of Chemistry II	20 students
PHYS 127	General Physics I	15 students
PHYS 128	General Physics II	17 students
PHYS 137	Principles of Physics I	8 students
PHYS 138	Principles of Physics II	7 students

TOTAL 144 students

The faculty of Macon Junior College have been involved in all state and regional technical workshops, terminal user group seminars, and Campus Coordinator Conferences offered through the Network Coordinator's



Office. In addition, they conducted their own regional seminar on terminal usage and languages last October which attracted 24 participants from surrounding colleges, the Bibb County school system, and staff from a Macon hospital. Other on-campus activities include a series of faculty orientation seminars.

MEDICAL COLLEGE OF GEORGIA

Grant GJ-1039

Dr. Russell Morse, Principal Investigator

The Medical College of Georgia provides professional and allied programs in health sciences. Located in Augusta, it currently serves over four hundred students in the Schools of Medicine and Dentistry and approximately five hundred in allied programs such as Nursing and Medical Record Science. Dr. Richard E. Pogue is the Campus Coordinator.

The Medical College has had computing facilities for a number of years, IBM 360/65 and an NCR 315 have served administrative and clinical needs of the school. With the advent of the Network, an IBM 2780 and an IBM 2741 were installed to provide computing power to students and faculty. The two telephone circuits at this installation terminate in Athens allowing the Medical College to connect with the IBM 360/65. Usage of the batch terminal has been approximately 70 hours of connect-time per month, while interaction usage has yet to rise above fifteen hours per month. Both of these terminals are shared with neighboring participants, Augusta College and Paine College.

A number of research projects at the Medical College are dependent upon the terminals. This usage involves fourteen faculty members and their graduate research students. Some of these have participated in workshops held throughout the state, others have attended local orientation sessions.

Three faculty members are active in developing supporting materials for classroom work. Augusta College's computer service course, MATH 335A-Introduction to Programming for Electronic Computers, has been offered with an average of 20 students enrolled for each of the last three quarters.

## MERCER UNIVERSITY

Mercer University is a private, church-related college located in Macon, Georgia. Established by the Georgia Baptist Convention, it consists of three schools: the College of Liberal Arts, the Walter F. George School of Law, and Southern School of Pharmacy located in Atlanta. Combined enrollment of the three schools totals over 1,900 students. Dr. William F. Palmer is the Campus Coordinator.

Mercer's decision to participate in the Network was based on an analysis of the cost of adequate computer services for instructional purposes. It was found economically unfeasible for the university to either purchase or lease computer facilities adequate for the anticipated demand.

An initial installation of an IBM 1050 and an ASR 33 which share a leased line from Macon to Atlanta was made in December 1970. Average Network usage is 90 hours per month.

In March 1971, plans are to replace the IBM 1050 with an NCR 260, lease another teletype, and install an additional telephone circuit which will terminate in Athens.

At present, major use of the facilities is by the Chemistry Department in the following courses:

CHEM 21, 22, 23	General Chemistry	85 students
CHEM 125, 126	Analytical Chemistry	12 students
CHEM 130, 131, 132	Physical Chemistry	<u>8 students</u>
	TOTAL	105 students

Plans are being made to provide introductory seminars to interested mathematics students as soon as the new terminals arrive. Computer oriented problems will be introduced into the various calculus, statistics, and other

departmental courses as soon as possible. Efforts are also being made to hire a replacement staff member in the Mathematics Department which will aid the expansion of computer activities in the next academic year.

Since joining the Network, Mercer has participated in Campus Coordinators Conferences, terminal user seminars, and hosted a local short course presentation given by instructors from the University of Georgia.

## MIDDLE GEORGIA COLLEGE

Grant GJ-1040

Harry D. Crawford, Principal Investigator

Middle Georgia College is a two-year, coeducational, residential institution located in Cochran, Georgia. Founded in 1887, it became a state institution in 1917 and currently has nearly 2300 students enrolled in associate degree programs. Dr. Joseph P. Vidosic is the Campus Coordinator.

Middle Georgia acquired an IBM 1050 terminal in September 1970 and began interactive processing in October. The terminal remotes over an Athens business line accessing both the CDC 6400 and the IBM 360/65 at the University of Georgia. Network usage is approximately 12 hours connect-time per month.

Faculty have been actively participating in all state and regional technical workshops, and 1050 user group seminars on Basic CPS, and academic applications. In addition, the school has conducted its own faculty institute seminar with twenty in attendance and the Campus Coordinator has given individual, private FORTRAN instruction.

At present there are no offerings in computer science courses per se; however, seven faculty are using the 1050 in direct support of classroom instruction. The courses are as follow:

PHYS 201	Mechnaic and Kinetic Theory	97 students
PHYS 202	Waves, Electricity, Magnetism	55 students
PHYS 207	Mechanics	60 students
PHYS 208	Electricity	56 students

PHYS 209	Heat, Sound and Light	9 students
MATH 100	College Algebra	102 students
MATH 107	Calculus I	121 students
MATH 108	Calculus II	14 students
EGR 210	Statistics	<u>17 students</u>
TOTAL		531 students

## NORTH GEORGIA COLLEGE

North Georgia College, founded in 1873 in Dahlonega, is a senior, residential, coeducational, liberal arts institution offering baccalaureate programs in the arts and sciences. The school began teleprocessing in 1969 with two teletypes and a commercial time-sharing system. Dr. M. C. Wicht is the Campus Coordinator.

In Fall 1970, two more teletypes were leased, each share two Atlanta business lines. These machines access the Univac 1108 at Georgia Institute of Technology and the Spectra 70/46 at Georgia State University. Average connect-time is approximately 100 hours monthly.

Terminal utilization has been steadily integrated into the curriculum at North Georgia. Those courses involving computer use during the past academic year are as follow:

BUS 210	Electronic Data Processing	20 students
CHEM 121	General Chemistry	19 students
CHEM 122	General Chemistry	27 students
CHEM 331	Organic	25 students
CHEM 341	Physical	10 students
CHEM 441	Analytical Chemistry	5 students
MATH 151	Computer Programming	35 students
MATH 122	Analytical Geometry for Honor students	20 students
MATH 240	Probability and Statistics	13 students
MATH 245	Calculus	12 students
MATH 247	Multi-dimensional Calculus	20 students

MATH 246	Integral Calculus	18 students
MATH 300	Differential Equations	25 students
PHYS 102	Basic Physics	15 students
PHYS 223	Mechanics	48 students
PHYS 224	Electricity	38 students
PHYS 230	Electronics	10 students
PHYS 320	Mechanics Analytical	5 students
PHYS 420	Electricity and Magnetism	<u>10 students</u>
TOTAL		375 students

In addition, six faculty members are currently using the terminals in research projects.

Faculty of North Georgia have participated in all Campus Coordinators Conferences, state and regional technical workshops, and hosted the teletype user seminar in March for 22 participants. The school also sponsored a series of three terminal user training sessions in October with 17 attending.



**PAINE COLLEGE**

**Grant GJ-1149**

**Leonard E. Dawson, Principal Investigator**

Paine College was chartered in 1903. Located in Augusta, it is a four-year, residential, church - affiliated school whose historical purpose has been to provide a Christian liberal arts education to Negro students. Of late, both the faculty and student body are interracial and total enrollment approximates 1100 students. The Campus Coordinator is Tom McCain.

It would not be truthful to deny that Paine College has been beset with many problems during this year which have severely hampered their activity under this grant. Without going into detail, the city of Augusta has been the scene of civil disruption; the office of President of Paine has changed hands; Dr. Dawson has resigned and a new investigator has not been named; and Mr. McCain has been deeply involved with activity unrelated to the Network. The present situation is much improved and during the last quarter, both students and faculty members began to use the Network facilities.

The IBM 2780 and IBM 2741 at the Medical College of Georgia are located across the street from the Paine campus, and two orientation sessions have been held for Paine participants to use these facilities. The economic situation at the College is such that on-campus facilities are unlikely during the coming year, but plans are underway for both scheduled and unscheduled use of the nearby facilities. Despite the delay, it is anticipated that by the end of this coming year, Paine College will have a nucleus of active computer users.

# **SAVANNAH STATE COLLEGE**

**Grant GJ-1042**

**Martha Wilson, Principal Investigator**

**Savannah State College is a coeducational, residential, liberal arts institution founded in 1890 in Savannah, Georgia. Degree programs offered are the A.B., B.S., and B.B.A., with a combined current enrollment of nearly 2400 students. Mrs. Martha Wilson is the Campus Coordinator.**

**Savannah State's participation in the Network began late in 1970 with their acquisition of an IBM 1130. This small, stand-alone computer communicates in medium-speed to both the IBM 360/65 and the CDC 6400 at the University of Georgia via an Athens business line. In early 1971, an IBM 2741 was also leased to provide low-speed access to the 360/65. Average Network connect-time is 25 hours per month.**

**Computer science courses offered are as follow:**

<b>MATH 306</b>	<b>FORTRAN Programming</b>	<b>60 students</b>
<b>MATH 366</b>	<b>RPG Programming</b>	<b>52 students</b>
<b>MATH 307</b>	<b>Internal Computer Programming</b>	<b>6 students</b>
<b>BAD 301</b>	<b>Principles of Data Processing</b>	<b>39 students</b>
<b>ACCT 310</b>	<b>Business Data Processing Systems</b>	<b>13 students</b>

**Other courses utilizing the terminals in class related study are:**

<b>ACCT 201</b>	<b>Principles of Accounting</b>	<b>90 students</b>
<b>BAD 300</b>	<b>Business Machines</b>	<b>15 students</b>
<b>ECON 450</b>	<b>Business Statistics</b>	<b>18 students</b>
<b>MATH 107</b>	<b>Algebra and Trigonometry</b>	<b>81 students</b>

MATH 108	Algebra and Trigonometry	24 students
MATH 213	Analysis II	16 students
MATH 217	College Algebra and Trigonometry	<u>35 students</u>
TOTAL		449 students

Faculty of Savannah State have actively participated in all Campus Coordinators Conferences, state and regional technical workshops and terminal user seminars on languages and academic applications. In addition, they have held system orientation workshops on campus for faculty and hosted a short course presentation conducted by University of Georgia instructors. These sessions have generated weekly followup faculty seminars.

**SOUTH GEORGIA COLLEGE**

**Grant GJ-1043**

**Robert R. Johnson, Principal Investigator**

South Georgia is a two-year, coeducational, residential institution located in Douglas, Georgia. In fall 1970, the school began low-speed processing to the IBM 360/65 in Athens using an IBM 1050. Robert R. Johnson is the Campus Coordinator.

Originally, an Atlanta business line was utilized to establish communication with the 360, which also had an Atlanta telephone number. Douglas, however, is serviced by General Telephone Company. This company does not recognize the use of GSA-shared Telpak facilities, which save over \$2.00 per mile in communication costs. Because of the problem, South Georgia's data line was moved in January 1971, to the University of Georgia Centrex system, a private telephone exchange. As an extension of a private exchange, billing control passed to Southern Bell, enabling a savings of over \$300.00 monthly in communication costs.

Utilization from South Georgia has steadily increased, partly due to faculty participation in a number of workshops and seminars. Present monthly connect-time is approximately 28 hours. During Fall Quarter of 1970, a total of 15 faculty members attended two separate workshops. Early in 1971, two local training sessions were held with a total attendance of 27. This increased faculty interest is expected to continue with the addition of a new faculty member in Fall 1971 who has experience in the computer field.

To date, two computer courses, listed below, have been added to the South Georgia curriculum:

Data Processing 101	31 students
Bus. Adm. 235      Information Systems Development and Analysis	<u>19 students</u>
TOTAL	50 students

# VALDOSTA STATE COLLEGE

Grant GJ-1044

Sam W. Brooks III, Principal Investigator

Valdosta State College is a residential, coeducational, senior liberal arts institution located in Valdosta, Georgia. Opened in 1906 as a women's college, it became coeducational in 1950, and inaugurated its graduate program in 1967. Degree programs offered are the A.B., B.S., M.A., M.S., and M.S. Ed., with a total enrollment of nearly 2700 students. Dr. Maurice W. Lindauer is the Campus Coordinator.

In June 1970, the school began remote processing from a Univac 9200 and an ASR 33. These two terminals share a telephone circuit which terminates into the State Centrex System in Atlanta. Thus, low-speed access is provided to all three Central Sites: medium-speed hardware and software interfaces are operational with the Univac 1108 and the IBM 360/65. Network usage is approximately 95 hours connect-time per month.

Computer science is being integrated into the Business Administration Curriculum with the first such course, Economics 309 - FORTRAN Programming, having been offered for three quarters to a total of 77 students. Other courses utilizing both remote batch and interactive programming are:

BIO 460	Ecology	16 students
ECON 209	Introduction to Computer Information Science	25 students
CHEM 281	Quantitative Analysis	10 students
CHEM 499	Nucleonics	7 students
PHYS 381	Mathematical Physics	9 students

PHYS 851	Advanced Modern Physics	3 students
PSY 460	Experimental Psychology	<u>30 students</u>
	TOTAL	177 students

Six faculty members are also employing the use of the terminals in research projects.

Valdosta State College representatives have attended all regional and state technical workshops and user group seminars to study programming languages and academic applications. In addition, the Campus Coordinator conducted three-day terminal usage workshop last October for 29 faculty members.

## WESLEYAN COLLEGE

Wesleyan College is a four-year, residential liberal arts college for women. Founded in 1836 by the Methodist Church, it is located in Macon, Georgia. Current enrollment is over 500 students. Miss Virginia Johnson is the Campus Coordinator.

At the end of March 1971, Wesleyan became affiliated with the Network with the acquisition of an ASR 33 and an Atlanta business line, which affords access to all three Central Sites.

Several faculty are already using Network facilities for research projects and both the Mathematics and Biology Departments will utilize the terminal in classroom instruction spring quarter. The Mathematics Department is also planning to offer a programming course in the coming academic year.



## WEST GEORGIA COLLEGE

West Georgia College is a coeducational, residential liberal arts institution located in Carrollton, Georgia. Established in 1933 as a junior college, it became a senior college in 1957. In 1967, the Board of Regents authorized the initiation of graduate programs at West Georgia at the master's level. Current enrollment at this institution is over 5,500 students. J. Allan Irby is the Campus Coordinator.

Remote processing to the University of Georgia began in 1968 with the installation of an IBM 2780 and an IBM 2741 to supplement the IBM 1620 computer system which had been in operation for several years. In 1969, an IBM 360/30 was installed and in 1970, it was upgraded to a Model 40, replacing all of the equipment except the IBM 2741 which currently has access to systems in both Atlanta and Athens. The majority of the needs of the school are served by the 360/40; 2741 usage is limited to special interactive projects. Present usage of the Network is more than 100 hours per month.

The Computer Center at West Georgia College maintains a continuing series of faculty workshops. This year 18 training sessions were held with an average attendance of eleven participants. Some of the attendees have been students, but most student participation has been in formal course work associated with the Computer Science Program and other academic classes.

C.S.C. 201	Introduction to Computer Science	270 Students
C.S.C. 202	Introduction to Discrete Structures	10 Students
C.S.C. 250	Business Data Processing	16 Students
C.S.C. 303	Programming Languages	7 Students
C.S.C. 411	Computer Organization	3 Students

Some of the other courses are specifically directed towards the  
IBM 2741.

GLY 402	Paleontology	9 Students
BIO 560	Biometry	2 Students
BBA 303	Principles of Marketing	62 Students
BED 541	Office Management	8 Students
SOC 490	Special Problems in Sociology	19 Students
BBA 430	Production Management	37 Students
MAT 107	Principles of Mathematics	<u>13 Students</u>
TOTAL		456 Students

Approximately fifteen faculty members are using the terminal in support  
of research projects. The interactive services of the Network are an  
important part of the total computer offerings at West Georgia College.

**APPENDIX C**  
**SHORT COURSE PRESENTATIONS**

## SHORT COURSE PRESENTATIONS

CONVERSATIONAL SYSTEMS (2 days) Instruction in programming for the various conversational systems available at the central sites. Advantages and disadvantages of the systems will be pointed out and special features will be discussed as time permits.

CONTROL LANGUAGES (1 day) Job control languages for the Univac 1108, RCA 70/46, IBM 360/65, and CDC 6400. Topics will include basic deck setup, tape specifications, direct access allocation, catalog procedures, etc.

SIMULATION AND MANAGEMENT GAMES (2 days) Description and comparison of the various simulation programs and management games available at the central sites. The second day will be devoted primarily to operational procedures, using the local terminal, to use the packages of interest to the attendees.

PUBLIC LIBRARY (4 hours) Organization and usage of the program libraries available at the central sites. Documentation on existing programs will be presented as well as procedures for submitting programs to these libraries and requesting that programs not currently available be obtained or developed.

INSTALLATION MANAGEMENT (4 hours) Discussion of various ways to organize and administer the data processing function. Particular attention will be given to operations and applications programming. Methods of selection, training, and supervising data processing personnel.

OPERATING PROCEDURES (4 hours) Presentation of procedures to be employed to submit jobs, obtain output, obtain central site operator assistance, isolate and report central site errors in hardware or software.

DISCIPLINE INTEREST (time variable) An attempt will be made to obtain faculty members from the central sites to discuss the applications of the computer to the research and instruction programs of their departments.

When requesting this offering, please specify:

- i) Specific discipline and name of contact
- ii) Time available
- iii) Area of interest (basic instruction, senior division instruction, area of research, etc.

STATISTICAL AND MATHEMATICAL PACKAGES (1 or 2 days) Descriptions and comparisons of the various 'canned' programs that are available at the central sites to perform statistical and mathematical analysis. The second day (optional) will be devoted to the operational details of using these programs, including extensive hands-on laboratory work using the local terminal.

SUBROUTINE USAGE (4 hours) Description of types of subroutines available in the FORTRAN and/or PL/1 Scientific Subroutine Packages (SSP). Methods for calling these programs from a main program. Knowledge of FORTRAN and/or PL/1 required.

APPENDIX D

ROSTER OF CAMPUS COORDINATORS

## ROSTER OF CAMPUS COORDINATORS

Mr. Dale Sherman  
University System Computer Network  
Abraham Baldwin Agricultural College  
ABAC Station, Box 87  
Tifton, Georgia 31794

Mr. John L. Baxter  
University System Computer Network  
Albany Junior College  
Albany, Georgia 31705

Mrs. Rosa Johnson  
University System Computer Network  
Albany State College  
Albany, Georgia 30705

Mr. Donald Anderson  
University System Computer Network  
Armstrong State College  
11935 Abercorn Street  
Savannah, Georgia 31406

Dr. Frank H. Chou  
University System Computer Network  
Augusta College  
Augusta, Georgia 30904

Dr. Ouida Dickey  
University System Computer Network  
Berry College  
Mount Berry, Georgia 30149

Mr. John Hamilton  
University System Computer Network  
Brunswick Junior College  
Brunswick, Georgia 31520

Mrs. Carolyn Harris  
University System Computer Network  
Clark College  
Atlanta, Georgia 30314

Dr. Leonard R. Daniel  
University System Computer Network  
Clayton Junior College  
Forest Park, Georgia 30050

Mr. Neal S. Coulter  
University System Computer Network  
Columbus College  
Columbus, Georgia 31709

Mr. Bill Smith  
University System Computer Network  
Dalton Junior College  
Dalton, Georgia 30720

Dr. Daniel C. Pantaleo  
University System Computer Network  
Floyd Junior College  
Rome, Georgia 30161

Dr. Bill Dalton  
University System Computer Network  
Fort Valley State College  
Fort Valley, Georgia 31030

Mr. Edward Spencer  
University System Computer Network  
Georgia College at Milledgeville  
Milledgeville, Georgia 31061

Col. John P. McGovern  
University System Computer Network  
Georgia Institute of Technology  
225 North Avenue, N.W.  
Atlanta, Georgia 30332

Dr. David B. Kelley  
University System Computer Network  
Gainesville Junior College  
Gainesville, Georgia 30501

Dr. F. Russell Helm  
University System Computer Network  
Georgia Southern College  
Statesboro, Georgia 30458

Mr. William Wells  
University System Computer Network  
Georgia State University  
Atlanta, Georgia 30303

Dr. J. Hubert Greene  
University System Computer Network  
Georgia Southwestern College  
Americus, Georgia 31709

Mr. C.G. Dobson  
University System Computer Network  
Kennesaw Junior College  
Marietta, Georgia 30060

Dr. Richard E. Pogue  
University System Computer Network  
Medical College of Georgia  
Augusta, Georgia 30902

Mr. J. Alan Irby  
University System Computer Network  
West Georgia College  
Carrollton, Georgia 30117

Dr. Joseph P. Vidosic  
University System Computer Network  
Middle Georgia College  
Cochran, Georgia 31014

Dr. W. Thomas Bass  
University System Computer Network  
Macon Junior College  
Macon, Georgia 31201

Dr. William F. Palmer  
University System Computer Network  
Mercer University  
Macon, Georgia 31207

Dr. M.C. Wicht  
University System Computer Network  
North Georgia College  
Dahlonega, Georgia 30533

Mr. Tom McCain  
University System Computer Network  
Paine College  
Augusta, Georgia 30902

Mr. Robert R. Johnson  
University System Computer Network  
South Georgia College  
Douglas, Georgia 31533

Mrs. Martha Wilson  
University System Computer Network  
Savannah State College  
State College Branch  
Thunderbolt, Georgia 31404

Dr. Britain J. Williams  
University System Computer Network  
University of Georgia  
Athens, Georgia 30601

Dr. Maurice Lindauer  
University System Computer Network  
Valdosta State College  
Valdosta, Georgia 31601

Miss Virginia Johnson  
University System Computer Network  
Wesleyan College  
Macon, Georgia 31201



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SECOND ANNUAL REPORT  
to the  
NATIONAL SCIENCE FOUNDATION  
on Grant GJ-608

EXPERIMENT IN THE DEVELOPMENT OF A REGIONAL COMPUTER CENTER

April 1, 1971 - March 31, 1972

James L. Carmon  
I. E. Perlin  
Principal Investigators

University System Computer Network  
100 Edgewood Avenue, N.E.  
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including reports on the following grantee institutions:

<u>Grant No.</u>	<u>Institution</u>	<u>Principal Investigator</u>
GJ-1054	University of Georgia	James L. Carmon
GJ-1055	Georgia Institute of Technology	I. E. Perlin
GJ-1031	Abraham Baldwin Agricultural College	J. Dale Sherman
GJ-1032	Albany Junior College	John L. Baxter
GJ-1033	Albany State College	C. K. Dunson
GJ-1034	Armstrong State College	Donald D. Anderson
GJ-781	Berry College	Ouida W. Dickey
GJ-1035	Brunswick Junior College	D. M. Monroe, Jr.
GJ-1027	Fort Valley State College	William D. Moorehead
GJ-1025	Georgia College at Milledgeville	David G. Baarda
GJ-1036	Georgia Southwestern College	J. Hubert Greene
GJ-1038	Macon Junior College	Jack H. Ragland
GH-1039	Medical College of Georgia	Russell W. Morse
GJ-1040	Middle Georgia College	Harry D. Crawford
GJ-1149	Paine College	Leonard E. Dawson
GJ-1042	Savannah State College	Martha Wilson
GJ-1043	South Georgia College	Robert R. Johnson
GJ-1044	Valdosta State College	Sam W. Brooks III

## DEDICATION

Some five years ago during 1967 the concept of a regional computer network to serve the University System of Georgia was advanced by Colonel John P. McGovern.<sup>1</sup> After discussions with Dr. I. E. Perlin of the Georgia Institute of Technology and Dr. James L. Carmon of the University of Georgia, Colonel McGovern embarked on the task of devising a plan, completing the research necessary for the implementation of the plan, and preparing a proposal to the National Science Foundation. For several years Colonel McGovern devoted nights and weekends to the task that he had undertaken. His efforts resulted in a proposal to the National Science Foundation.

The funding of the regional computer network by the National Science Foundation marked the realization of Colonel McGovern's dream that every student in the University System of Georgia be provided with an opportunity for training and education in the field of Computer Technology so that these students could compete successfully in modern society and be enabled to serve society better.

Colonel McGovern loved Georgia Tech, the State of Georgia and his nation fiercely. He believed in championing the cause of the "little people" - the students who were struggling to get an education. In them he recognized the seeds of the future, and he did not spare himself in the fight to obtain for them the best tools and methods.

It is fitting that we dedicate this report to the memory of Colonel John P. McGovern, Associate Director of the Rich Electronic Computer Center at the Georgia Institute of Technology. We fully recognize the great debt all of us owe to this dedicated, devoted, hard-working and forward-looking man of vision - - - Colonel John P. McGovern.

June 12, 1972

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## ABSTRACT

This second annual report describes the work done within the State of Georgia by the University System Computer Network under the co-direction of Dr. James L. Carmon, Assistant Vice Chancellor for Computing Systems, University System of Georgia, and Dr. Irwin E. Perlin, Director of the Rich Electronic Computer Center, Georgia Institute of Technology. A significant portion of this work was conducted under National Science Foundation Grant GJ-608 and covers the period from April 1, 1971 through March 31, 1972.

The University System Computer Network is an organization of thirty-two institutions of higher learning within the State of Georgia. The purpose of the organization is to provide low-cost computing services and training to meet the academic needs of all Network institutions. This goal has been reached by establishing a network of terminals and telephone circuits which extend the computing power at the major institutions to the remote campuses.

Two Central Sites, University of Georgia and Georgia Institute of Technology, and sixteen remote schools are receiving support from the National Science Foundation under eighteen additional grants. Their work during this past year is also described in this report. The NSF supported remote schools are Abraham Baldwin Agricultural College, Albany Junior College, Albany State College, Berry College, Brunswick Junior College, Fort Valley State College, Georgia College at Milledgeville, Georgia Southwestern College, Macon Junior College, Medical College of Georgia, Middle Georgia College, Paine College, Savannah State College, South Georgia College, and Valdosta State College.

Georgia State University also provides computing service to the Network, and additional users are: Augusta College, Clayton Junior College, Clark College, Columbus College, Dalton Junior College, Floyd Junior College, Gainesville Junior College, Georgia Southern College, Kennesaw Junior College, Mercer University, North Georgia College, Wesleyan College, and West Georgia College.



## Second Annual Report To The National Science Foundation

On Grant GJ-608

### Experiment In The Development Of A Regional Computer Center

#### INTRODUCTION

In the State of Georgia, overall control of all State-supported colleges and universities is vested in the Board of Regents, a fifteen member Board appointed by the Governor, subject to confirmation by the State Senate. The Board serves to establish policies for the University System of Georgia with executive direction provided by the Chancellor.

The University System consists of three universities, a medical college, twelve senior colleges, and eleven junior colleges, each directed by a president reporting to the Chancellor. These units are geographically dispersed throughout the state as shown in Figure 1. Total enrollment for Fall 1971 was 102,755 students. Seven additional junior colleges have been authorized by the Board and are expected to begin operations in the near future.

Most of the research, graduate, and professional work is conducted at the four major institutions: the University of Georgia, Georgia Institute of Technology, Georgia State University, and the Medical College of Georgia.

The senior colleges are: Albany State College, Armstrong State College, Augusta College, Columbus College, Fort Valley State College, Georgia College at Milledgeville, Georgia Southern College, Georgia Southwestern College, North Georgia College, Savannah State College, Valdosta State College, and West Georgia College.

The junior colleges are: Abraham Baldwin Agricultural College, Albany Junior College, Brunswick Junior College, Clayton Junior College, Dalton Junior College, Floyd Junior College, Gainesville Junior College, Kennesaw Junior College, Macon Junior College, Middle Georgia College, and South Georgia College.

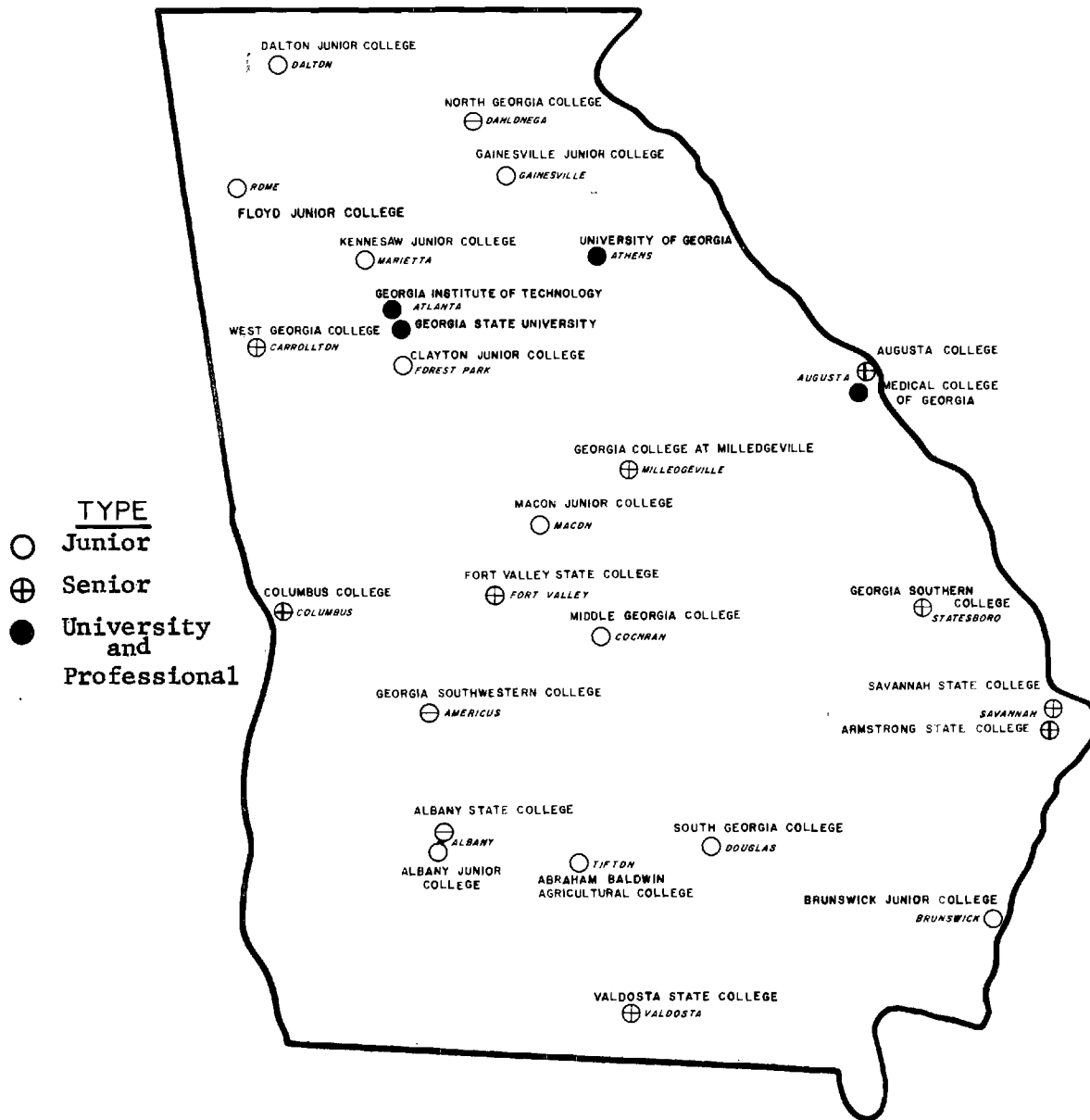


Fig. 1-- UNIVERSITY SYSTEM OF GEORGIA

## SCOPE OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

On May 18, 1970, the University System Computer Network and the Office of the Coordinator were established within the University System of Georgia under the overall direction of Dr. James L. Carmon, Assistant Vice Chancellor for Computing Systems, and Dr. I. E. Perlin, Director of the Rich Electronic Computer Center, Georgia Institute of Technology. The purpose of the organization was to provide low-cost computing services and training to meet the academic needs of all Network members.

During its second year of operation, the Network served 32 institutions - all of the units in the University System plus five private institutions. Students and faculty on twenty-nine remote campuses have access through 53 installed terminals and small computers to the powerful computing facilities at three Central Sites - University of Georgia, Georgia Institute of Technology, and Georgia State University. The Network contributes to the total program of higher education in Georgia by providing modern computer facilities to all member institutions.

### Network Organization

Remote terminals were first established in 1968, and the number of users has increased annually. The basic premise is that the smaller institutions should have access to computing facilities equal to the resources available to the larger institutions. Economically, this is only possible by sharing the same resources in a communications network.

The two Principal Investigators, Drs. Carmon and Perlin, furnish overall guidance of the project. Technical direction and operational responsibilities rest with the Coordinator, Robert R. Pearson. The Central Site Committee, composed of representatives from each of the Central Sites, meets regularly with the Coordinator and the Principal Investigators to consider questions of operational support

from the host computers. These Sites provide a broad base of software and training support for Network users.

The key man in the organization is the Campus Coordinator. Each participating institution has one person appointed by its president to be responsible for the installation, usage, and development of the computer project on the campus. All external assistance is channeled through him, and all local training is organized by him. The Campus Coordinators meet quarterly with the Principal Investigators, the Coordinator and the Central Site Committee to review the progress of the Network and consider plans for future development.

#### Summary of Participants

During the period of the grant, the computing power of five large-scale systems has been made available to the remote users, and the number of users has grown to twenty-nine institutions. The participating institutions are listed in Table 1. Their individual enrollments range from 455 to 5194 equivalent full-time students. Their geographic locations are shown in Figure 2.

TABLE 1

## LISTING OF PARTICIPATING INSTITUTIONS

<u>NAME</u>	<u>LOCATION</u>	<u>TYPE</u> <sup>1</sup>	<u>ENROLLMENT</u> <sup>2</sup>	<u>CODE</u>
Abraham Baldwin Agricultural College	Tifton	Jr. Pub.	2062	ABC
Albany Junior College	Albany	Jr. Pub.	1141	AJC
Albany State College	Albany	Sr. Pub.	1956	ALS
Armstrong State College	Savannah	Sr. Pub.	1963	ARS
Augusta College	Augusta	Sr. Pub.	2219	AUC
Berry College	Mount Berry	Jr. Priv.	973	BER
Brunswick Junior College	Brunswick	Jr. Pub.	889	BJC
Clark College	Atlanta	Sr. Priv.	1135	CLK
Clayton Junior College	Morrow	Jr. Pub.	1715	CJC
Columbus College	Columbus	Sr. Pub.	2830	COC
Dalton Junior College	Dalton	Jr. Pub.	917	DJC
Floyd Junior College	Rome	Jr. Pub.	642	FJC
Fort Valley State College	Fort Valley	Sr. Pub.	2352	FVS
Georgia College at Milledgeville	Milledgeville	Sr. Pub.	1915	GCM
Georgia Institute of Technology	Atlanta	Univ. Pub.	(Note 3)	GIT
Gainesville Junior College	Gainesville	Jr. Pub.	917	GJC
Georgia Southern College	Statesboro	Sr. Pub.	5194	GSC
Georgia State University	Atlanta	Univ. Pub.	(Note 3)	GSU
Georgia Southwestern College	Americus	Sr. Pub.	2117	GSW
Kennesaw Junior College	Marietta	Jr. Pub.	1250	KJC
Medical College of Georgia	Augusta	Univ. Pub.	1495	MCG
Mercer University	Macon	Univ. Pub.	2010	MER
Middle Georgia College	Cochran	Jr. Pub.	1915	MGC
Macon Junior College	Macon	Jr. Pub.	1231	MJC
North Georgia College	Dahlonega	Sr. Pub.	1250	NGC
Paine College	Augusta	Sr. Priv.	718	PNC
South Georgia College	Douglas	Jr. Pub.	1107	SGC
Savannah State College	Savannah	Sr. Pub.	2309	SSC
University of Georgia	Athens	Univ. Pub.	(Note 3)	UGA
Valdosta State College	Valdosta	Sr. Pub.	2953	VSC
Wesleyan College	Macon	Sr. Priv.	455	WES
West Georgia College	Carrollton	Sr. Pub.	<u>5084</u>	WGC

TOTAL 52,768

Notes: 1. Some Senior Institutions have graduate programs.  
All University Institutions have doctoral programs.

2. Fall 1971 - Equivalent Full Time

3. A Central Site whose computers serve remote users.

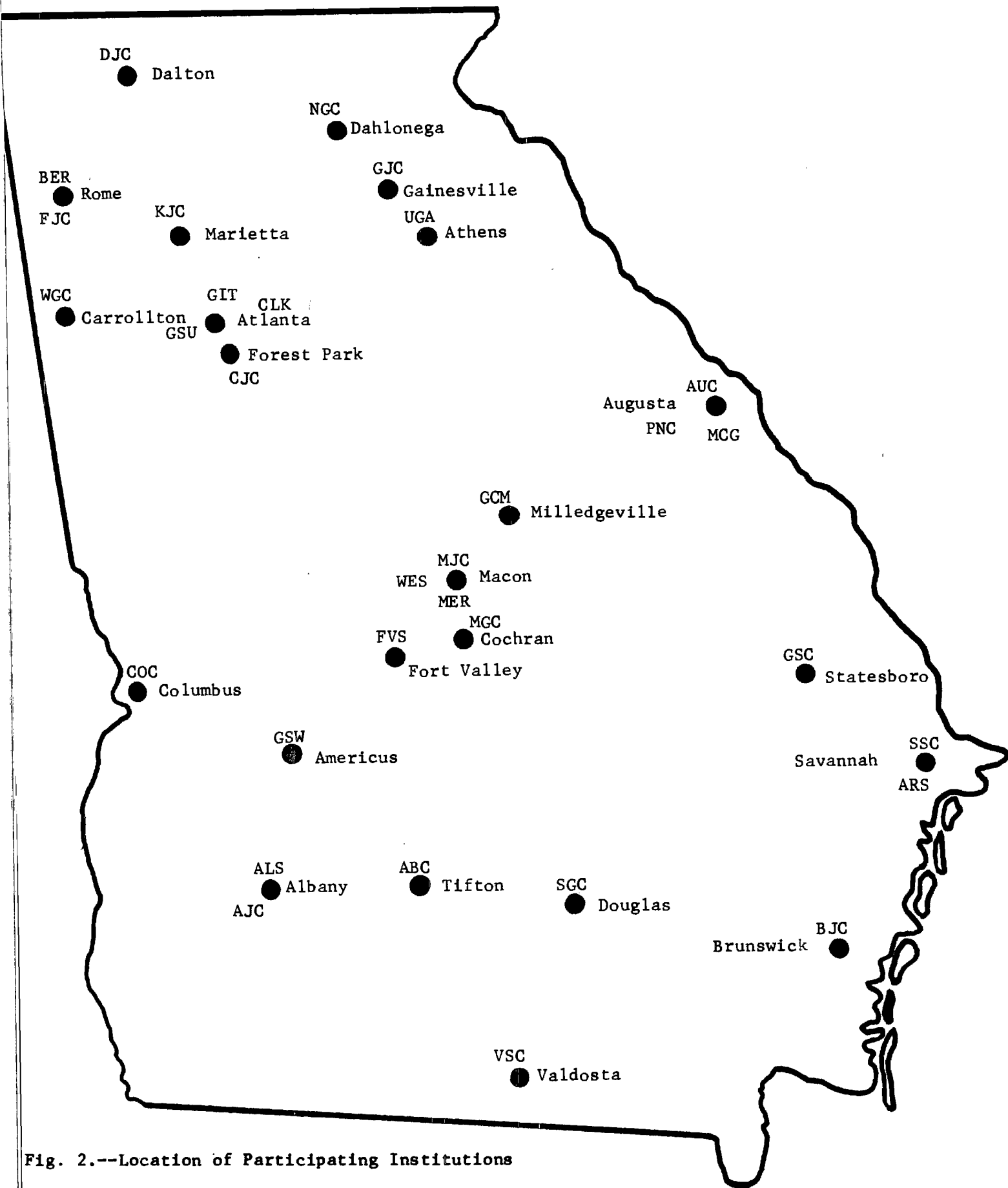


Fig. 2.--Location of Participating Institutions

## CONFIGURATION OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

In all cases, computer access from a remote site is accomplished over voice-grade telephone lines on a dial-up basis. The ability of the remote user to access more than one system depends on the availability of interfaces and the economics of the line costs.

### Central Site Hardware

The locations of the three Central Sites are shown in Figure 3. Two computing systems are located in Atlanta and two in Athens.

The Rich Electronic Computer Center (RECC) at Georgia Tech provides Network users with access to their Shared Processor System, Univac 1108 (196k of core), which operates under EXEC. 8. This machine is capable of both remote, demand and batch operations, supporting the Univac 9200's in the Network, and interactive or on-line conversational programming using the Univac Time Sharing system. The latter system supports ASR 33 teletypes and teletype-compatible devices at 110 baud and 300 baud.

The RECC also supports a limited amount of Network usage on their Burroughs B-5500 (32k) system. Most Network utilization of this system has been from low-speed devices.

The computer center at Georgia State University provides computer capability to the Network through their Univac 70/46 (256k of core) which operates under the Time Sharing Operating System (TSOS), supporting both teletype-compatible devices and the IBM 2741.

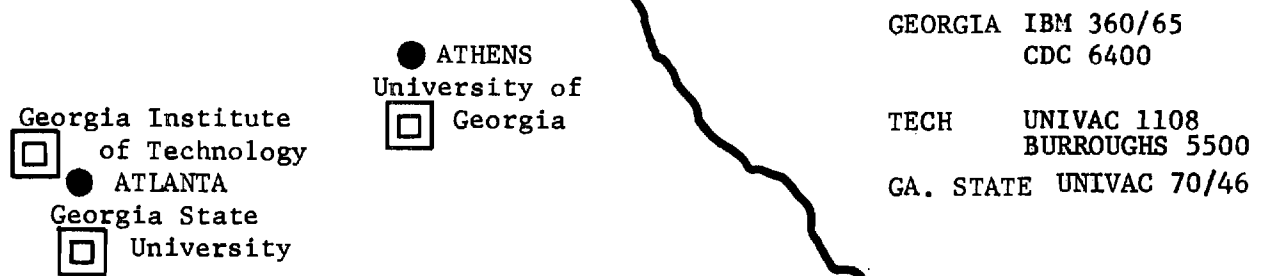


Fig. 3.--Location and Machines of Central Sites



The University of Georgia Computer Center (UGACC) presently has two large-scale systems which are available to the Network. An IBM 360/65 with 512K of high-speed core and 1m bytes of low-speed core offers both Remote Job Entry (RJE) and low-speed interactive capability through the Conversational Programming System (CPS). This computer system runs under OS/MVT with HASP-II and is capable of communications with all types of terminals presently operating in the Network.

The second system at the UGACC is a CDC 6400 with 65K words of core which operates under SCOPE 3.3. This system is supporting the IBM 1130 terminals in medium-speed (2000 baud) operation and teletype-compatible devices at 100 baud under INTERCOM 2.

#### Remote Hardware

Table 2 lists the remote installations and the hardware currently in use at each site. The terminals listed under "Keyboard" are low-speed\* terminals, and the "Batch" terminals are medium-speed.

A breakdown of equipment at the remote installations follows:

Remote Computers: IBM 1130 (5)  
IBM 360/20 (1)  
NCR 100 (1)  
Univac 9200 (3)

Remote Batch Terminals: COPE 1225 (2)  
IBM 2780 (2)

---

\*For the purpose of this report, low-speed will be defined as 110 baud through 300 baud. Medium-speed will be above 300 baud to 9600 baud.

TABLE 2

## REMOTE HARDWARE INSTALLATIONS

<u>CODE</u>	<u>KEYBOARD</u>	<u>INSTALLED</u>	<u>REMOVED</u>	<u>BATCH</u>	<u>INSTALLED</u>	<u>REMOVED</u>
ABC	ASR 33	5-70		U-9200	5-70	
AJC	IBM 2741	9-70	3-71	IBM 1130	3-71	
ALS				IBM 1130	11-70	
ARS	IBM 2741	7-70				
	ASR 33	11-70				
	IBM 6610	3-72				
AUC	IBM 1050	2-71		COPE 1225	11-71	
BER	(2)ASR 33	10-70		IBM 360/20	4-71	
BJC	IBM 1050	10-70	7-71			
	(3)ASR 33	7-71				
CJC	IBM 2741	1969		IBM 2780	9-70	
CLK	ASR 33	12-70	5-71			
	ASR 33	2-72				
COC	IBM 2741	1969				
DJC	ASR 33	9-71				
FJC	ASR 33	9-71				
FVS				IBM 1130	1-71	
GCM	ASR 33	10-70		U-9200	1-71	
GIT				COPE 1225	3-72	
GJC	IBM 2741	1-71				
GSC				IBM 2780	1969	11-71
				NCR 100	8-71	
GSW				IBM 1130	12-70	
KJC	IBM 1050	1969	3-71			
	(2)NCR 260	3-71				
	ASR 33	3-71				
MCG	IBM 2741	4-70		IBM 2780	4-70	

<u>CODE</u>	<u>KEYBOARD</u>	<u>INSTALLED</u>	<u>REMOVED</u>	<u>BATCH</u>	<u>INSTALLED</u>	<u>REMOVED</u>
MER	IBM 1050	12-70	4-71			
	ASR 33	12-70				
	ASR 33	4-71				
	(2)NCR 260	4-71				
MGC	IBM 1050	9-70	3-72			
	ASR 33	3-72				
MJC	IBM 1050	7-70	3-71			
	ASR 33	3-71				
NGC	(4)ASR 33	1969				
PNC	ASR 33	12-71				
SGC	IBM 1050	11-70	9-71			
	(2)ASR 33	9-71				
SSC	IBM 2741	1-71		IBM 1130	10-70	
VSC	ASR 33	6-70		U-9200	6-70	
WES	ASR 33	3-71				
WGC	IBM 2741	1968				
	(2)ASR 33	11-71				
Total	40		Total	13		

Remote Interactive Terminals: ASR 33 (27)  
IBM 2741 (7)  
IBM 1050 (1)  
IBM 6610 (1)  
NCR 260 (4)

In summary, there are forty low-speed and fourteen medium-speed devices at remote locations throughout the Network. No high-speed devices are presently contemplated.

Figures 4 and 5 illustrate the locations of Keyboard and Batch installations, respectively. It should be noted that several installations have both keyboard and batch capability. This was found to be a very workable combination, with the two terminals alternating use of the same line. In most cases, the keyboard device is an ASR 33 teletype, so that a student can be punching a program on paper tape while the batch terminal is using the line.

#### Data Communications

The variety of equipment in the Network creates obvious restrictions in communication to the central computers. In order for all users to have access to any computer capable of communicating with their terminal, all switching is done by telephone company switching equipment in the same manner as any other telephone call. In this arrangement, each computer port is assigned a telephone number. All ports of the computers located in Atlanta terminate in Atlanta, whereas the ports of the Athens machines are divided between Athens and Atlanta, so that remote users whose lines terminate in Atlanta can dial any computer with a local call.

Some terminals (i.e., IBM 1050, and IBM 2780) can only communicate with the IBM 360/65. Therefore, the lines associated with these terminals have been terminated

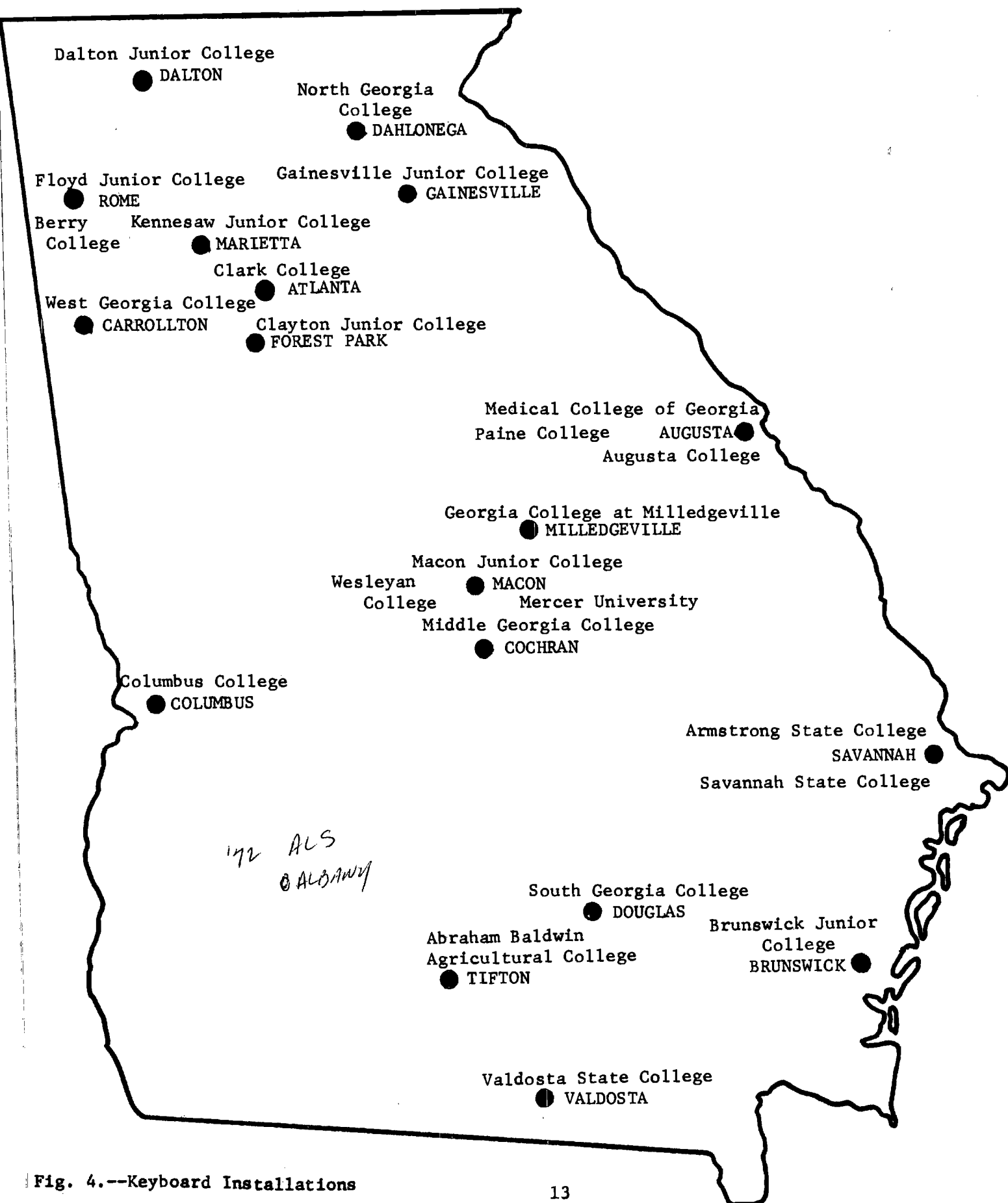


Fig. 4.--Keyboard Installations

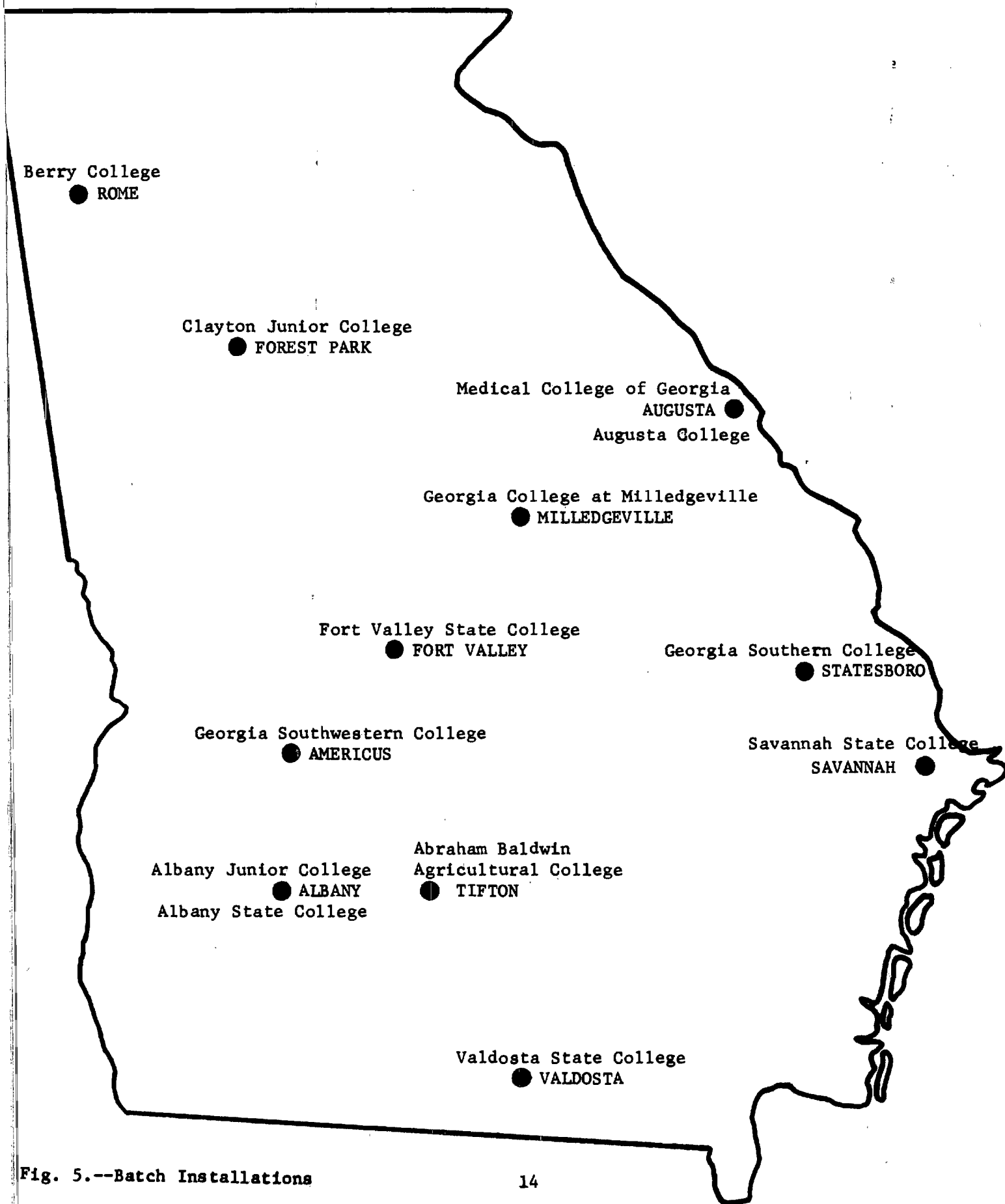


Fig. 5.--Batch Installations

in Athens. During the past year all but one 1050 have been phased out and replaced by teletype terminals to give access to more of the systems.

The present data communications circuits as summarized in Table 3 allow a user to lease his foreign exchange data line from a portion of lines already leased by the Federal Government through the General Services Administration. The advantage is that the mileage rate is only \$0.54 per mile.

TABLE 3

## DATA COMMUNICATIONS

<u>CODE</u>	<u>LOCATION</u>	<u>TELPAK ACCESS POINT</u>	<u>TERMINATION</u>	<u>LXC MILES</u>	<u>TELPAK MILES</u>
ABC	Tifton	Albany	Atlanta <sup>1</sup>	40	150
AJC	Albany	Albany	Athens	--	170
ALS	Albany	Albany	Athens	--	170
ARS	Savannah	Savannah	Atlanta <sup>1</sup>	--	223
AUC	Augusta	Augusta	Athens	--	88
	Augusta	Augusta	Athens	--	88
BER	Rome	Rome	Atlanta <sup>1</sup>	--	58
	Rome	Rome	Atlanta	--	58
BJC	Brunswick	Brunswick	Athens	--	222
CJC	Atlanta	--	Atlanta	--	---
	Atlanta	--	Atlanta	--	---
CLK	Atlanta	--	Atlanta	--	---
COC	Columbus	Columbus	Athens	--	139
DJC	Dalton	Rome	Atlanta <sup>2</sup>	40	58
FJC	Rome	Rome	Atlanta	--	58
FVS	Fort Valley	Warner Robins	Athens	18	94
GCM	Milledgeville	Milledgeville	Atlanta <sup>1</sup>	--	77
GJC	Gainesville	Gainesville	Athens	--	35
GSC	Statesboro	Savannah	Athens	49	139
GSW	Americus	Albany	Athens	34	116
KJC	Marietta	--	Atlanta	--	---
MCG	Augusta	Augusta	Athens	--	88
	Augusta	Augusta	Athens	--	88
MER	Macon	Macon	Atlanta	--	77
	Macon	Macon	Atlanta	--	77
MGC	Cochran	Warner Robins	Athens	21	116
MJC	Macon	Macon	Athens	--	79
NGC	Dahlonega	--	Atlanta	59	---
	Dahlonega	--	Atlanta	59	---
PNC	Augusta	Augusta	Athens	--	---
SGC	Douglas	Alma	Athens <sup>3</sup>	23	174
SSC	Savannah	Savannah	Athens	--	186
VSC	Valdosta	Valdosta	Atlanta <sup>1</sup>	--	88
WES	Macon	Macon	Atlanta	--	77
WGC	Carrollton	Austell	Atlanta	31	16
Totals				374	3219

Total Network Mileage: 3,593 miles

Notes: 1. State Centrex with OUT-WATS

2. GSU Centrex

3. UGA Centrex



## SERVICES OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

### Training

A major training project was conducted during the winter quarter. Dr. Don Leyden of the Chemistry Department at the University of Georgia made one to two day visits to nearly all the schools in the Network to conduct informal seminars for faculty and students. These seminars concentrated on interactive terminal applications in the sciences. After a short introduction to the group, simple programs written in Basic were demonstrated. Then, three to four participants at a time worked together with Dr. Leyden to write and develop their own programs. Dr. Leyden's experience as a teacher who uses the terminal as an integral part of his course of instruction contributed to the success of these seminars.

This series of seminars also produced a fresh look at the problems and inefficiencies of the Network configuration as described in a report made by Dr. Leyden which lent significant impetus to the redesign of the Network. The conclusions of his report, which is included in its entirety in Appendix C, are presented in the next section.

Local training programs were continued under the direction of the Campus Coordinator and were supported by personnel and materials from the Central Sites.

### Interactive Software

Each computer system maintains a set of interactive programs in a public library which is available to all users. In addition to these public libraries, users also maintain their own private libraries on-line. Programs of general interest are accepted into the public libraries, subject to the restriction that they are fully documented.

At the present time, most of the programs in the interactive libraries are oriented toward instruction, rather than research. In addition to the standard mathematical and statistical routines, an increasing number of programs are being

developed in direct support of specific courses.

The combined available languages of the five central systems are: BASIC, FORTRAN, APL, ALGOL, COBOL, SIMULA, SIMSCRIPT, GASP, SNOBOL, AMTRAN, CPS, ASSEMBLER, GTL, WIPL. Operating schedules are as listed below:

RCA 70/46 (Univac Series 70/7)	Monday - Friday	10:00 A.M. - 4:00 P.M., 5:30 P.M. - 11:00 P.M.
	Saturday	8:00 A.M. - 4:00 P.M.
	Sunday	11:00 A.M. - 6:00 P.M.
CDC 6400	Monday - Friday	8:00 A.M. - 3:00 P.M., 5:00 P.M. - 7:00 A.M.
	Saturday - Sunday	24 hours
IBM 360/65	Monday - Friday	10:00 A.M. - Midnight 1:00 A.M. - 7:00 A.M.
	Saturday - Sunday	24 hours
UNIVAC 1108	Monday, Wednesday	10:00 A.M. - 2:00 A.M.
	Tuesday, Thursday	8:00 A.M. - 2:00 A.M.
	Friday	10:00 A.M. - Midnight
B 5500	Monday - Friday	12:00 Noon - 9:00 P.M.

#### Batch Software

The capabilities of smaller remote computers in the Network are greatly extended through the remote batch operations of the U-1108, the CDC 6400 and the IBM 360/65. In general, all of the software that is available to on-site users is also available to the remote users.

The operating schedules for remote batch work are the same as for interactive.

#### Program Libraries

Approximately 1000 programs are currently available to Network users through the program libraries of the three Central Sites. Abstracts of the programs have been compiled into manuals and distributed to the Campus Coordinators and other users.

## NETWORK RECONFIGURATION AND STANDARDIZATION

Although the Network has been an effective operation which offered a wide variety of computer systems and program libraries, there are obvious drawbacks to its present configuration. In order to consider alternative designs, a committee was established to survey future computing needs at each institution and draw up a proposal for the development and growth of the Network.

### Computer Requirements Committee Survey

In August 1971, a Computer Requirements Committee composed of six Campus Coordinators was appointed by the Vice Chancellor for Computing Systems to explore and study the hardware requirements of Network institutions for the next two fiscal years and the administrative organization of the Network itself. The report stated that Network requirements for equipment by the end of the two year period studied would be 140 low speed devices and 22 batch terminals.

A comprehensive questionnaire was prepared and distributed to each Network institution to obtain information on enrollment, computer science courses, non-computer science courses utilizing the computer, research, and anticipated administrative application. A copy of this questionnaire and complete report are included in Appendix B.

Briefly, the overall recommendations and comments of the Committee were:

1. Retain Campus Coordinators as a representative body of Network members and establish advisory committees as needed.
2. Maintain Equipment scheduling at remote sites to better facilitate the usage of the computer by all divisions of the unit.
3. Make equipment available for as long a period a day as necessary for academic use.

4. Establish one central computer facility with sufficient staff to carry on operations to support the educational requirements of the Network.
5. Establish a comprehensive data base, such as the one Western Interstate Commission for Higher Education (WICHE) has recommended for institutional administrative application.
6. Establish a uniform core curriculum in Computer Science throughout the University System.
7. Initiate a state-wide program on curriculum development utilizing the computer where feasible.

#### Report On Instructional Utilization

In March 1972, at the conclusion of the winter quarter project, Dr. Leyden reported his observations at the remote institutions and made the following recommendations:

1. Convert the Network to one central computer facility with a common program library.
2. Add additional staff with teaching experience to the Coordinator's office to assist the new users at the remote sites.
3. Initiate a faculty incentive program and offer grants to local faculty for curriculum development projects.
4. Allow for a more generous distribution of teletype compatible terminals.
5. Establish a central hardware purchasing facility.
6. Initiate a subscription journal or newsletter such as "Georgia Journal of Computer Applications in Undergraduate Instruction" with the subscription rate adjusted to cover the costs of production.

This report in its entirety is included in Appendix C.

## Progress and Planning Report - March 1972

After studying the problems with the initial Network configuration as described above, a Progress and Planning Report was prepared by the Network office. This report is included as Appendix D and describes current plans to transfer all remote Network users to the CDC 6400 at the University of Georgia effective September 1, 1972.

This transition will then allow for the solution of problems incurred in the original Network configuration. Work will begin this summer to document programs in all curricula written on the remote campuses for inclusion in the central programs library. An abstracts manual will be distributed to all members and updated regularly.

The low-speed interactive users will procure, if not already installed, the common Network interactive terminal, ASR 33 teletype. An RFP for a common Network batch terminal is being prepared for submission to vendors with a selection date scheduled for late summer. By securing one type of batch terminal on a quantity basis, individual cost will be reduced by at least one-third, and the systems support requirements at the central site will be reduced. Program sharing will be greatly facilitated.

A Network Advisory Council will be established from volunteer Network Campus Coordinators effective summer quarter with the following committees and responsibilities:

Finance - Financing by Network vs. institution; private school charges; expenditure decisions, i.e., lines, ports, etc.; budget development

Training - Curriculum development; public relations-marketing; manuals distribution

Utilization and Operations - Usage by institutions; priorities of packaged program implementation; operations scheduling

Public Library - Search, documentation and conversion of programs; abstract manual

Planning and Review (composed of the other four committee chairman) -  
Make final decision on addition of lines and ports working with Finance and Operations Committees; correlate work of all other committees

#### Transition and Implementation

Plans are set to effect a complete change in Network Communications as of September 1, 1972. All FXD lines currently terminating in Atlanta and Athens to access ports of the current three central facilities, Georgia Institute of Technology, Georgia State University, and University will be brought down. All communication lines for low-speed devices will be put on local telephone service with dial-up access to computer ports on the CDC 6400, with the exception of four remote institutions with only one terminal which will have a dedicated port.

Plans include connecting from eight to twelve terminals to a single voice-grade telephone circuit using frequency division multiplexors. These circuits will provide a terminal to port ratio which ranges from one to two. Medium speed users will access the CDC 6400 on rotary INWATS lines established in Athens.

## IMPACT OF THE UNIVERSITY SYSTEM COMPUTER NETWORK

At the participating institutions, the Network has met a locally recognized need: The Network has made available a variety of large computers and programs to be used by all the schools in the University System as well as a number of private schools in Georgia. The facilities in both hardware and software are most valuable adjuncts to support the educational and research missions of these institutions.

### Campus Coordinators

The growth and development of computing interest and usage has been the responsibility of the Campus Coordinator. A complete roster of Campus Coordinators is shown in Appendix E. Many have held local seminars for faculty orientation of Network services and to acquaint teachers with the terminal facilities and BASIC language applications. A few of the schools held these seminars regularly for both faculty and students. Others have requested teams from a Central Site to conduct workshops in a specialized area as requested by interested faculty. Besides carrying out the work of coordination on their own campus, many have visited other schools as guest lecturers and workshop leaders. This interchange of Coordinators has proved to be very effective.

### Utilization

Network CPU utilization of the five central computers is given in both annual and monthly composite form in Tables 4 and 5. Table 4 shows annual utilization by schools on each machine balanced against monthly utilization of all schools on each machine in Table 5. Following these tables is Figure 6 which depicts Table 5 in graph form.

### Remote Site Reports

A more explicit picture of progress, interest, and problems of the individual Network institutions is described in this section from reports on each participating school. Included in these reports is a narrative describing computer facilities, faculty encouragement, course work applications, and research efforts. Also included with each report is a chart showing each of the five computers of the central facilities into which the remote campus operates and CPU usage in hours and minutes broken out by months. Following this chart is a utilization graph depicting the school's monthly CPU usage of the central machines.



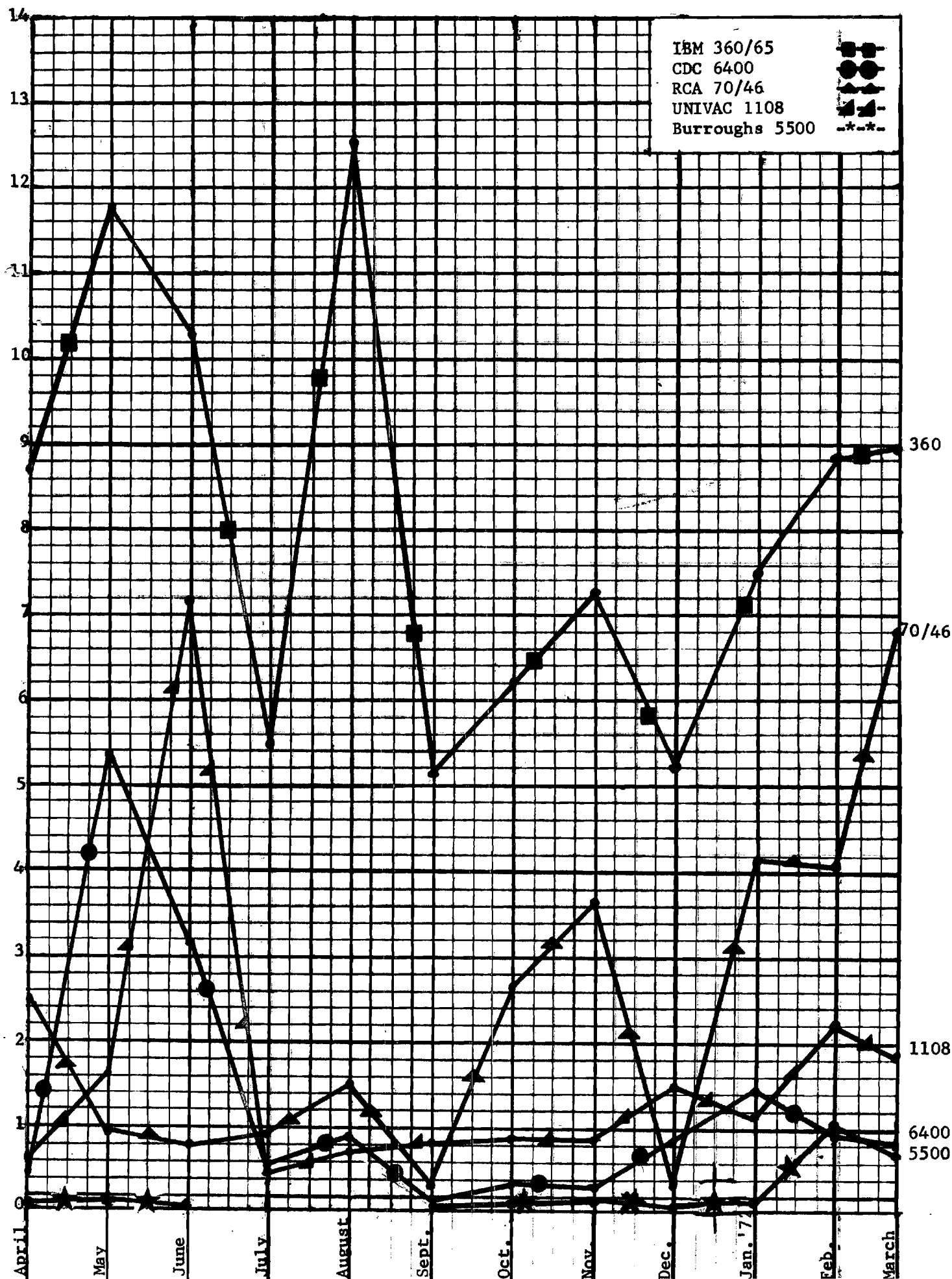
TABLE 4  
ANNUAL CPU HOURS

	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.	Min.	Sec.	Hr.	Min.	Sec.	Hr.	Min.	Sec.	Hr.	Min.	Sec.	Hr.	Min.	Sec.
ABC	4	41	41					39	24				10	8	51
ALS		3	53	1	49										
AJC		20				8			48						
ARS		59	30		8	20	5	57							
AUC	5				4	58									
BJC		29	1		30	18									
CJC	24	53						34							
COC	1	55													
DJC								32	30					16	30
FJC					2		3	46						4	35
FVS		30		1	50	57									
GCM		38	6					9	36				1	26	42
GIT															
GJC		51	34												
GSC	26	10			34	34					2				
GSU															
GSW		51									12				
KJC			45		3	36		25	18		1		1	24	
MCG	14	9													
MGO	3	26			5										
MJC	5	16		2	38	39									
NGC		9	18		57	16	1	15	6		3	6	1	13	
SGC		9	31		37										
SSC		21	45												
UGA															
VSC		6	37		3	56	1	6	54				4	14	
WGC	2	28			21		6	37		1	7	48			
BER		16	15		5	34			6		43	58		4	9
PNC			3			5									
WES					3	19	6	24	30					47	
MER	5	30	49	5	43	42		19	6		4			44	37
CLK							1								
TOTALS	99	16	46	15	39	22	28	47	18	2	13	52	20	23	24

TABLE 5  
MONTHLY COMPOSITE CPU HOURS

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71	8	39	36		28		2	27			5	27		44	15
May	11	39		5	24	21		59			5		1	42	
June	10	14	42	3	9	51		52	6		2	19	7	16	19
July	5	24	31		39	56		59	6					35	44
August	12	31	37		51	5	1	32	30					45	5
September	5	3	30		5	52		14	30		2			51	50
October	7	11	47		25	34	2	40	48			30		53	12
November	8	13	18		22	43	3	42			7	6		54	
December	5	11	48		50	25		19	6		3	18	1	28	12
January '72	7	35	18	1	27	30	4	6	24		3	18	1	10	24
February	8	41	35		58	1	4	5	6	1	2	36	2	13	8
March	8	50	4		56	4	6	49	42		42	18	1	49	15
TOTALS	99	16	46	15	39	22	28	47	18	2	13	52	20	23	24

Fig. 6 - COMPOSITE MONTHLY CPU UTILIZATION



ABRAHAM BALDWIN AGRICULTURAL COLLEGE

Grant GJ-1031

J. Dale Sherman  
Principal Investigator  
Campus Coordinator

During the past fiscal year, computing on the campus of Abraham Baldwin Agricultural College located in Tifton has taken a giant upswing. During this time, the institution has experienced a 200 to 300 per cent increase in the utilization of the computing facilities made available in part by the National Science Foundation Grant.

The current equipment configuration at Abraham Baldwin Agricultural College consists of the following hardware:

(1) A UNIVAC 9200 II computer system, with necessary communications equipment to allow it to interface with the dual processor 1108 UNIVAC computer at Georgia Institute of Technology and the IBM System 360/65 computer system at University of Georgia;

(2) One IBM 085 numeric collator;

(3) One IBM 082 sorter (650 cards per minute);

(4) Two IBM 026 card punches;

(5) One IBM 056 verifier; and

(6) Three UNIVAC 1710 verifying interpreting punches.

This equipment is available for student and faculty use from 8 a.m. to 11 p.m. Monday through Friday and on Saturday and Sunday by request.

The following is a list of the Center for Automation (computer center) personnel available for assistance to persons involved in computing activities:

(1) A Director - 1/3-time instructor in the Computer Science curriculum;

2/3-time head of the Center for Automation;

- (2) One full-time faculty member in the Computer Science curriculum;
- (3) Two full-time staff members for production work and assistance in computing projects; and
- (4) A minimum of four student assistants for both production work and assistance in computing projects.

The entire staff is thoroughly trained in all areas of computing and offers valuable aid in the aforementioned areas. With few exceptions, the student assistants are majoring in Computer Science, and their work offers a major advantage to the Center and to themselves. To the Center, these student assistants are an advantage in that, from their class work, they have been fully oriented in the computer sciences and are quite knowledgeable for their degree of academic attainment, thereby giving the Center qualified personnel. From the students' standpoint, they are able to put to use those concepts, procedures, and knowledge gained in the classroom.

Further, it should be mentioned that there has been an average of three to four students per year who work for the Center without compensation in order to gain the experience of "hands in use" of the computing equipment. These students are required to meet the same work standards as those students who are being paid. The reason this is done is to discipline all students in the work that they will be doing following the completion of their degree requirements at this college.

The Campus Coordinator at the college encouraged the faculty by direct contact to participate in the computing activities of the Center for Automation. It was thought that this would be the most appropriate method, inasmuch as 70 to 80 per cent of the faculty had not been exposed to computing prior to this grant,

and held the use of computers in their subject areas somewhat in awe. Short courses and seminars for faculty, staff, and students were conducted in an attempt to show these persons how computers can be relevant to their subject areas. Because the academic program is under the auspices of the Business Division, there was a greater increase in utilization in this area than in any other. However, projects relative to course work have been conducted in almost every academic area of the college.

There is currently in existence a full two-year career technological program in the computer sciences. An outline of course requirements is shown in Exhibit A. The computer science courses which are a portion of this curriculum are listed below along with a short explanation of the content of each.

(1) CSC 100 - Introduction to Computer Science - A broad overview of the entire field of computer science, with the last three to four weeks used as an intensive instruction period in one of the programming languages--normally, BASIC or FORTRAN. Even though this course is required for all Computer Science majors, it is taken by many students as an elective in the other curricula of the college.

(2) CSC 130 - Systems Analysis - An overview of the design and use of systems in computer science, with primary emphasis on business systems.

(3) CSC 131 - Principles of Computer Programming I - An introductory course in Assembly Language Programming.

(4) CSC 132 - Principles of Computer Programming II - An advanced course in Assembly Language Programming.

(5) CSC 221 - Compiler Programming I - An introduction to FORTRAN programming.

(6) CSC 222 - Compiler Programming II - An introduction to COBOL programming.

(7) CSC 223 - Advanced FORTRAN Programming.

(9) CSC 232 - Advanced COBOL Programming.

(10) CSC 233 - Advanced PL/1 Programming.

(11) CSC 234 - Advanced Assembly Language Programming.

There have been several noncredit adult education courses offered in the areas of RPG (Report Program Generator) and FORTRAN programming. Approximately 70 participants were involved in these noncredit courses during the last year.

Abraham Baldwin Agricultural College is unique in that there is more research carried on by its Computer Center than by all other junior colleges in the University System combined and by most senior institutions. To a large part, this is due to the location of a sister institution adjacent to our campus; a research station involved primarily in the area of agriculture and agricultural fields. The research of the individual investigators is, to a large degree, non-sponsored. For this reason, the computing aspects of the research work (data analysis and reduction) is carried on by this facility. There are currently forty to fifty professional research specialists using our facility, and the work load continues to increase.

Many research projects, of a smaller magnitude to those previously mentioned, are carried out by both students and faculty of this institution. This research effort has been encouraged by making available:

- (1) systems analysis and design,
- (2) program preparation, if needed, and
- (3) full use of facilities.

In summary, the following observations are important and should be considered as a part of this report:

- (1) Two years ago, at the start of this investigation, the computing facilities were used approximately 75 to 100 hours per month. Currently, utilization is running at approximately 325 to 350 hours per month. This increase is indicative of the effort made by the institution in the area of computing and of its acceptance by the students and faculty.

(2) There has been work in many areas brought to the Center for Automation for data analysis and reduction--from tabulation of the results of student elections to the statistical analysis for data collected by several Ph.D. and Master's degree candidates.

(3) There have been tours of the installation by groups ranging from first graders in the local school system to visiting scholars from universities both in the United States and overseas. Many civic clubs such as Kiwanis, Rotary, and Exchange have either toured the facility or had members of the faculty and staff of the Center present programs at their regular meetings. Tours and presentations were initiated in an attempt to better familiarize the local community with the possible use of computers, and, in particular, to show how the college is using and plans to use computers.

(4) Two years ago, when the computer was installed, it was the only computer installation in the city. Today, there are six. It is felt that ABAC's installation, with the goodwill emitted by the staff, is partially responsible for this increase in computing in this area of Georgia, inasmuch as the Center for Automation was contacted and actively involved in the establishment of the other five installations.

(5) In conclusion, the support received from the National Science Foundation has been valuable in firmly establishing the computer center and the use of the computer at this college. Both students and faculty have become educated to the import and applications of computers, and it is anticipated that the utilization of the computer at Abraham Baldwin Agricultural College will double during the next fiscal year.



# EXHIBIT A

## REQUIREMENTS FOR ASSOCIATE DEGREE IN COMPUTER SCIENCE

### FRESHMAN YEAR

COURSES		HOURS
ENG 101	English Composition and Rhetoric . . . . .	5
MAT 100	College Algebra . . . . .	5
CSC 100	Introduction to Computer Science . . . . .	5
BBA 100	Introduction to Business . . . . .	5
CSC 130	Systems Analysis . . . . .	5
CSC 131	Principles of Computer Programming I . . . . .	5
CSC 132	Principles of Computer Programming II . . . . .	5
ABA 211	Statistics. . . . .	5
MAT 235	Finite Mathematics . . . . .	5
Physical Education as Required		

### SOPHOMORE YEAR

BBA 100	Principles of Accounting . . . . .	5
BBA 111	Principles of Accounting . . . . .	5
BBA 108	Business Communication . . . . .	5
SSC 101	Survey of U. S. History & Government. . . . .	5
CSC 221	Compiler Programming I . . . . .	5
CSC 222	Compiler Programming II . . . . .	5
CSC 223	Compiler Programming III. . . . .	5
Physical Education as Required		

TWO FROM THE FOLLOWING: (10 Hours)

CSC 231	Advanced Topics in FORTRAN Programming . . . . .	5
CSC 232	Advanced Topics in COBOL Programming . . . . .	5
CSC 233	Advanced Topics in PL/1 Programming . . . . .	5
CSC 234	Advanced Topics in Assembly Programming . . . . .	5

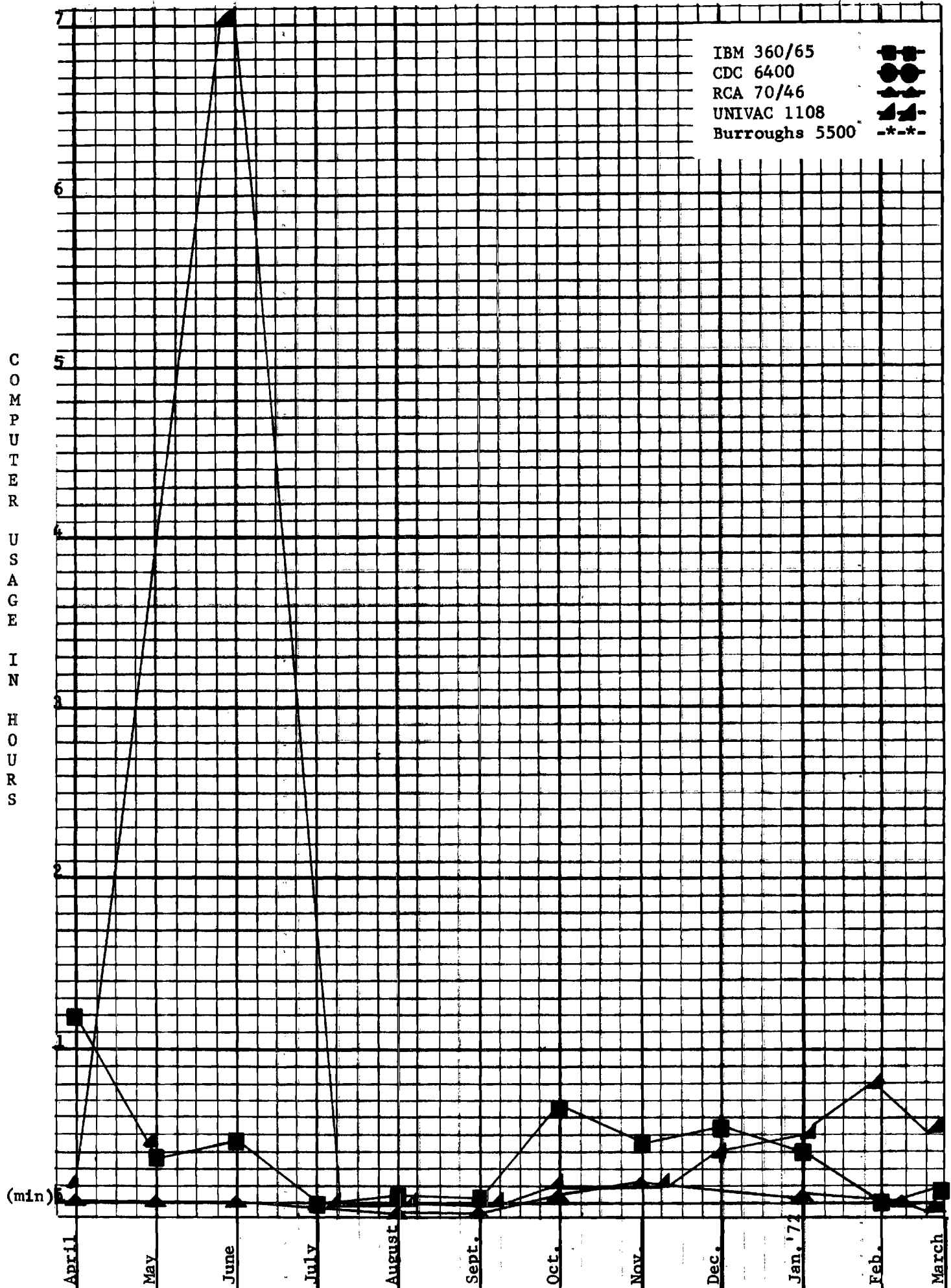
ABRAHAM BALDWIN AGRICULTURAL COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71	1	11						3						8	
May		22						1						22	
June		29							6				7		
July			41											1	26
August		9						1	18					1	5
September		8						2						2	20
October		41						7						10	
November		28						12						12	
December		33												20	
January '72		24						7						29	
February		6						2						50	
March		10						4						33	
TOTALS	4	41	41					39	24					10	8 51

Remote Equipment: ASR 33 and Univac 9200

Telephone Line Configuration: Location Access Point Termination  
Tifton Albany Atlanta

# ABRAHAM BALDWIN AGRICULTURAL COLLEGE



ALBANY JUNIOR COLLEGE

Grant GJ-1032

John L. Baxter  
Principal Investigator  
Campus Coordinator

Albany Junior College began its second year of Network participation with the following equipment on site:

A. IBM 1130 Computer

1. 1131 Central processing unit
2. 1442 Card reader/punch
3. 1132 Printer

B. Unit Record

1. 3 029 Keypunches
2. 1 082 Sorter
3. 1 085 Collator
4. 1 402 Accounting Machine

The 1130 Computer was adapted for communicating as a terminal with access to the IBM 360/65 and the CDC 6400 located at the University of Georgia. Prior to the installation of the 1130, Albany Junior College had an IBM 2741 with access to Georgia State University's RCA Spectra 70/46 and University of Georgia's IBM 360/65.

At the time of installation of the 1130, Albany Junior College was offering a general introductory course in data processing designed primarily as an elective for Business Administration majors. The College was also in the process of getting the Board of Regents' approval to offer a two-year program in Accounting/Data Processing, a program requiring many data processing courses. Concurrent with this program development was a search for a data processing instructor, a position

created for funding effective July 1, 1971.

Beginning summer quarter, the college offered its first programming course, an introductory course in FORTRAN taught by a member of the mathematics faculty. There were seventeen enrolled in the course and the results were gratifying. Meanwhile, the Campus Coordinator was sent to Hartford, Connecticut to an intensive three-week course in RPG programming on the 1130, a USOE funded institute. And, another faculty member was involved in developing a computer augmented accounting course.

During the fall quarter, the following computer oriented courses were offered and enrollments are indicated:

AG 201 Principles of Accounting	-	93
BA 275 Principles of Data Processing	-	73
DP 150 Basic Computer Programming	-	13

During the winter quarter, the following computer oriented courses were offered with enrollments indicated:

AG 201 Principles of Accounting	-	69
AG 202 Principles of Accounting	-	55
BA 275 Principles of Data Processing	-	34
DP 210 Computer Programming	-	28

During the spring quarter, the following computer oriented courses were offered with enrollments indicated:

AG 201 Principles of Accounting	-	65
AG 202 Principals of Accounting	-	53
BA 275 Principles of Data Processing	-	36
DP 220 Programming in RPG	-	15
DP 230 Computer Systems	-	20

Getting the faculty from the various disciplines to develop an interest in

the use of the computer as a teaching tool has not been easy. There have been numerous individual attempts. The following group attempts have been made:

Monthly meetings of Network Campus Coordinators

May 9-29, 1971 EDPA Institute, Hartford, Connecticut

February 8, 1972 - 1130 Users Workshop, Savannah State College, Savannah

Special visit by Dr. Don Leydon to faculty of various disciplines

Computer Center Open House

The major instructional use of the computer has been and will continue to be to support the Data Processing/Accounting program. Albany Junior College will continue its efforts to encourage the faculty of the various disciplines to utilize the computer as an instructional tool.

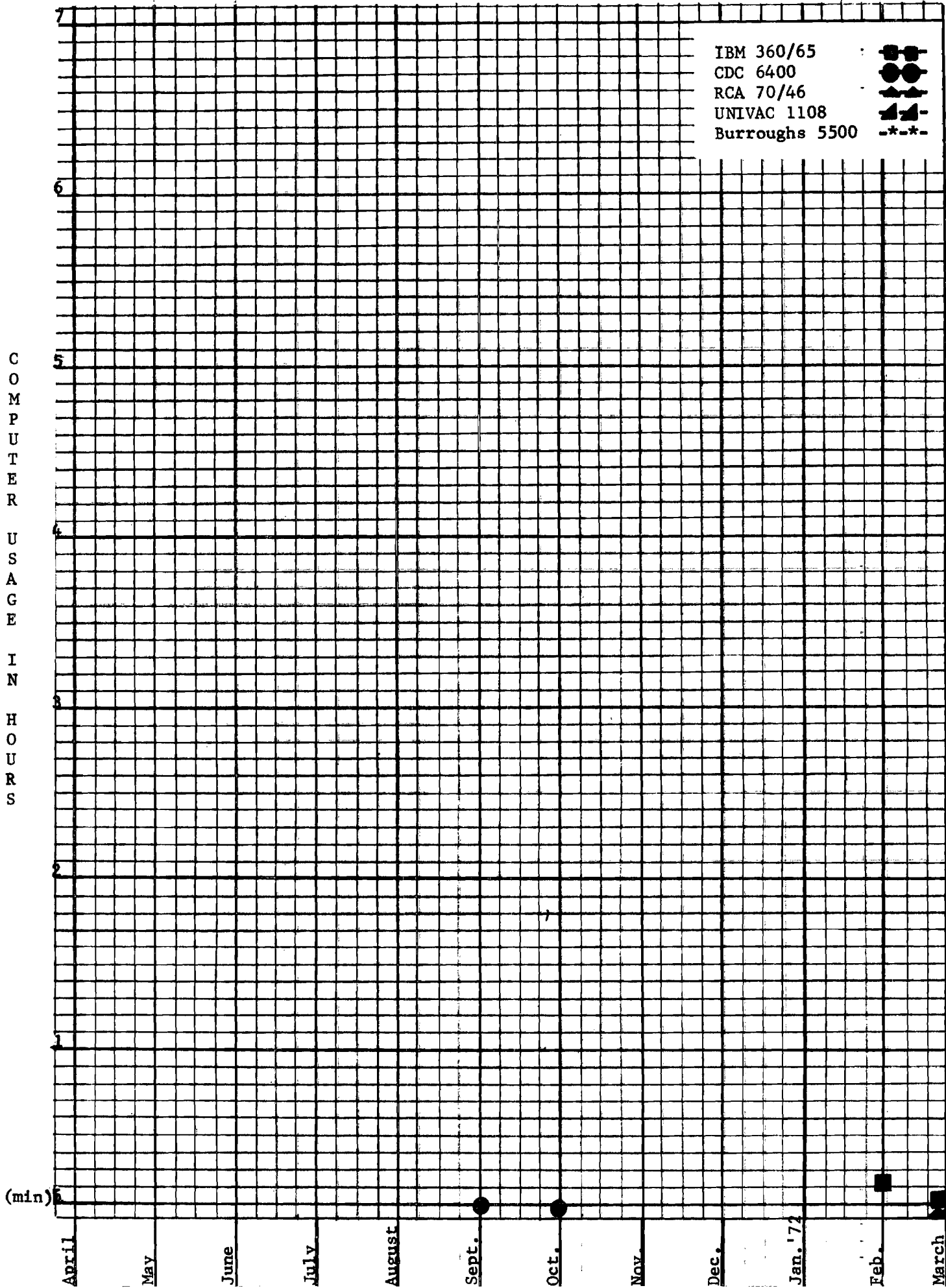
# ALBANY JUNIOR COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71															
May															
June															
July															
August															
September						3									
October						5									
November															
December															
January '72															
February		13													
March		7						48							
TOTALS	20			8			48								

Remote Equipment: IBM 1130

Telephone Line Configuration: Location Access Point Termination  
Albany Albany Athens

ALBANY JUNIOR COLLEGE





ALBANY STATE COLLEGE

Grant GJ-1033

C.K. Dunson  
Principal Investigator

Rosa Johnson  
Campus Coordinator

The Computer Center at Albany State College is equipped with an IBM 1130 Disk Monitor System, which includes a central processing unit, a card reader/punch, and a line printer. The 1130 system is equipped with a communications adapter which enables Albany State College to communicate with the IBM 360/65 and the CDC 6400 computers at the University of Georgia.

The Center is open to users a total of sixty hours per week, and is staffed by a full-time Coordinator-Director, a full-time Data Processor, a full-time Key punch Operator, four part-time Associate Instructors, and two part-time student assistants.

New Computer science courses instituted during the present school term include a five-hour course entitled "Computers and Programming." The enrollment in this course was small, mainly because it was offered as a second elective in Computer Science. However, the same course can now be taken with credit toward satisfying the requirements for a minor in Computer Science.

The Committee on Curriculum and New Programs has adopted a program leading to a minor in Computer Science, to become effective in the next fall quarter. A three-hour introductory course is still being offered, and the enrollment for the year was approximately sixty-two students.

Research efforts this year have increased slightly over last year. Faculty efforts include investigations in the areas of chemistry, physics, social science, a special project for the Counseling Center, and a special project for the CEAP

Coordinator. Student participation includes research on an architectural project by one student, and special projects by three students in the Mathematics department.

Encouragement of faculty and student body use of the computing facilities has involved class visitations to the Center, with demonstrations of the equipment and problem-solving in the area of immediate concern to the visiting classes; distribution of a "Users' Guide" which acquaints the reader with the what, where and how of the Center; informal discussions about the problem-solving capability available; and indepth discussions with academic departments about available programs and the types of problems that can be solved on the computer in their respective disciplines.

The interest level of the faculty has cooled quite a bit from what it was when the computing system was first installed. They are not apathetic or afraid of the computer, but most feel a need to know how others in their respective disciplines, on the same level, use the computer in their course work. Students are still curious and interested, but most of them have real difficulty in trying to fit the introductory course into their schedules until their senior year.

During the first eighteen months of operation, a noticeable increase in computer usage time was recognized. In the first six-month period, the average monthly usage was 18.98 CPU hours; during the second six-month period, average monthly usage was 32.12 CPU hours; and, in the six-month period ending April 30, average monthly usage was 37.44 CPU hours. With the implementation of plans under way for the 1972-73 fiscal year, utilization of the equipment is expected to double.

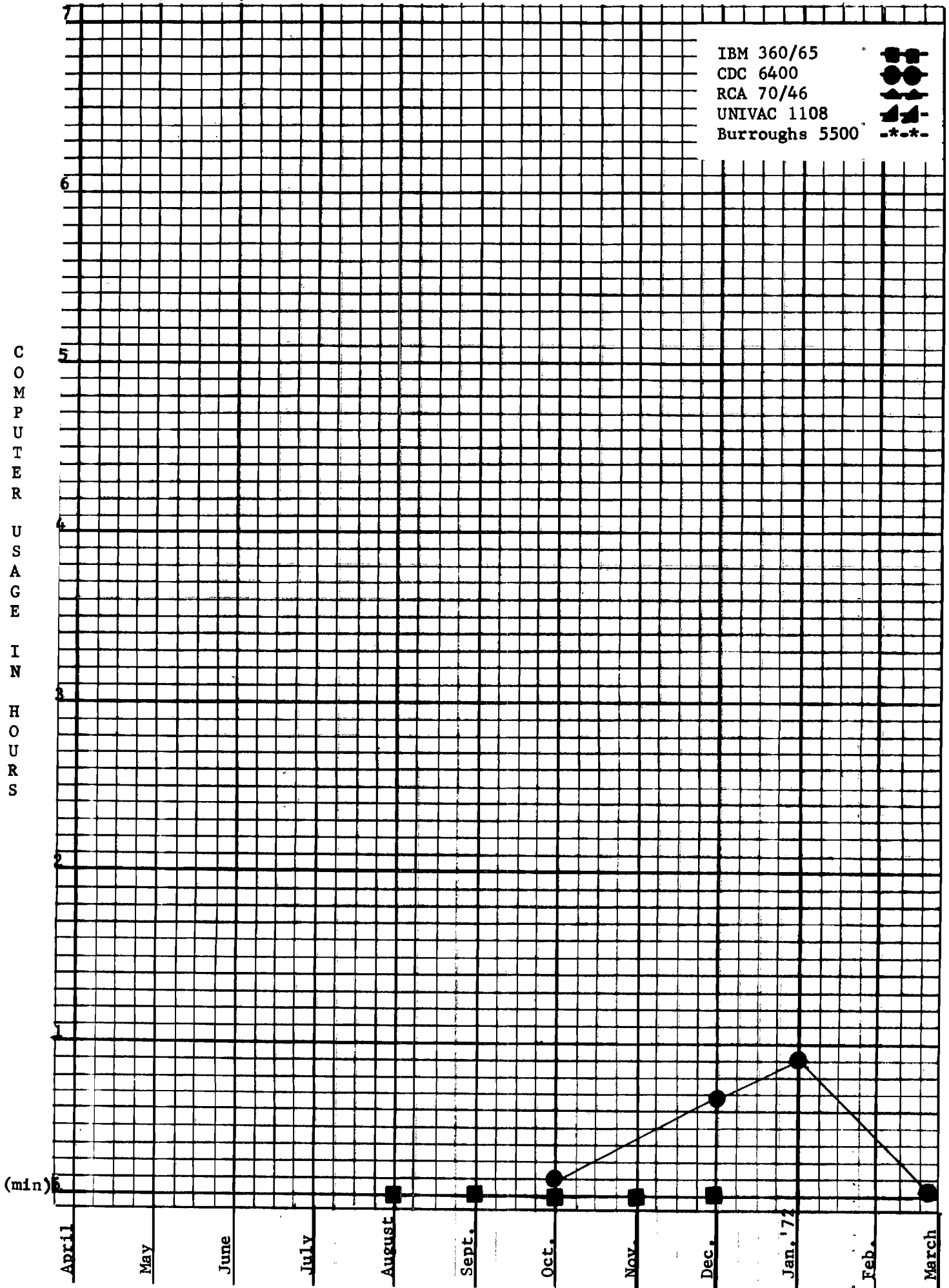
# ALBANY STATE COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71															
May															
June															
July															
August		1													
September			3												
October			16		8										
November		1	20												
December		1	14		40										
January '72					54										
February															
March					7										
TOTALS	3	53		1	49										

Remote Equipment: IBM 1130

Telephone Line Configuration: Location      Access Point      Termination  
    Albany                   Albany                   Athens

C  
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(min)

ARMSTRONG STATE COLLEGE

Grant GJ-1034

Dr. Donald D. Anderson  
Principal Investigator  
Campus Coordinator

Computer equipment on campus at Armstrong State College supported by National Science Foundation funds currently is limited to three interactive, teletype computer terminals (one of which has paper tape capabilities and one of which can be operated by magnetic cards) and a standard card punch. All three terminals are connected via a single telephone line to the University System Computer Network. In addition to this equipment, some utilization of the IBM 1130 Computer at Savannah State College is made by certain Armstrong students and faculty members.

Single terminals are located in each of three academic buildings, immediately adjacent to the Department of Business Administration, Mathematics, and Chemistry and Physics. These terminals are, however, conveniently available to all Armstrong students and faculty members. Use of the terminals is made via a central reservations system. Reservations can be made Monday through Friday from 8:00 A.M. to 9:45 P.M. When the equipment is not reserved, it is available on a first come, first serve basis. All present usage is for instruction and/or research.

During the past year encouragement of the faculty and students to use the terminals was intensified. First, an additional interactive terminal was added to make access to the Computer Network even more available. Several short courses in programming were conducted by the Department of Mathematics. A new central reservations system that maximized efficient utilization of the terminals was established. Representatives from the University System Computer Network office met with faculty members on campus on several occasions. Finally, a faculty

member was released one-third time to render technical assistance to Armstrong students and faculty members who wished to utilize the terminals. That this intensive encouragement has been successful is evidenced by the fact that connect time increased from 35 hours and 56 minutes during the third quarter of last year to 341 hours and 37 minutes during the same period of time this year.

Several courses have been added as a result of having these computer terminals on campus. The Department of Business Administration has added BA 205: Data Processing, and BA 440: Information Systems to its course offerings. The Department of Mathematics has added Math 251: Introductory Computer Programming. Other Departments, especially Chemistry and Physics, use the terminals extensively as an instructional tool for a number of courses. Additionally, the Department of Mathematics has offered for the past several summers a short, non-credit course on computer programming designed as an enrichment course for area high school students.

Several faculty members are conducting extensive research through the use of the computer terminals. An associate professor of Biology is studying the relationship of oxygen uptake of brain tissues to brain maturation, while an assistant professor of Sociology is conducting several studies relating to criminal behavior.

In summary, this year has been one of steady growth for the program of computer services at Armstrong State College. A faculty member was released one-third time to assist terminal users, a third interactive terminal was added to the computer inventory, and the total connect time usage of the terminals increased quite significantly. Also, of considerable importance, the concept of a University System-wide Network for computer services gained acceptance among both faculty members and students.

Many needs still exist, particularly for a batch processing terminal and an additional telephone line to the Network. But, generally, this year has been one of much progress in making available to Armstrong State College students and faculty members the use of computers as an instructional tool.

ARMSTRONG STATE COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		1	36					21							
May		13						11							
June		5						7							
July			52			21		2							
August		6				14		38							
September		2						2							
October		4				22		17							
November		5			4			20							
December		1				45		1							
January '72		3				38	2	3							
February		8			1		1	45							
March		11			1			10							
TOTALS		59	28		8	20	5	57							

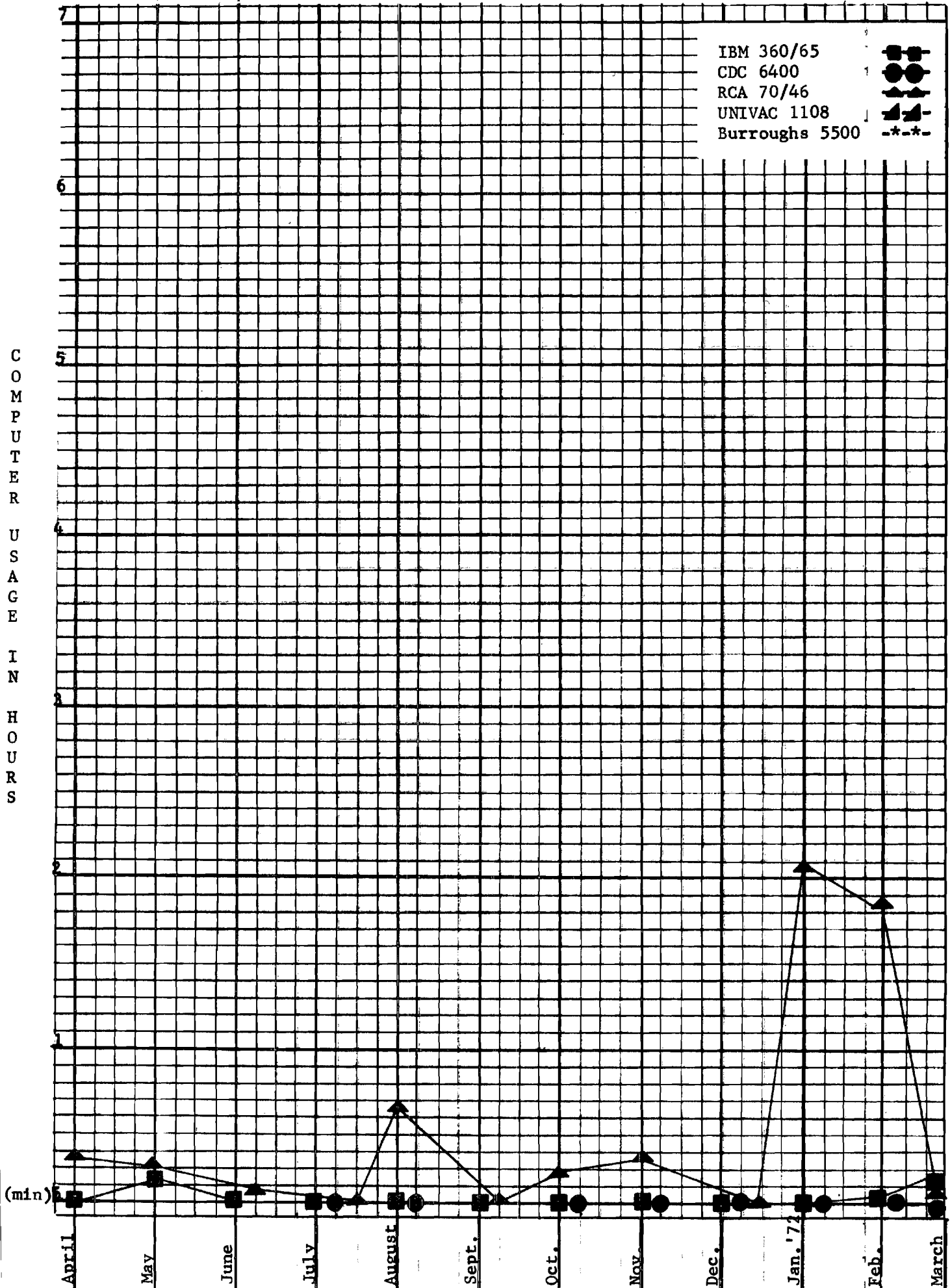
Remote Equipment: IBM 2741, ASR 33 and IBM 6610

Telephone Line Configuration: Location      Access Point      Termination  
                                  Savannah      Savannah      Atlanta



# ARMSTRONG STATE COLLEGE

C O M P U T E R  
U S A G E  
I N  
H O U R S



## AUGUSTA COLLEGE

Frank Chou  
Campus Coordinator

Augusta College has had a very progressive year in terms of computer-related activities. A COPE 1225 Terminal was acquired, two positions were filled - thus, doubling the size of the computing staff, and advice was given by a consultant on what Augusta College should do and where the College should go in terms of computing activities.

Increasing interest in the use of the computer by faculty and students in instruction and research has developed on campus, so much so that the Curriculum Committee is currently considering the initiation of a minor in Computer Science. The increased interest in the computer, especially in the Science departments, can be attributed to the special effort made by the Computer Committee who have made a positive effort to make education more relevant with the use of the computer.

The administration has also given support in computer activities, especially in funding. They have started considering the background in computer science as one of the criteria for hiring new faculty in many departments.

It has been said that Augusta College has entered a new era because of the general interest in computer-related activities. The type of education students receive on the campus has become more stimulating and relevant, and less anachronistic. This would not have happened so soon had it not been for the University System Computer Network in the State of Georgia. Augusta College has definitely benefited from its affiliation with the Network in the promotion of computer activities on campus, and continued association and growth are anticipated.

# AUGUSTA COLLEGE

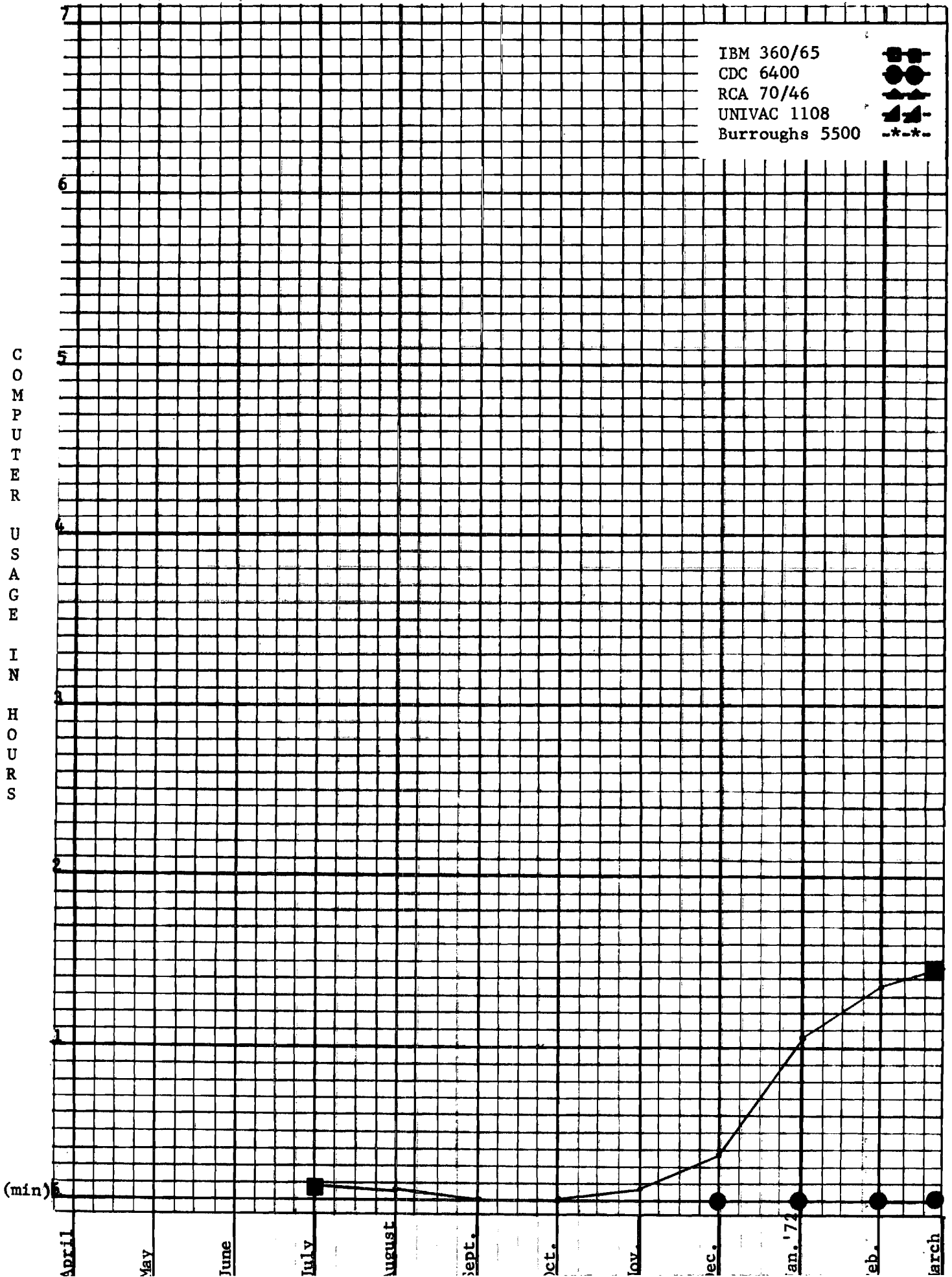
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71															
May															
June															
July		11													
August		9													
September		4													
October		6													
November		10													
December		23				28									
January '72	1	9			1										
February	1	20				30									
March	1	28			3										
TOTALS	5			4			58								

Remote Equipment: IBM 1050 and COPE 1225

Telephone Line Configuration: Location      Access      Termination  
    Augusta      Augusta      Athens

# AUGUSTA COLLEGE

COMPUTER  
USAGE  
IN  
HOURS



BERRY COLLEGE

Grant GJ-781

Ouida W. Dickey  
Principal Investigator  
Campus Coordinator

During the two years covered by NSF Grant GJ-781, Berry College's neophyte computer science program and computing on the college campus in general have made notable gains. Having begun working the spring of the preceding year (1969) on a shoestring with one teletype on-line to the B5500 computer at Georgia Tech and one class of approximately 20 students, Berry has advanced to an interdisciplinary minor with facilities of three computer centers available through the University System Computer Network and has added equipment to support the growing program. All the courses have been implemented, and at least ten students are now pursuing the minor.

Equipment on-site includes two ASR-33 teletype terminals on-line via two dedicated telephone lines to computers at Georgia Institute of Technology, Georgia State University, and University of Georgia. Equipment also includes an on-site IBM 360/20 computer with a binary synchronous communications adapter from which remote batch processing for the program is done on the IBM 360/65 computer in Athens. The teletype terminals are used for the majority of the academic computing. The 360/20 is used in stand-alone capacity for administrative data processing.

Teletype terminals are available to students and faculty members from eight o'clock in the morning until, about nine o'clock in the evening Monday through Friday and on Saturday morning. The 360/20 is a closed shop operation to whose manager batch jobs are submitted and by whom they are sandwiched in between administrative tasks.

During thirty-six hours of prime time throughout the week, a student assistant is available (three are employed) under the college work-study program to

assist users as necessary. Faculty members may have access to the terminal rooms for even longer hours, including Sundays, if they desire. Hours are not open to students on Saturday evenings and Sundays as student assistants are not available at these times.

In addition to the three student assistants, each of whom spends some time in preparation of programs for use by professors and students in courses representing their various disciplines (Business, Mathematics, and Physics are usual areas from which student assistants are drawn), the part-time computer science instructor also lends aid to professors and students interested in computing.

Various approaches have been employed to encourage faculty use of the computers. Prior to receipt of the grant, Berry College undertook, in the winter of 1969, the responsibility of helping its faculty gain an appreciation of the computer and acquire some basic computing knowledge. An instructor was engaged to come to Berry on a twice-a-week basis for a faculty class, which some forty members began and about twenty-five completed. It was not until Berry had made its faculty feel somewhat more comfortable than they had felt concerning computers that the first student course was initiated in the spring of 1969.

For the encouragement of the science faculty, particularly, Berry professors were visited, through the courtesy of the Network, by a University of Georgia professor who has made a name for himself in the orientation of his chemistry classes to the computer. Following this visit, a suggestion to move one teletype terminal to the science building was implemented, and this equipment relocation appears to be drawing more users from the sciences, which include Physics, Chemistry, and Biology.

Faculty from Physical Education, Business Administration, Mathematics, Social Science, and Religion have gradually come into the fold, although some of these were carry-overs from the original faculty class. The primary use has been

in course-related work on an irregular basis, since courses in which these professors can use the computer are not repeated each quarter in the small institution.

Other specific actions taken to accomplish greater usage are mentioned in succeeding sections of this report.

Six Computer Science Courses have been established during the three years of operation of the program. The 1969-70 catalog listed the first two of these:

CS 130.     Introduction to Computer Principles and Programming (4-0-4), offered each quarter. This course is a brief survey of the development of computers and introduction to computer hardware; a review of typical computer applications in both data processing and in problem solving; and an introduction to the fundamentals of programming in certain standard languages with opportunity for experience in simple programming. Prerequisite is Mathematics 101 or equivalent. BASIC is the language emphasized.

CS 131 (now 231).     Computers and Programming (3-4-5), offered winter and spring. This is a continuation of CS 130 with major emphasis on the higher-level programming languages applicable to the subject areas of students enrolled.

About the time of receipt of the grant, a minor program of 29 quarter hours was adopted. Additional courses comprising this interdisciplinary minor are these:

115.     Computer Science Mathematics I (5-0-5), is algebra for students not majoring in mathematics, physical sciences, or engineering. Fundamental set theory, basic mathematical logic, Boolean algebra, functions, graphs, exponents, polynomial equations, inequalities, progressions, ratio and proportion, determinants, matrices, and systems of linear equations.

315.     Computer Science Mathematics II (5-0-5). This course employs the intuitive approach to calculus as applied to the problems of business, biological sciences, and behavioral sciences. Polynomial functions, limits, slopes, differentiation and integration of rational functions, rates, areas, volumes, general applications, and applications adaptable to digital computer programming. Prerequisite is C.S. 115 or equivalent.

316.     Computer Science Mathematics III (4-2-5). This is a study of linear programming, elementary mathematical game theory, operations research, systems analysis, and decision-making for students expecting to apply digital computer programming to problems encountered in their academic majors. Prerequisites are C.S. 231 and 315 or equivalent.

420. Computer Applications (1-6-5). This course is a seminar where students select problems, program them, and obtain feasible solutions on the computer. Students are expected to research, program, and solve problems suggested to them by instructors teaching courses in their academic major departments. Prerequisite is C.S. 316.

It should be noted that, although a minor is available, there is no official Computer Science Department at Berry College. A part-time instructor works strictly in Computer Science, teaching one or two courses a quarter. A mathematics professor teaches on an alternating basis the upper level Computer Science courses.

Evaluation of the minor program reveals it is perhaps too heavily mathematically oriented to serve many disciplines. A close look should be given to the feasibility of adjustments to make possible some work in systems analysis and management.

A new course listed in the 1972-73 catalog but not yet implemented is Business Administration, Principles of Data Processing, which could be cross-listed as Computer Science to fill one void in the current program.

Courses in several disciplines have used the computer: Business Administration--Management Mathematics, Managerial Finance, Marketing Principles; Chemistry--Physical Chemistry; Mathematics--Analytic Geometry and Calculus, Independent Study, Linear Algebra, Freshman Mathematics, Methods of Teaching Mathematics; Physical Education--Tests and Measurements; Physics--Modern Physics, Independent Study, Senior Physics Laboratory.

Because faculty members have spent their time in becoming acquainted with techniques of using the computer and with its capabilities, research has received minor concentration when compared with course work. Two significant projects have been completed--a doctoral thesis by a Mathematics professor using Flanders' Interaction Analysis System for Data, and a Sociological project producing a profile of the Berry College student.



Students enrolled in independent study primarily in Mathematics and Physics have accomplished their research through computer applications in numerical analysis, real analysis, abstract algebra, linear programming, and atomic physics (electron transmissions of a hydrogen atom).

The Campus Coordinator, through occasional communications to faculty concerning availability of materials and facilities and by personal contacts with faculty members, has encouraged usage. The Coordinator, who also serves as Chairman of the Computer Science Committee, has been primarily responsible for planning and coordinating several instructional sessions utilizing instructors from other institutions. The first of these was a faculty course held in the winter of 1969, taught by Georgia Tech instructors; the second, a two-day workshop in the BASIC language in the winter of 1971, taught by professors from Dalton Junior College and Georgia Tech; the third, a two-day short course in the FORTRAN language taught by University of Georgia personnel. Approximately ninety participants benefited from these three instructional sessions.

Additionally, the Coordinator has attended all meetings of Network Campus Coordinators and accompanied six or eight Berry professors on different occasions to technical workshops offered through the Network at other locations. She has also encouraged outstanding students to prepare computer applications for use by their professors and classmates.

The Coordinator made arrangements with the Network for visitation by the chemist from the University of Georgia and scheduled appointments for him with Berry faculty members. She also initiated and has continued to promote the acquisition of appropriate library holdings in Computer Science, Data Processing, and related fields, and has arranged for appropriate publicity on the program in general. These duties have been performed by the Coordinator while also serving as a full-time professor of Business Administration.

The Computer Science Committee was established by the president of Berry College in the fall of 1968, to determine the course which the college should take, primarily with respect to academic computing. Now a permanent committee, chaired since its inception by the Campus Coordinator, it has functioned to establish the direction which the program has taken, subject to approval by the proper academic governing body and the president.

The Committee has encouraged participation of its members in regional meetings. The college sponsored the attendance of the Computer Science instructor at the User's Forum in Atlanta in March; it will send the Campus Coordinator and another professor to the Conference on Use of Computers in the Undergraduate Curricula in June, 1972.

Professors, students, and administrative staff members compose the committee. The Computer Science instructor is an ex officio member. While evaluation of the committee's effectiveness would perhaps best be left to someone other than its chairman, committee structure does appear to be the most viable means, without departmental organization, to provide province for course offerings serving many disciplines.

The Computer Science instructor has also worked to encourage faculty and student usage. At various times she has sent letters to the faculty inviting them to come individually for assistance, distributed at a faculty council meeting a simple program which anyone could perform, talked briefly about what computer usage had to offer, and personally invited faculty to come to the terminal room with a simple equation and learn to operate the teletype. This latter overture has resulted in two or three additional interested professors. The instructor has worked with one professor of Religion in the development of a grade evaluation routine which members of that department and the Computer Science instructor are now using.

Other activities of the instructor extending beyond the college community

include two visits by the Berry Academy senior algebra-trigonometry class to learn about the computer. On the second trip the students wrote their own programs. The instructor gave assistance to a seventh grade mathematics class, a senior business class, and a class of exceptional children, all from the local public schools, and wrote letters to local high schools inviting outstanding seniors to enroll in Computer Science classes under the Joint Enrollment Program at Berry College. Twelve of these students participated during the year.

The program has received favorable publicity in local newspapers, the campus newspaper, the president's newsletter, and the alumni quarterly.

From its meager beginning in 1969, the Computer Science Program has grown slowly but surely. Increasing interest is exhibited on the part of faculty and students by the growing numbers who have made usage an actuality. The following figures can best demonstrate this growth:

Individual Users of Computer  
Two-Year Period Covered by Grant

	<u>C.S. Courses</u>	<u>Non-C.S. Courses</u>	<u>Other</u>	<u>Total</u>
April 1, 1970-April 1, 1971	44	37	35	116
April 1, 1971-April 1, 1972	<u>84</u>	<u>113</u>	<u>35</u>	<u>232</u>
TOTAL	128	150	70	348

The total number of connect hours (terminals on-line to computers) during the two-year interval were as follows:

April 1, 1970-April 1, 1971	About 80
April 1, 1971-April 1, 1972	222

A better picture of the progress made is presented in an academic year comparison for the three years of operation:

Individual Users of Computer  
1969-1972

	<u>C.S. Courses</u>	<u>Non-C.S. Courses</u>	<u>Other</u>	<u>Total</u>
1969-1970	35	10	25	70
1970-1971	39	56	35	130
1971-1972	<u>89</u>	<u>141</u>	<u>35</u>	<u>265</u>
TOTAL	163	207	95	<u>465</u>

Usage measured by number of hours' connect time between computers at remote sites and teletype terminals and the 360/20 at Berry has grown as follows:

	<u>Hours</u>
1969-1970	50
1970-1971	85
1971-1972	<u>282</u>
TOTAL	417

The most regular users of the computer are those students enrolled in the Computer Science classes. Others might be called occasional users. A professor might have a course during one or two quarters out of three in which computer usage is feasible.

While some progress has been made, there is still much room for growth. At the outset it was hoped that 500 people would be using the facilities by the termination of the grant. It was soon learned that acceptance comes more slowly and painfully than was anticipated. But the committee, the Coordinator, the instructor, and others have come to realize the value of the program and continue to work toward its further development.

The most recent action of the committee to expand usage was the relocation of teletype equipment in a second building where most of the scientists are located. Indications point to positive results.

The decision was made recently to remove the communications adapter from the 360/20, in view of its cost and the frequency of usage (its primary academic usage

having been during quarters when FORTRAN was taught), and to concentrate on the teletypes. The need for batch processing capability will be reassessed in the fall of 1972.

A forward look must include not only continual reassessment of the program, modifications where indicated, and promotion thereof, but should also take into consideration student interests and needs outside the classroom environs as they relate to computing. Toward this end, the possibility of a student chapter of ACM is currently being investigated.

# BERRY COLLEGE

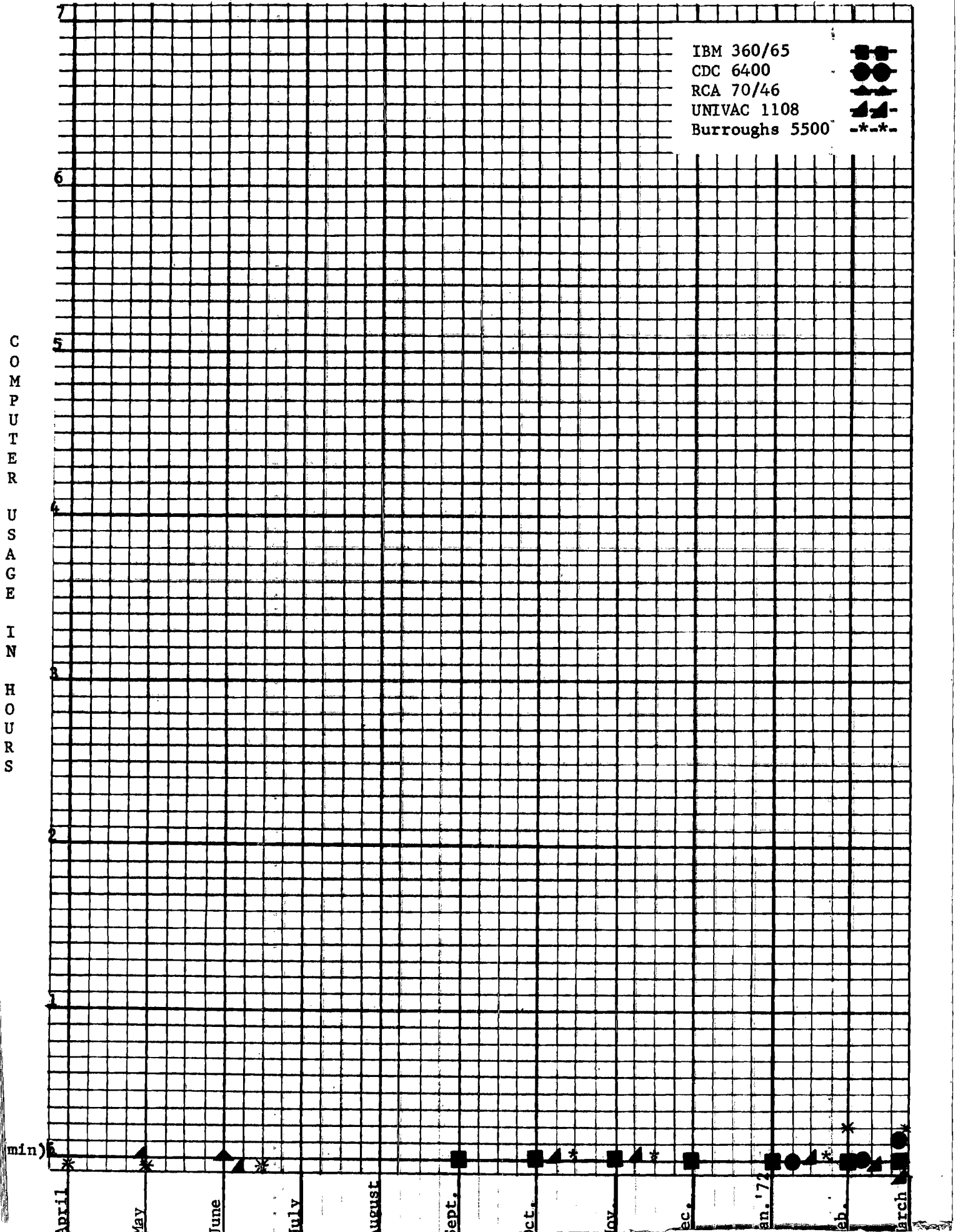
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71												27			
May											5			1	
June									6			19			15
July															
August															
September			25												
October		1										12			54
November		2									5				30
December		4													
January '72		1	50			34					1				24
February		4				4					17				51
March		3				1					15				15
TOTALS		16	15		5	34			6		43	58		4	9

Remote Equipment: IBM 360/20 and (2) ASR 33

Telephone Line Configuration: Location Access Point Termination  
Rome Rome Atlanta  
Rome Rome Atlanta

# BERRY COLLEGE

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BRUNSWICK JUNIOR COLLEGE

Grant GJ-1035

Dougland M. Monroe  
Principal Investigator

John Hamilton  
Campus Coordinator

In order to access the CDC 6400 system, to give more flexibility in the location of the computer terminals, and to cut the cost of terminal rental, Brunswick Junior College changed from one IBM 1050 terminal with card reader to three ASR Model 33 TTY's with tape reader/punch. The TTY's are acoustically coupled through the college switchboard, allowing use of the TTY's from any phone on campus. The equipment is available to students from 8:00 a.m. to 5:00 p.m. daily, and until 10:30 p.m. on Monday and Thursday nights. Arrangements may be made to use the terminals at other times. The Campus Coordinator and one other instructor are available to assist students during the day. Many students who are experienced in use of the computer terminals also provide assistance on a casual basis.

All members of the faculty are encouraged to use the computer in their courses. Assistance in preparing programs for use in the courses is provided by the Campus Coordinator. The computer is now used on a regular basis in courses in Physics, Statistics, Biology and Trigonometry. It is used occasionally in Chemistry, Business and Political Science. A one credit hour course in use of the computer has been taught for the past three quarters. The course teaches programming in BASIC and the use of stored programs.

A faculty group is using the computer to analyze data from a research problem on Diversity and Bioenergetics of the Turtle River-St. Simon's Sound Estuary. Programs have been written to analyze the diversity of organisms by a variety of formulae (Pielou's estimate of the Shannon-Weaver diversity, Brillouin's index, Gleason's diversity index and the evenness index of Pielou's estimate).



The results of this study were presented in a paper at the Annual Meeting of the American Society of Limnology and Oceanography.

Students under the direction of an instructor in biology are using the computer facilities to analyze data from a study of the marsh productivity near the Jekyll Island causeway. The computer is also used in a variety of student "week-end" problems in biology courses.

Use of the computer is encouraged by the Campus Coordinator and by faculty members and students who have used the facilities. The faculty has also met with Dr. Donald Leyden of the University of Georgia, who discussed how the computer could be used in a variety of subject matter areas.

The interest in use of the computer facilities has increased among faculty members and students as each group gains more experience with the computer. Most usage has switched to the CDC 6400. With the PUT, GET system of permanent record handling, the use of stored programs will increase greatly. Members of the Humanities and Social Science Divisions are beginning to show an interest in using the computer as an adjunct to their courses. The proposed realignment of the system should be implemented as soon as possible and more lines to the 6400 system added.

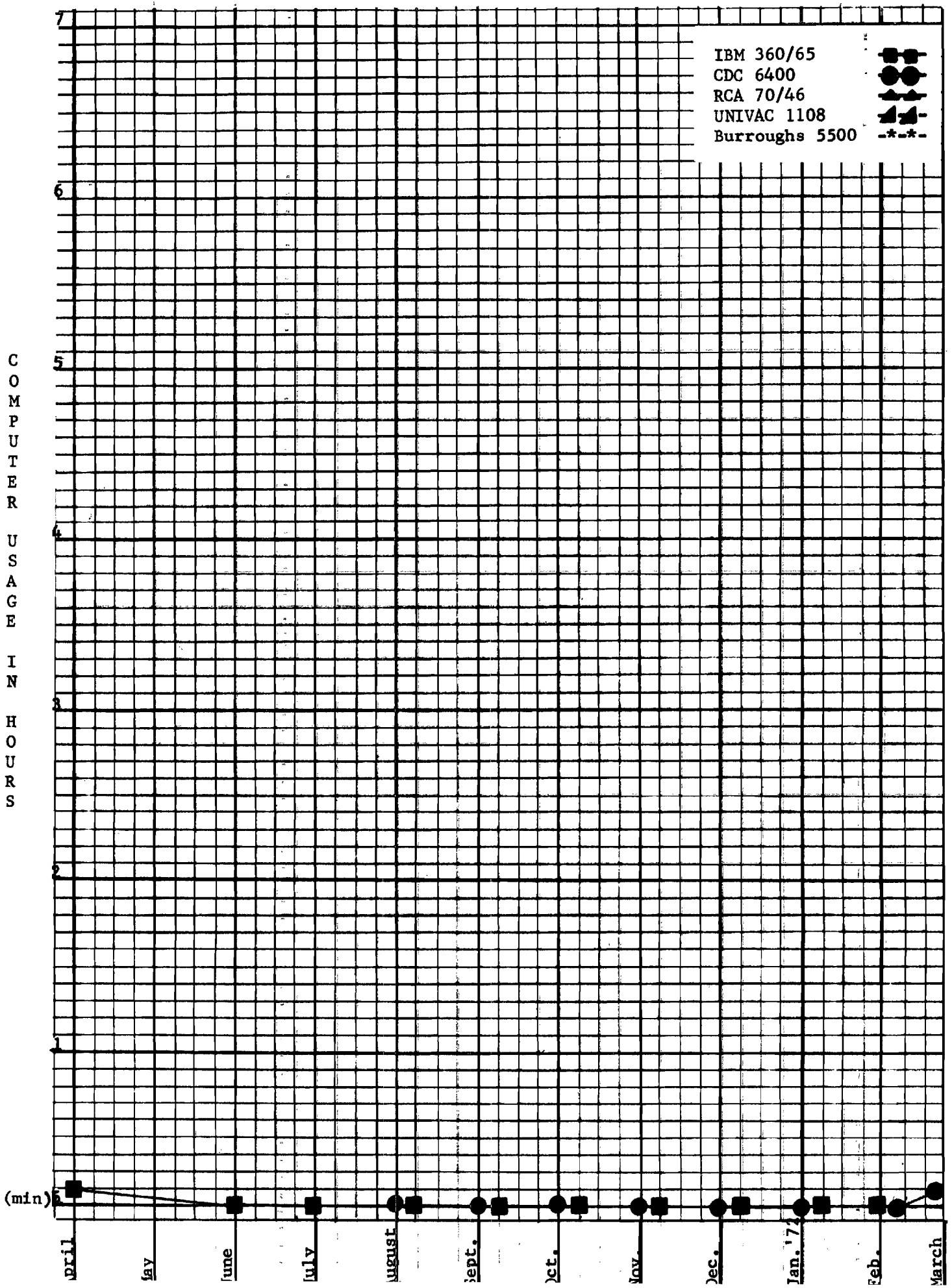
# BRUNSWICK JUNIOR COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		9													
May															
June		6													
July			40												
August		5			2										
September			1			18									
October			20		5										
November		2			4										
December		1			2										
January '72		3			2										
February		2			5										
March					10										
TOTALS		29	1		30	18									

Remote Equipment: (3) ASR 33

Telephone Line Configuration: Location      Access Point      Termination  
    Brunswick      Brunswick      Athens

# BRUNSWICK JUNIOR COLLEGE



## CLARK COLLEGE

Carolyn Harris  
Campus Coordinator

Clark College is a four-year, liberal arts college located in Atlanta and associated with the Atlanta University Complex.

Under the auspices of the Thirteen College Program, Clark had installed an ASR 33 teletype with use restricted to participants in this program. The terminal is located in the Math Department where several faculty members lend assistance to students who wish to run programs.

Utilizing the facilities of Georgia State University and Georgia Institute of Technology, applications at Clark have been primarily in the fields of Math and Physical Science.

# CLARK COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71								50							
May															
June															
July															
August															
September															
October															
November															
December															
January '72															
February															
March								10							

TOTALS

1

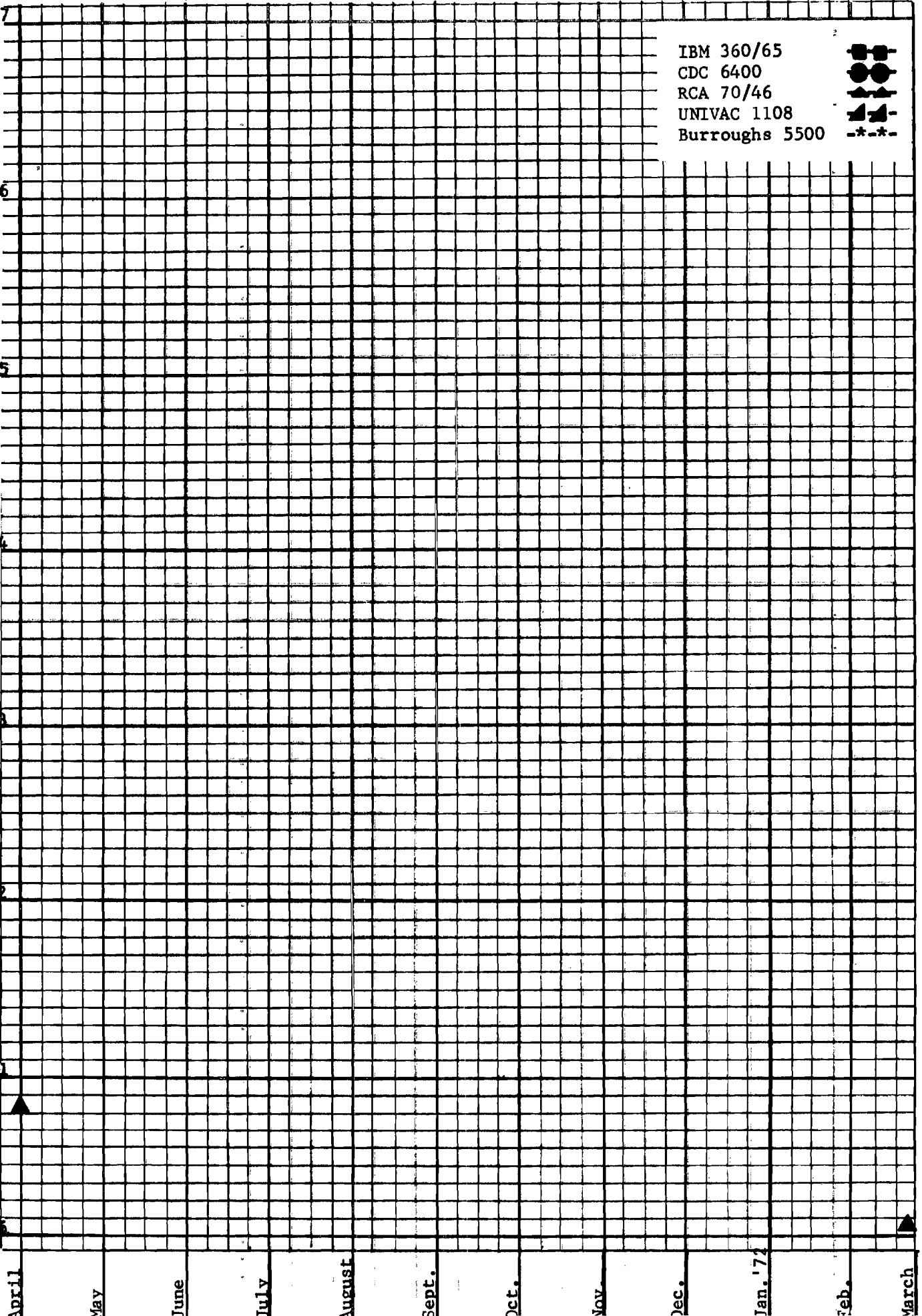
Remote Equipment: ASR 33

Telephone Line Configuration: Location Access Point Termination  
Atlanta -- Atlanta

# CLARK COLLEGE

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## CLAYTON JUNIOR COLLEGE

Leonard R. Daniel  
Campus Coordinator

Clayton Junior College is a two-year, coeducational institution located in Morrow, Georgia, a suburb of Atlanta. The college offers the Associate of Arts degree. The fall 1971 enrollment was approximately 2250 students.

Throughout the year Clayton Junior operated two terminals, an IBM 2741 for interactive use, and an IBM 2780 for batch work. Present usage of the Network is approximately 125 hours connect-time per month, an increase of some 75 per cent over the previous year.

One Computer Science course, COMP 201--Introduction to Computing--has been taught all four quarters of the year. The cumulative enrollment is 153, a 50 per cent increase over the previous year. Other courses which have used the terminals in direct support of course work are: ACCT 201-202--Principles of Accounting; CHEM 151-152--Principles of Chemistry; MATH 105--Introduction to College Mathematics; MATH 111--College Algebra; MATH 112--Trigonometry; PHYS 111-112--Introductory General Physics. While every student enrolled in these courses has not been required to use the terminals, it is estimated that some 500 students in these courses have used one or both terminals at least once during the year.

Faculty interest in using the computer has been growing slightly, and efforts are underway to expand faculty participation.

Although not directly related to course work, Clayton Junior has developed an administrative system for student records which appears to be unique for Georgia in that complete records of all currently enrolled students are maintained on direct access files at the University of Georgia. Through the use of these files, all administrative processing done by the college is handled remotely through the IBM 360/65 at the University of Georgia.

# CLAYTON JUNIOR COLLEGE

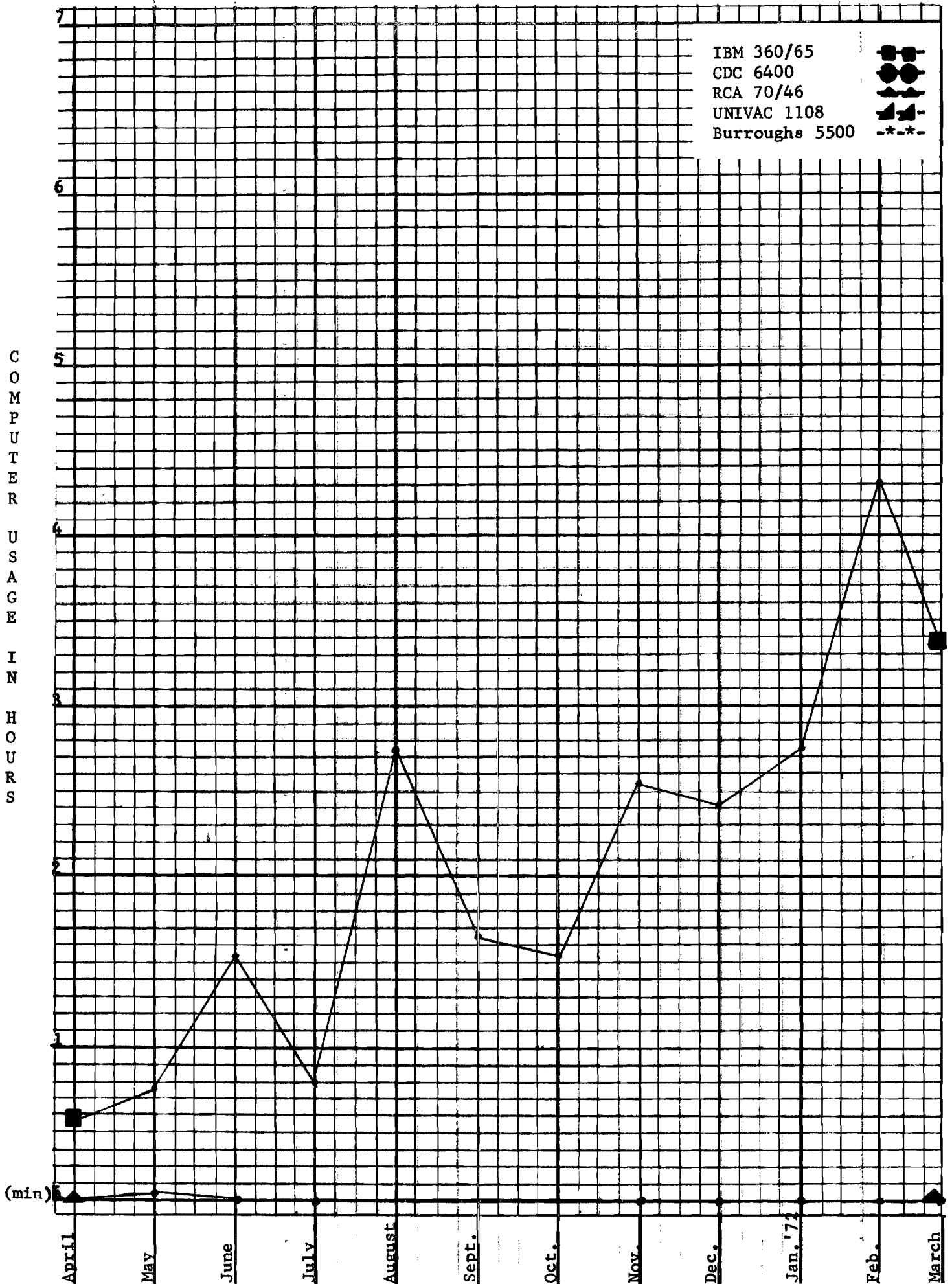
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		34						3							
May		46						7							
June	1	31						1							
July		48													
August	2	43													
September	1	37													
October	1	32													
November	2	33						4							
December	2	25						4							
January '72	2	46						4							
February	4	18						5							
March	3	20						6							
TOTALS	24	53						34							

Remote Equipment: IBM 2741 and IBM 2780

Telephone Line Configuration:	<u>Location</u>	<u>Access Point</u>	<u>Termination</u>
	Atlanta	--	Atlanta
	Atlanta	--	Atlanta



# CLAYTON JUNIOR COLLEGE



## Columbus College

John R. Talburt  
Campus Coordinator

As in its first year of affiliation with the University System Computer Network, Columbus College has had only a single IBM 2741 Communications terminal with a dial-up connection to the IBM 360/65 computer on the campus of the University of Georgia in Athens. Despite this limitation in facilities and an enrollment of approximately 3,800 students, considerable progress has been made in introducing computer power to students and faculty of Columbus College. This has been accomplished largely through the efforts of interested faculty contributing their time beyond their normal teaching duties.

The Computer Science curriculum at Columbus College consists of two courses; MS400, Introduction to Computer Concepts, and MS495, Seminar in Computer Applications. MS400 is required for all B.S. degrees in science and business and has an average enrollment of 70 students per quarter. Interest in this course is high and the number of sections offered each quarter depends on the faculty available to teach it. The course carries five quarter hours credit and is a survey of the varied topics in Computer Science. Although it is not primarily a programming course, considerable time is spent learning a simple ten instruction machine language and learning to read programs written in a high-level programming language such as PL/1. Because of the number of students, actual programming at the terminal is not required.

On the other hand, students in the two hour seminar, MS495, are required to write original programs for applications in their area of study. A typical class has from two to five students.

Several professors have incorporated computer work into their courses. These include Statistics, Linear Algebra, Chemistry, Behavioral Statistics, Accounting

and Abstract Algebra. In addition, many students brought into contact with the computer through one course continue to use it on their own in other courses.

The majority of contacts made with students and faculty have been through the Campus Coordinator. Anyone expressing an interest in the terminal is given a demonstration of the dial-up procedure and the use of some canned program, usually in his field if one is available. If the user's interest continues, further information and materials are made available on an individual basis. The terminal itself is available on an open door, no priority basis to any one who can operate it. A utilization profile, made during the winter quarter of 1972, yielded these figures for actual connect time. For the months of February and March students logged 91 hours and 49 minutes of connect time and faculty members a total of 50 hours and 08 minutes. Figuring the availability of the terminal from 10 a.m. to 8 p.m. on class days during that same period and using a factor of 15% for down time, this means that the total time available was approximately 322 hours. Thus, the total usage for this period was approximately 44%. However, it must be remembered that this figure reflects only casual and research work. Requiring terminal work by all students in MS400 or other courses where it should be required would immediately saturate the existing facilities to the point of excluding all other users. If such courses are to be taught properly, expanded facilities must be obtained.

# COLUMBUS COLLEGE

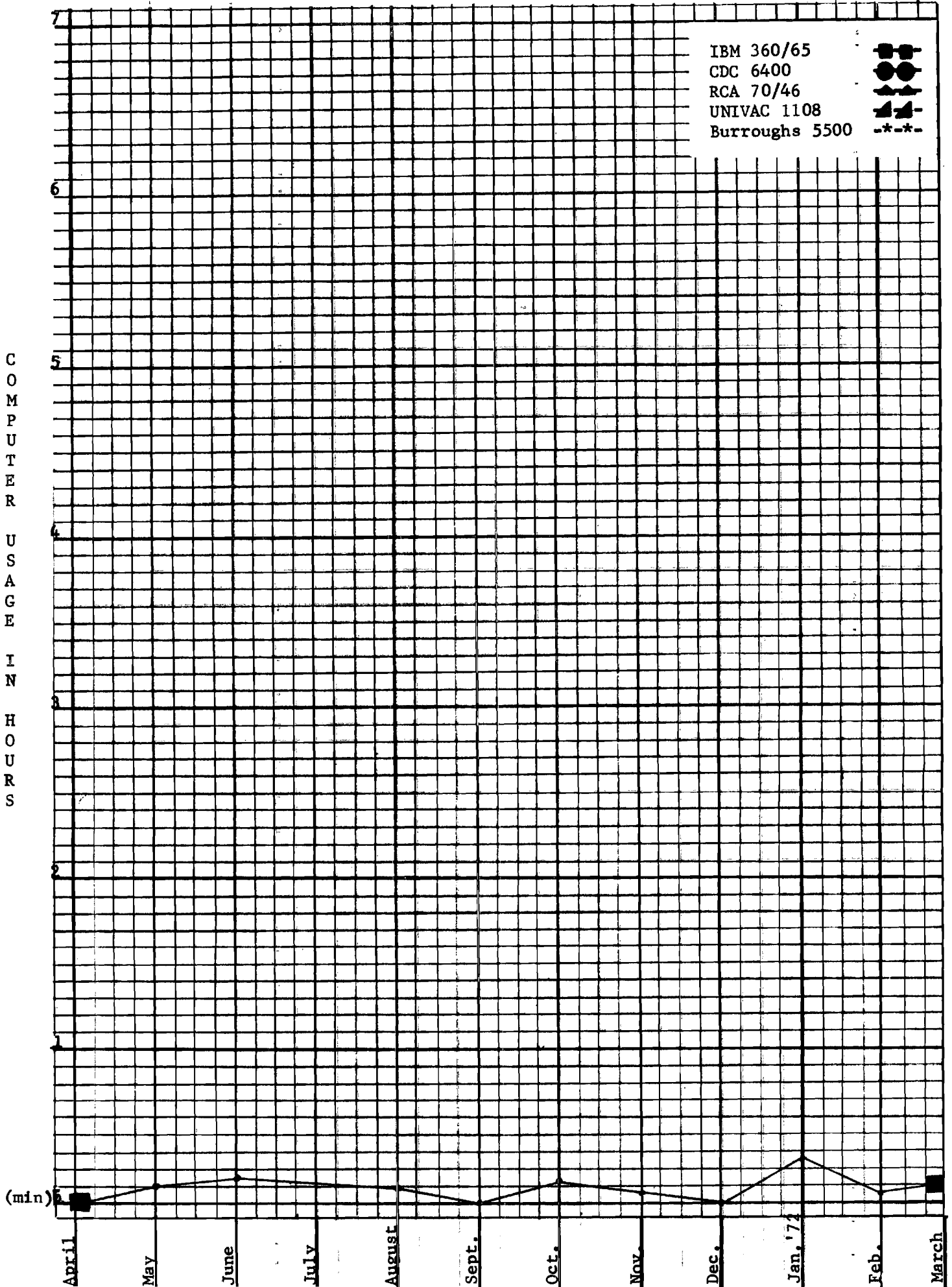
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		6													
May		12													
June		14													
July															
August		11													
September		2													
October		13													
November		9													
December		4													
January '72		21													
February		10													
March		13													
TOTALS	1	55													

Remote Equipment: IBM 2741

Telephone Line Configuration: Location Access Point Termination  
Columbus Columbus Athens

# COLUMBUS COLLEGE

COMPUTER  
USAGE  
IN  
HOURS



DALTON JUNIOR COLLEGE

Bill Smith  
Campus Coordinator

During 1971-72, an increasing number of the faculty and students of Dalton Junior College showed an interest in utilizing the computer for classwork. The limitations imposed by the availability of only one ASR 33 terminal at times resulted in an excessive waiting-time, with a possible loss of interest of some students.

Generally the ASR 33 was available for use from 8:00 a.m. until 5:00 p.m. and again from 6:00 p.m. until 9:30 p.m.. However, in a commuter college, usage falls almost exclusively during the busy class hours from 8:00 a.m. until 2:00 p.m. This pattern would support an earlier time for main sites to be operational. Assistance to persons using the computer is limited to aid by the Campus Coordinator and by an interested counselor who has an office in the area.

The increased interest of faculty can be traced to two factors. The first is the general pressure in the scientific community to utilize the computer, and the second is the inservice training of campus workshops held by the Campus Coordinator. During the current year, faculty in Math, English, Psychology, Biology and Business have utilized the terminal to some extent. The usage by faculty members varied from learning to program in BASIC to applying computers in course work. However, no consistent application in instruction has been made except in the business course in Data Processing. Members of the Math faculty have received grants to study at Emory University during the summer. Included in the subjects to be covered is the application of computers in teaching Mathematics. This should insure increased interest during the coming year.

Utilization of the terminal in course work has varied from teaching about computers in the Business Data Processing course to the use of the canned programs

in statistics by instructors in Psychology, Biology and Mathematics. During the previous year a non-credit Computer Science course was taught. The limited time of the Coordinator made this impossible in 1971-72.

One faculty member utilized the terminal for statistical purposes while preparing a paper for publication.

Since this has been the first full year of operation of the terminal, interest by faculty and students has been slow to develop. Utilization during the first part of the year was low, but it has increased steadily since the winter quarter. With the specialized training that the mathematics faculty will receive and the continued interest in other areas, utilization in 1972-73 should be significantly higher.

Generally, the quality of support from the computer sites has been good. As specified above, earlier hours of operation at the central sites are desirable. The Network staff has provided excellent support whenever difficulties were encountered.

DALTON JUNIOR COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71							4						2		
May							23						10		
June								12					1		
July														18	
August								6							
September														30	
October							1								
November							2							36	
December								12						6	
January '72															
February							1						1		
March							1						1		
TOTALS							32	30					16	30	

Remote Equipment: ASR 33

Telephone Line Configuration: Location      Access Point      Termination  
    Dalton                      Rome                      Atlanta

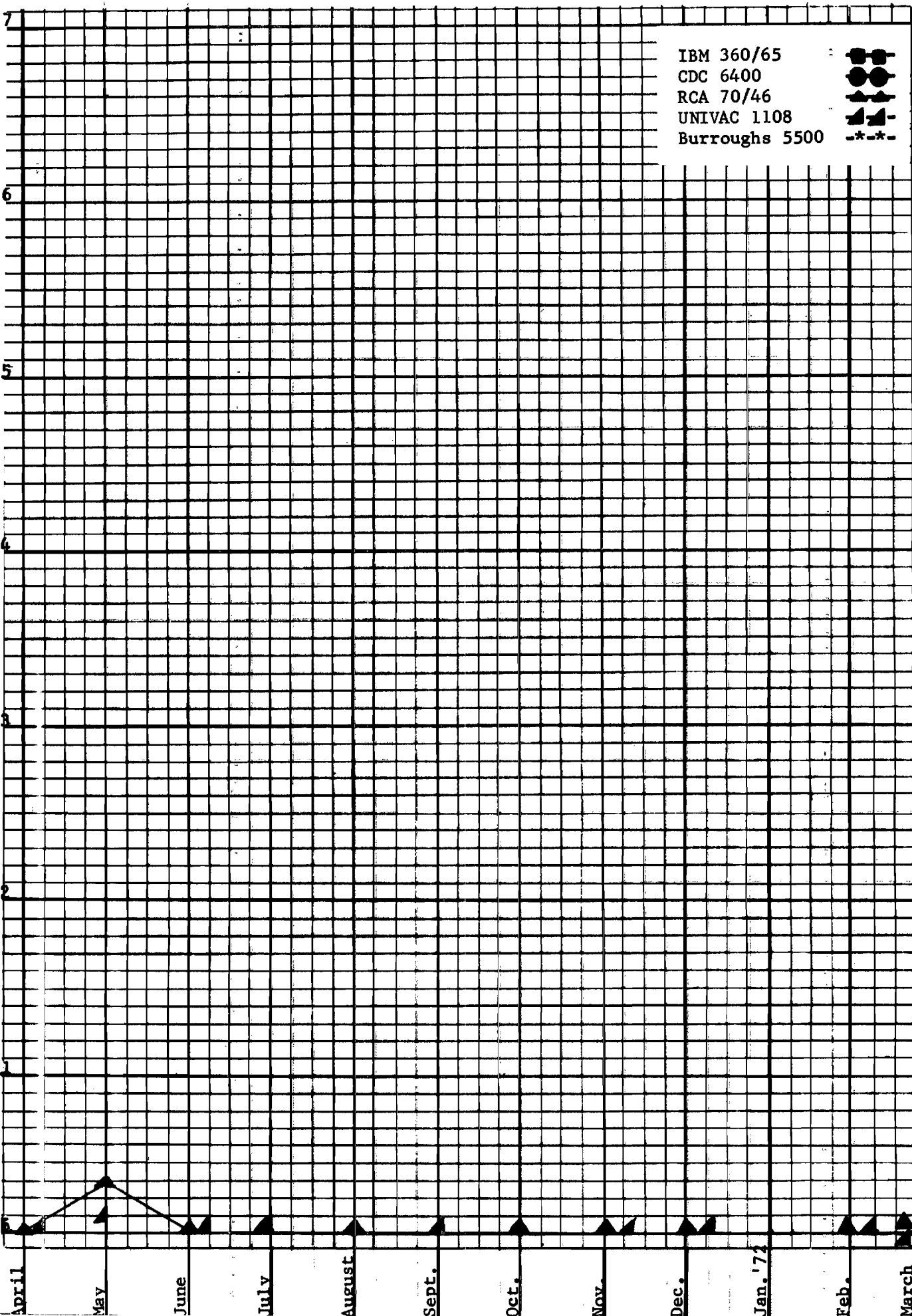


# DALTON JUNIOR COLLEGE

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IBM 360/65    ●●●●  
 CDC 6400    ●●●●  
 RCA 70/46    ▲▲▲▲  
 UNIVAC 1108    ▲▲▲▲  
 Burroughs 5500    -\*-\*-

(min)



## FLOYD JUNIOR COLLEGE

Daniel C. Pantaleo  
Campus Coordinator

Present facilities at Floyd Junior College consist of one Teletype Model 33, coupled with one phone line which can access the major computers in the system. The equipment is available to faculty and students on a full time basis. Some time blocks have been reserved for specific causes and labs.

After having two intrafaculty workshops, there are now at least three faculty members who are capable of assisting both students and other faculty members in getting into the rudiments of operating all major computers in the system.

In line with this, several faculty members have made substantial attempts at establishing programs for their courses. Heavy student use has resulted in Chemistry and Mathematics with Economics and Physics presently developing some student usage. English tutorial programs for remedial courses are being developed and will be implemented beginning summer quarter, 1972.

At present, there are no Computer Science courses offered at this college. However, some tentative plans are being made for such a course during the academic year.

The faculty is kept abreast of new developments or changes in operating procedures by circulation of releases and newsletters from the computing centers. In addition, periodic intrafaculty work sessions help keep faculty members interested and knowledgeable in the use of the computer. A manual of I/O procedures for the various computers was developed containing often used procedures. It is found that such a manual increases usage since it eliminates discouraging errors and paging through large manuals to find these procedures. These activities are coordinated through the Campus Coordinator.

In summary, a substantial interest has developed among faculty and students. An extensive local library has been developed and faculty-faculty, as well as faculty-student assistance has been fostered. The computer has been a definite asset to Floyd Junior College.

FLOYD JUNIOR COLLEGE

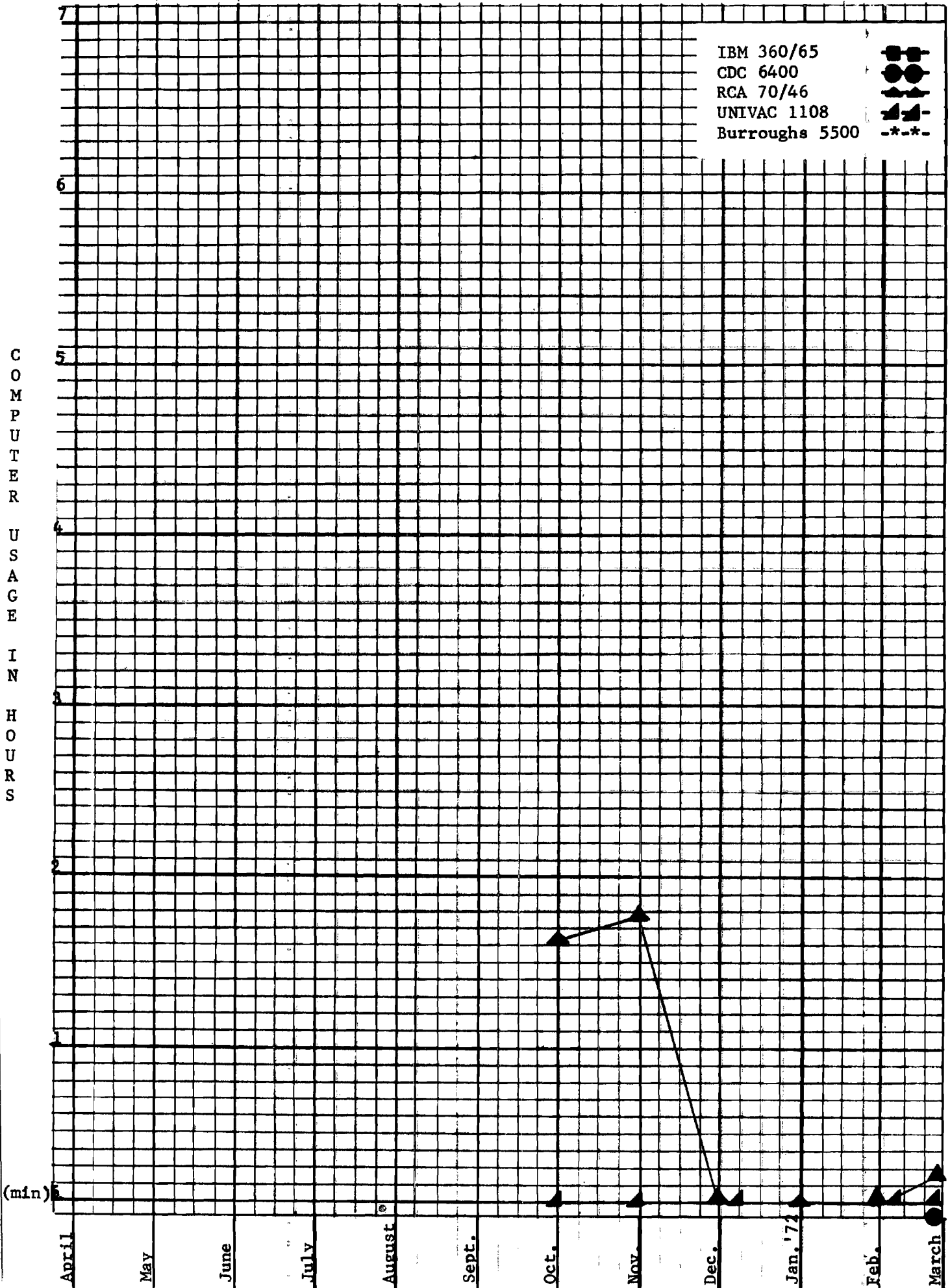
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71															
May															
June															
July															
August															
September															
October							1	38							18
November							1	47						1	
December								1						1	
January '72								2							
February								5							17
March					2			13						1	
TOTALS					2		3	46						4	35

Remote Equipment: ASR 33

Telephone Line Configuration: Location      Access Point      Termination  
    Rome                      Rome                      Atlanta

# FLOYD JUNIOR COLLEGE

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FORT VALLEY STATE COLLEGE

Grant GJ-1027

William D. Moorehead  
Principal Investigator

Bill Dalton  
Campus Coordinator

The computer center at Fort Valley State College is equipped with an IBM 1130, which includes a central processing unit, card reader/punch, and line printer. This equipment is available for use by students and faculty eight hours a day, five days a week. Personnel available for assistance during these hours include one full-time programmer/operator and two faculty instructors.

Computer Science courses offered are: Introduction to Data Processing - 3 hours; FORTRAN - 9 hours; COBOL - 6 hours. Other courses which utilize the computer as an instructional tool include Chemistry, Accounting, and Economics. Several faculty have also made use of the 1130 for agricultural research and in the Kellogg Research Project.

In the last year, Fort Valley State established a Computer Committee composed of faculty and staff members who, in conjunction with the Campus Coordinator, set guide lines for computer operations, promote utilization and integration into new curricula areas. These aims are fostered through personal contact with faculty by Committee members, seminars and demonstrations designed for both students and faculty.

# FORT VALLEY STATE COLLEGE

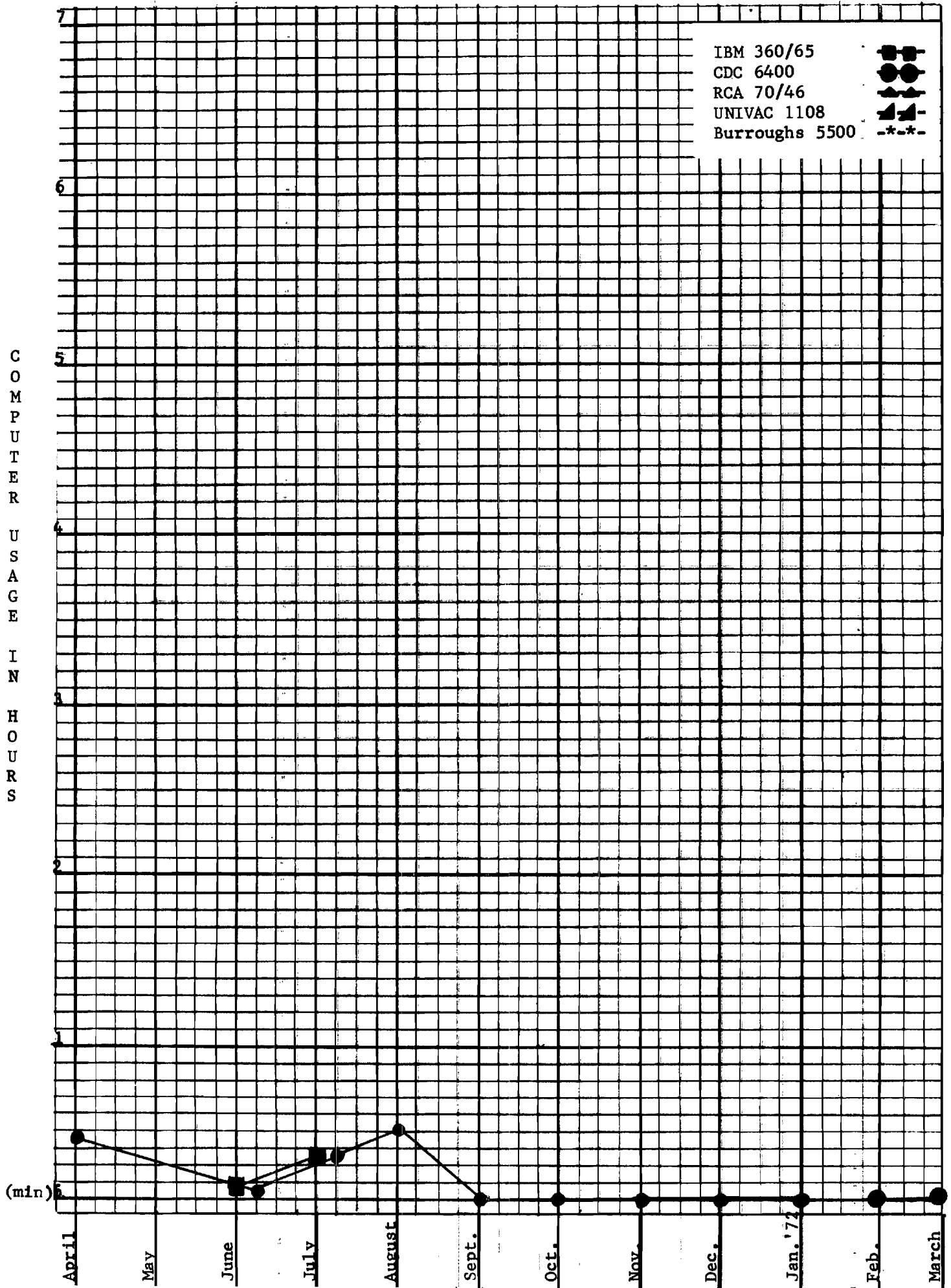
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71					28										
May															
June		10			10										
July		20			20										
August					30										
September					5										
October					4										
November					1										
December					1										
January '72						57									
February					4										
March					7										

TOTALS                      30                      1    50    57

Remote Equipment: IBM 1130

Telephone Line Configuration: Location    Access Point    Termination  
Fort Valley Warner Robins    Athens

FORT VALLEY STATE COLLEGE





GAINESVILLE JUNIOR COLLEGE

Billy Taylor  
Campus Coordinator

Gainesville Junior College has an IBM 2741 Communications Terminal which interacts with the IBM 360/65 Computer at the University of Georgia. The terminal is available to students and faculty from 8 a.m. to 5 p.m., Monday through Friday, and is available at other times upon request. Student assistants were available for assistance to users three hours each day fall and winter quarters.

The facility was used for assisting the instruction of the Calculus courses and Elementary Chemistry courses. Data Processing instructors made use of the terminal for instructional purposes in this course. The Coordinator of Institutional Research made varied uses of the terminal. Various faculty members used the terminal as an aid for their individual research projects.

Efforts were made by the Campus Coordinator to encourage full usage of the terminal through personal contacts. Also, a visit by Dr. Don Leyden through the Chemistry and Science Winter Quarter Project added enthusiasm to various faculty members in the Natural Science Division for using the terminal for instructional purposes.

Not a great deal of progress was made during the 1972 school year at Gainesville Junior College in computer usage. The outstanding reasons for this lack of progress are: (1) Lack of a person on campus knowledgeable in the writing of programs for the computer, and (2) Inadequate facilities to meet the needs in various courses.

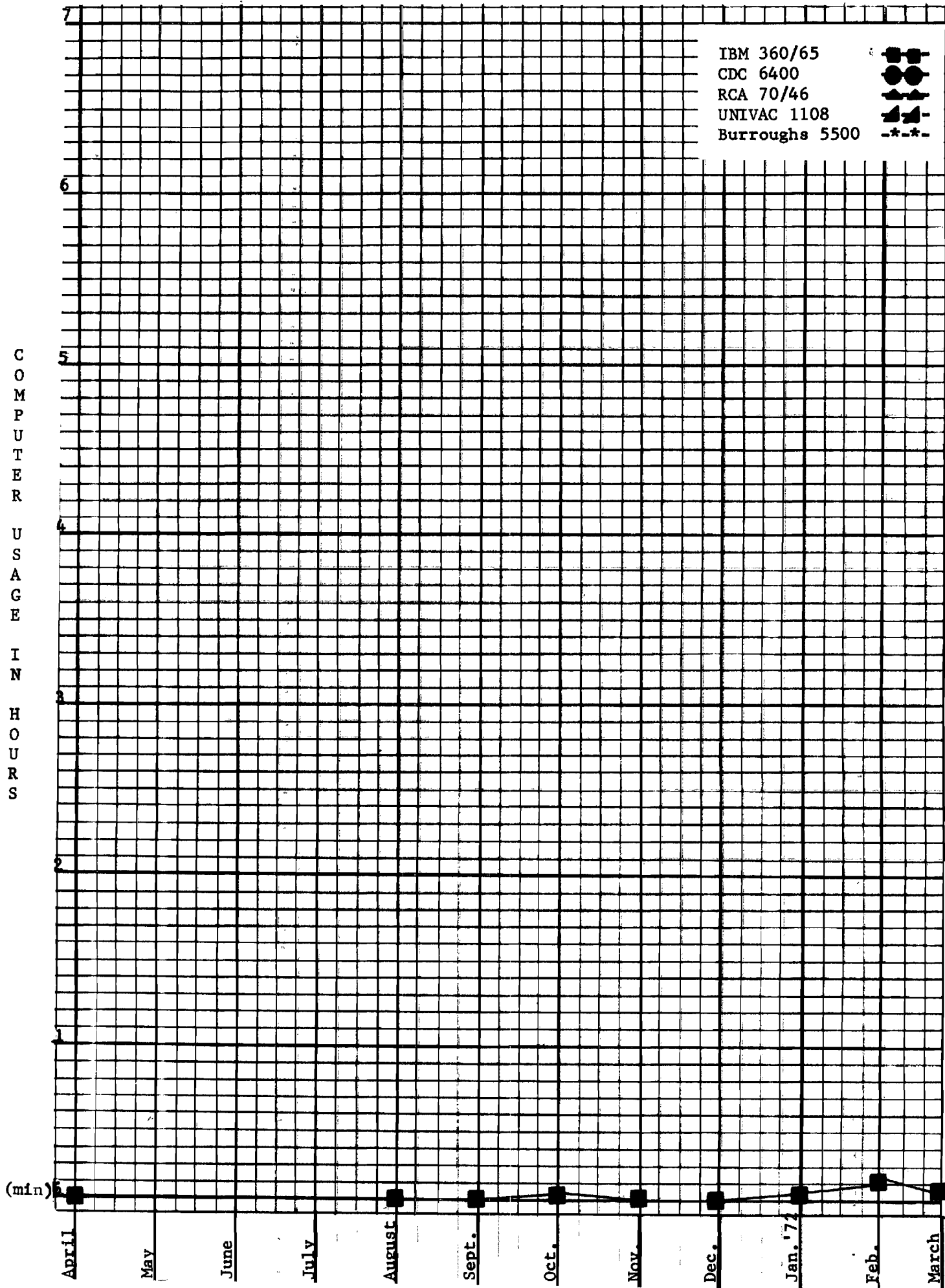
# GAINESVILLE JUNIOR COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		6													
May															
June															
July															
August			34												
September		4													
October		7													
November		6													
December		1													
January '72		7													
February		11													
March		9													
TOTALS		51	34												

Remote Equipment: IBM 2741

Telephone Line Configuration: Location Access Point Termination  
 Gainesville Gainesville Athens

# GAINESVILLE JUNIOR COLLEGE



GEORGIA COLLEGE AT MILLEDGEVILLE

Grant GJ-1025

David G. Baarda  
Principal Investigator

E. M. Spencer  
Campus Coordinator

The Georgia College Computer Center is equipped with a Univac 9200 Computer and peripheral equipment designed to promote two major purposes, research and education. In addition to the 9200 and its related equipment, Georgia College has an ASR 33 teletype, both of which are connected to the large memory equipment of the University Computer Network.

The 9200 II is a card oriented system, and peripheral equipment consists of: (1) an I.B.M. 85 collator; (2) an I.B.M. sorter; (3) a Univac V.I.P. interpreter punch; and (4) four I.B.M. key punches. The computer and the first three pieces of related equipment are located in a limited access area restricted to computer operating personnel and faculty members having a direct interest. The ASR 33 teletype and the four I.B.M. key punches are available to students, faculty and administrative personnel eight hours each day during six days each school week. By prior arrangement keys are issued which allow access to this equipment at any time by an authorized user.

Access to the University System Computer Network for research and study is both interactive using the teletype and the "Basic" language and batch mode using the 9200 and the FORTRAN and COBOL languages.

To date Georgia College has had less than adequate personnel to assist students and faculty. The Computer Center director and student assistants

give a limited amount of help in the preparation of access and "lead" card instruction, but cannot provide adequate assistance in program de-bugging, etc. A very competent part-time instructor in the Business Administrative Department has given generously of his time to assist students and faculty outside of his classes; and the faculty of the Chemistry Department, who have had experience in both teaching and applications in the computer area, continue to help many interested scholars both within their discipline and out.

Interest on the part of Georgia College's faculty is growing although somewhat slower than had been hoped. A year ago the only area in which there was a strong interest was Chemistry with a limited beginning in the Business Administration area. During the year, there has been a marked increase in computer use by Business Administration faculty and students. Research programs have been developed by two members of the Sociology Department and lectures on research applications given to advanced students in Education. In a related area, the Library Department is taking an active interest in promoting the use of the Georgia Information Dissemination Center of the University of Georgia.

A faculty sub-committee carefully reviewed the teaching of computer-related courses in the various departments of the college and recommended for the present: (1) elementary undergraduate courses in computer languages and general computer applications be offered in the Mathematics Department; and (2) courses at the graduate level and in specialized applications at the undergraduate level be offered by the departments teaching the area of application. These recommendations were adopted and the 1972-73 Georgia College Catalogue lists the following:

Mathematics	201, Introduction to Computer Science
Chemistry	341, Advanced Computer Application
Bus. Adm.	545, Computer and Decision-Making Process
Bus. Adm.	306, Office Mechanization and Automation

One new full-time instructor was added to implement this program which will be frequently reviewed.

The greatest research activity on the part of both faculty and students has been in Chemistry and Applied Statistics. In Chemistry, major effort has been expended in developing programs to teach Chemistry through the use of digital models and other related computer applications. Statistical programs, particularly the "Bio-med" package and "Statpac," have been used extensively by graduate students and instructors in business and sociological research. A very comprehensive study of the causes and control of forest fires is being developed under faculty direction.

One non-credit adult education course has been offered which generated a gratifying response. In addition, a few local businesses are encouraging employees in computer related jobs to attend some of the regular courses offered during the evening. As local interest develops, it is our purpose to expand service to the community to the extent of our ability.

Every effort has been made in the limited staff time available to work with faculty members and through them with students to promote interest in the use of the computer facilities. Results have been mildly encouraging. As mentioned before, a faculty sub-committee devoted time to curriculum review which resulted in a noticeable improvement of faculty understanding of the place of the computer on the college campus. Utilization of equipment as shown by our quarterly reports has improved and, although still low, the improvement is substantial. It is felt that even greater progress can be made during the next school year after some of the presently undecided questions in regard to equipment and communications have been solved.

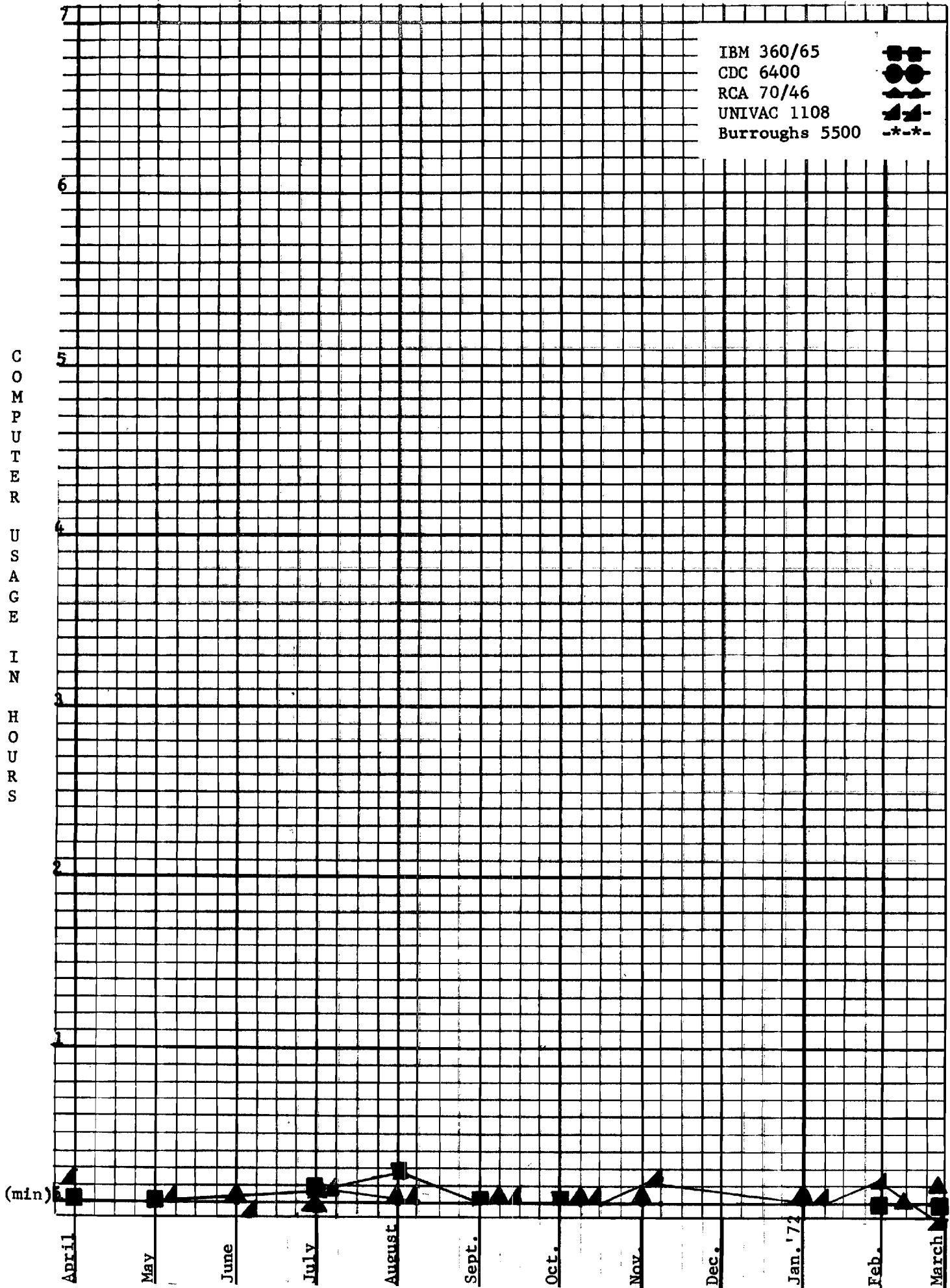
# GEORGIA COLLEGE AT MILLEDGEVILLE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		3											15		
May		4											6		
June							2							42	
July		10						6					10		
August		17						18					7		
September		1					2						7		
October			32					48					7		
November							1						14		
December															
January '72								24					5		
February			34				2						11		
March		2					1						4		
TOTALS		38	6				9	36					1	26	42

Remote Equipment: ASR 33 and Univac 9200

Telephone Line Configuration: Location   Access Point   Termination  
Milledgeville   Milledgeville   Atlanta

# GEORGIA COLLEGE AT MILLEDGEVILLE





GEORGIA SOUTHERN COLLEGE

Russell Helm  
Campus Coordinator

During the year April 1, 1971 to March 31, 1972, Georgia Southern College moved from an IBM 2780 to a computer system to serve both administrative and educational needs. The IBM 2780 remained on campus until November 1, 1971, to serve educational needs as an element of the State Network. The NCR Century 100 was installed August 18, 1971, to meet administrative needs and replaced the IBM 2780 on November 1, 1971, as an element of the State Network. This resulted in a decrease in the amount of communications time used by Georgia Southern which resulted in a longer turn around time for educational programs. The resulting rate was one or two runs each day, depending on job size and requirements. This reduction in service was necessary because of limited funds at Georgia Southern which had to support both computer needs. To help offset the delays that were necessary, more consulting time was made available to faculty members needing help with computer oriented research in the form of a consultant available half time, and more keypunch time and services were provided to students doing class work. Students can now have their keypunch work done by a full-time Computer Center staff member or they may choose to do their own work in the evenings. This keypunch service is also available to faculty on a time available basis to meet their research needs.

All Computer Center staff members attempt to serve faculty requests for service in the educational area on a time available basis and encourage projects presented with a reasonable level of requirements and time limits. However, due to limited staff time, researchers are encouraged to learn as much as they need to do their own work so that available staff time can be spent training other faculty members to use the equipment while the experienced users serve the majority of their own needs. This has worked well at Georgia Southern, which is rapidly developing

a base of experienced faculty members who can support their fellow researchers and relieve the Computer Center staff of research support except in difficult or unusual problems.

The Department of Mathematics and the Department of Management have jointly developed a series of ten new Computer Science courses. They cover Fortran, Cobol and Assembly Language Programming, System Design, Scientific Programming and Computer Center operations. They allow majors in Mathematics and Management to obtain degrees with emphasis in Computer Science. These courses also serve other majors who wish to take electives in Computer Science. This area is developing as several courses in other areas are beginning to use the computer in course related work.

Along with the credit courses developed, the Department of Continuing Education has developed a non-credit night course that introduces the student to the computer.

The faculty use of the State Network is continuing to grow and has reached the point where approximately one in fifteen has been involved in a computer related project. One of the factors that has hindered this growth is the shortage of consulting help. Due to this shortage, it has been necessary to restrict consulting help to areas in which the researcher cannot do his own work. This allows available help to be divided among as many faculty members as possible. In several cases this has resulted in the faculty member deciding the project wasn't worth the effort to run on the computer.

The present level of research has been accomplished with less than ninety hours of communications time each month. With input/output bound by line speed the CPU time required of the Network is only a small fraction of this time. Faculty research efforts have included computer support for the completion of degrees, support for research, and support for paper presentations. Subject areas

include Chemistry, Physics, Education, Business, Student Services and Geography. A special effort, nearly completed, involves the implementation and use of a numerical taxonomy system designed by the State University of New York at Stony Brook. This effort is in support of a local post-doctoral research project in Biology, but the system is now available to batch users in the Network.

Student research efforts have involved candidates for graduate degrees in Education, Business and Psychology.

Interest in the use of the State Network for academic use has continued to grow as the core of experienced users develop interest in their fellow faculty. This has been especially true in departments with members who had considerable computer experience before coming to Georgia Southern. This expanding interest has reached the point that plans are now being considered for the installation of two interactive terminals for fall quarter in addition to expanding remote batch work.

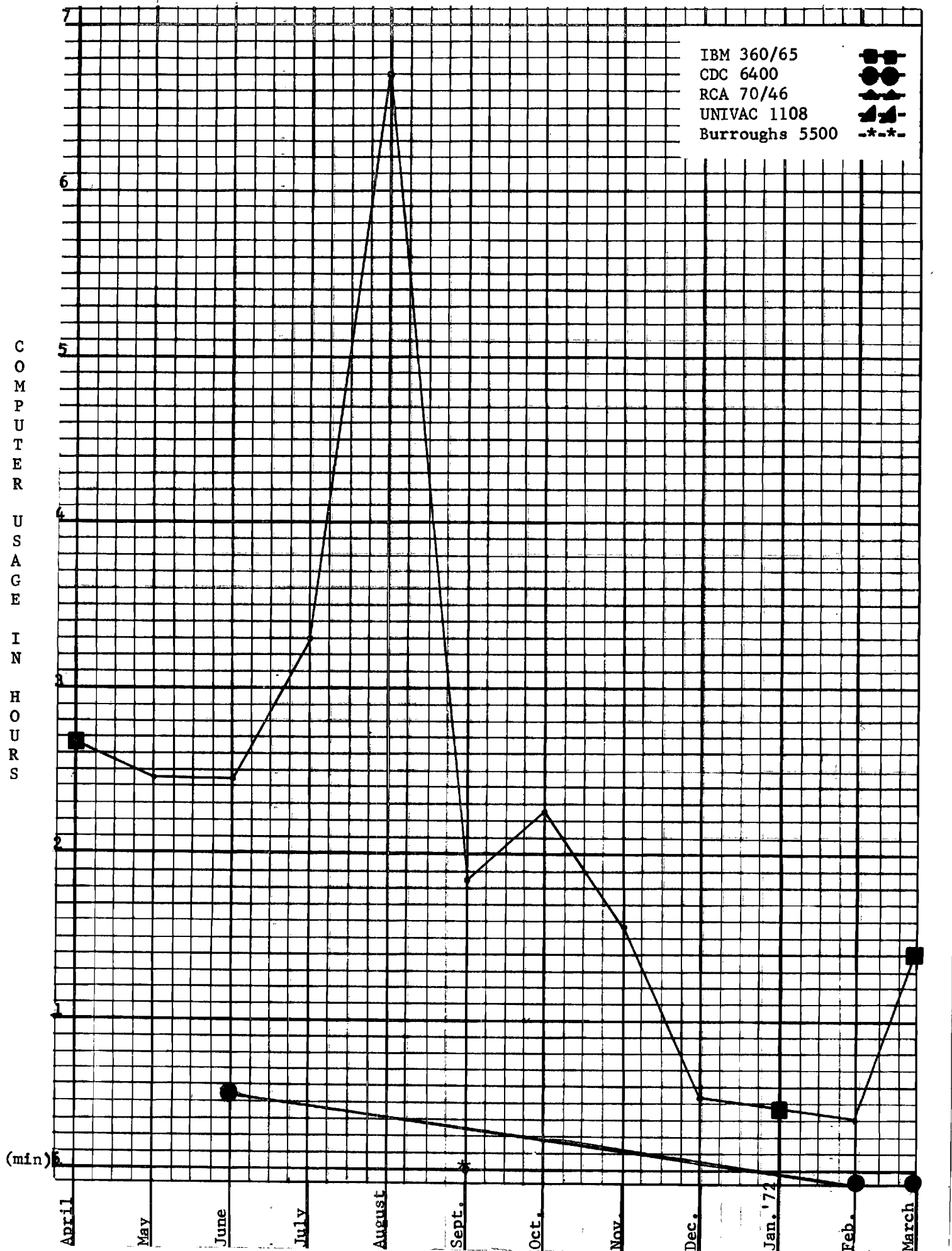
GEORGIA SOUTHERN COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71	6	41													
May	2	26													
June	2	26			34										
July	3	18													
August	6	42													
September	1	52								2					
October	2	16													
November	1	35													
December		31													
January '72		29													
February		24				30									
March	1	30				4									
TOTALS	26	10		34	34					2					

Remote Equipment: NCR 100

Telephone Line Configuration: Location    Access Point    Termination  
    Statesboro    Savannah    Athens

# GEORGIA SOUTHERN COLLEGE



GEORGIA SOUTHWESTERN COLLEGE

Grant GJ-1036

J. Hubert Greene  
Principal Investigator  
Campus Coordinator

As of May 1, 1972, computing at Georgia Southwestern College has existed in fact for a sixteen-month period. The IBM 1130 has been operational on campus since January 1, 1971. During this period of time, considerable progress has been made in the utilization of this equipment; i.e., a larger number of the faculty and student body are using it. At the same time, some progress has been experienced in the area of knowledge of how to use this equipment as an educational aid. The college is experiencing a slow, but definitely noticeable, expansion of faculty interest and utilization. It could have and should have made more progress in both these areas.

Computer facilities at Georgia Southwestern consist of an IBM 1130 Model 2B with 8,000 words of memory. This model has a resident disk storage device capable of storing 500,000 16 bit words. Its principal input device is an IBM 1442 Card Read/Punch, and its principal output device is an IBM 1132 Line Printer.

This equipment is generally available during regular working time for forty hours per week, though special arrangements can be made for off-hour usage.

Computer operations personnel available for assistance in the area of input design and some small amount of keypunching service include three full-time employees and two half-time employees whose primary function is to provide administrative data processing services. Programming services and assistance are provided by one full-time faculty member.

During this reporting year, Georgia Southwestern has published a Computer News Letter directed toward the faculty which outlines possible computer usage in

the undergraduate curricula in the scientific and non-scientific areas.

In addition, the college has published a 100-page Users' Guide telling the reader how to use the equipment as a stand alone computer and as a time sharing terminal for Remote Job Entry and Conversational applications for two computers, the IBM 360 and the CDC 6400, at the University of Georgia.

A computer management concepts course entitled, "Computer Applications in Business," has been offered during this year and proposals have been presented to the curriculum committee for a number of additional computer programming courses.

The Georgia Southwestern computer is being used to aid in Accounting, Marketing, Retail Management, Chemistry and Finite Mathematics courses.

Several faculty members have utilized GSW facilities to conduct research studies in a number of areas during this time period. Research has been conducted in: "History of Political Party Members in Tennessee during the Nineteenth Century", "Theater for the Deaf", "Trigonometric Teaching Methods", and several smaller efforts. Student Research has consisted of a study of election results of presidential and gubernatorial elections in the Southeast and a survey of grocery buying habits of low-income families in Americus, Georgia.

Use has been made of the GSW computer to tabulate the results of a student opinion questionnaire for both Crisp and Tift County schools. The Middle Flint Planning Commission has conducted research into the needs of the elderly in South Georgia and the results were tabulated on the IBM 1130.

The potential for meaningful utilization of the computing facilities at Georgia Southwestern is great, and realization is slowly awakening. However, this is not occurring at the pace Georgia Southwestern would prefer due to lack of awareness on the part of faculty and student body of the computer's potential and the need for knowledge of computing in this contemporary world.

GEORGIA SOUTHWESTERN COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71											5				
May															
June											2				
July															
August		8													
September		11													
October		19													
November		9													
December											3				
January '72															
February		4													
March											2				
TOTALS	51									12					

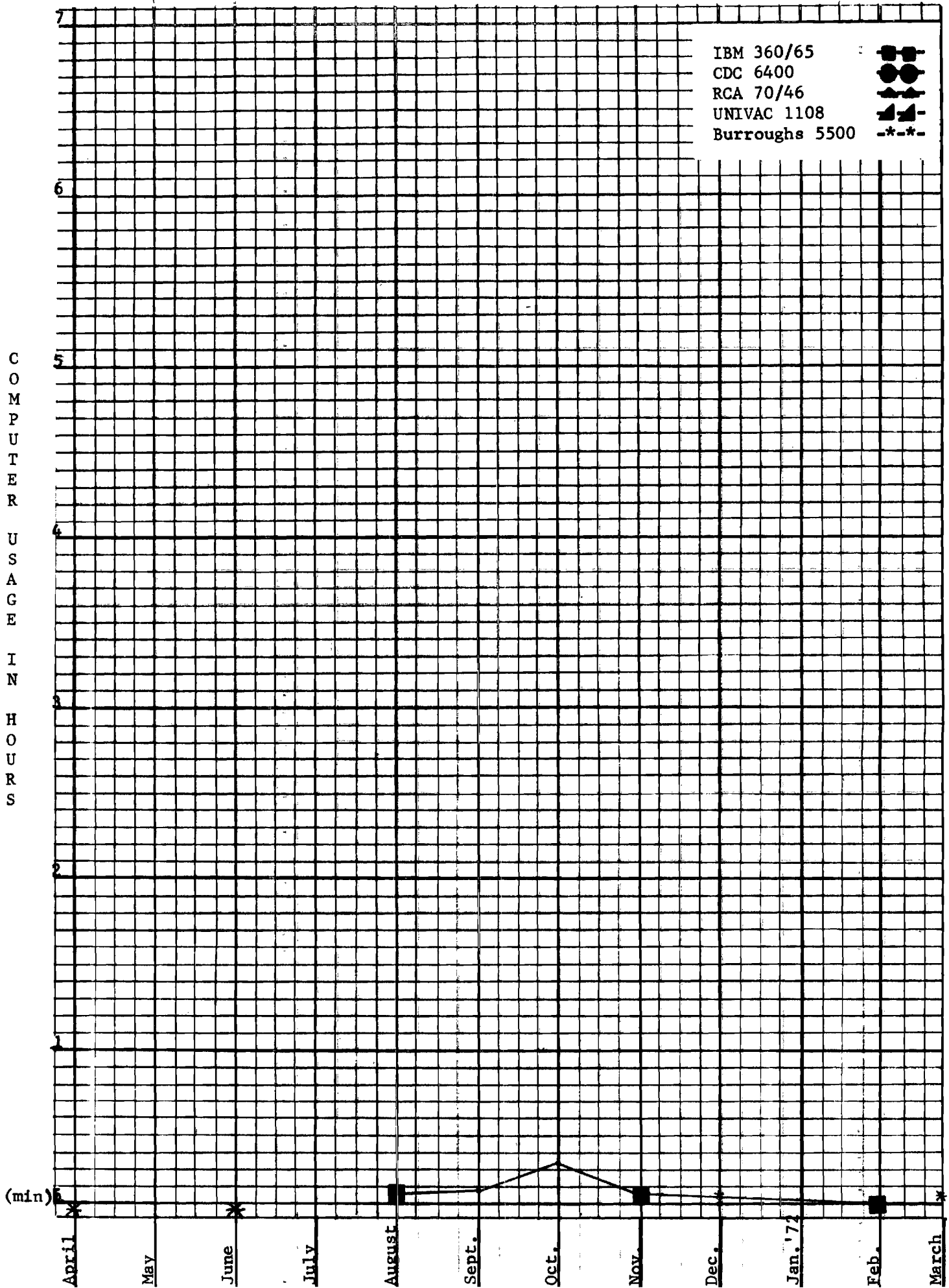
Remote Equipment: IBM 1130

Telephone Line Configuration: Location    Access Point    Termination  
Americus    Albany    Athens



# GEORGIA SOUTHWESTERN COLLEGE

COMPUTER  
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## KENNESAW JUNIOR COLLEGE

Carlton Neville  
Campus Coordinator

Kennesaw Junior College is a two year, coeducational, non-residential institution offering the Associate in Art and Science degrees. Located in Marietta, Georgia, the college, which opened in 1966, has a current enrollment of 1700 students.

Kennesaw has three low speed terminals, one ASR 33 and two NCR 260's. These terminals are acoustically coupled to three Atlanta business lines which provide access to all three central computing centers. Present network usage is approximately 200 connect hours per month. The terminals are available for student use daily from 8 a.m. to 9:30 p.m. Several faculty members and student assistants are available to provide assistance to users. All three terminals are located in the Science Building but are used by students from all disciplines.

The terminals are used by students both in course work and in independent study. Most students learn to use the terminals initially in a particular course where its use is necessary. Some students learn by asking other students and then use the terminals as aids in courses not requiring their usage. A seminar was presented explaining how to use the terminals and the fundamentals of the BASIC language. This seminar which had an enrollment of 50 students and faculty, proved very successful. Due to the success of the computer programming seminar offered this year, the program will be expanded next year.

The courses presently offered which rely on terminal usage to study basic concepts, solve problems and aid research are:

CHEM 223 Qualitative Analysis	45 students
MATH 103 Analytical Geometry and Calculus	30 students
MATH 111 Mathematical Ideas	122 students
MATH 201 Calculus	10 students
MATH 202 Calculus	10 students

MATH 203 Calculus	10 students
PHYS 101 Introductory Physics	60 students
PHYS 102 Introductory Physics	40 students
PHYS 201 General Physics I	10 students
PHYS 202 General Physics II	7 students
PHYS 203 General Physics III	<u>5 students</u>
TOTAL	349 students

A new course, Math 141, Introduction to Computer Science and Programming, has been formulated and will be offered next year. This course will provide four laboratory hours per week devoted to problem solving techniques using the computer, as well as three lecture periods in computer systems, programming and use.

While computer usage has proved very beneficial, several things have prevented even more widespread use. Faculty members who are not experienced in using a computer are reluctant to devote much of their time to learning to use this rather complex tool. A program designed to give faculty members time to learn about the computer would greatly increase its utilization.

A second problem is availability. One cannot be sure the computer terminals will be free or that telephone lines will be available when needed. A closely related problem is reliability. Computer terminals do not work all the time and when the terminals are functioning, sometimes interference on the telephone circuit and computer system problems exist. For this reason, teachers cannot be sure the computer will function properly in classroom demonstrations or during analysis of data in scheduled laboratories.

## KENNESAW JUNIOR COLLEGE

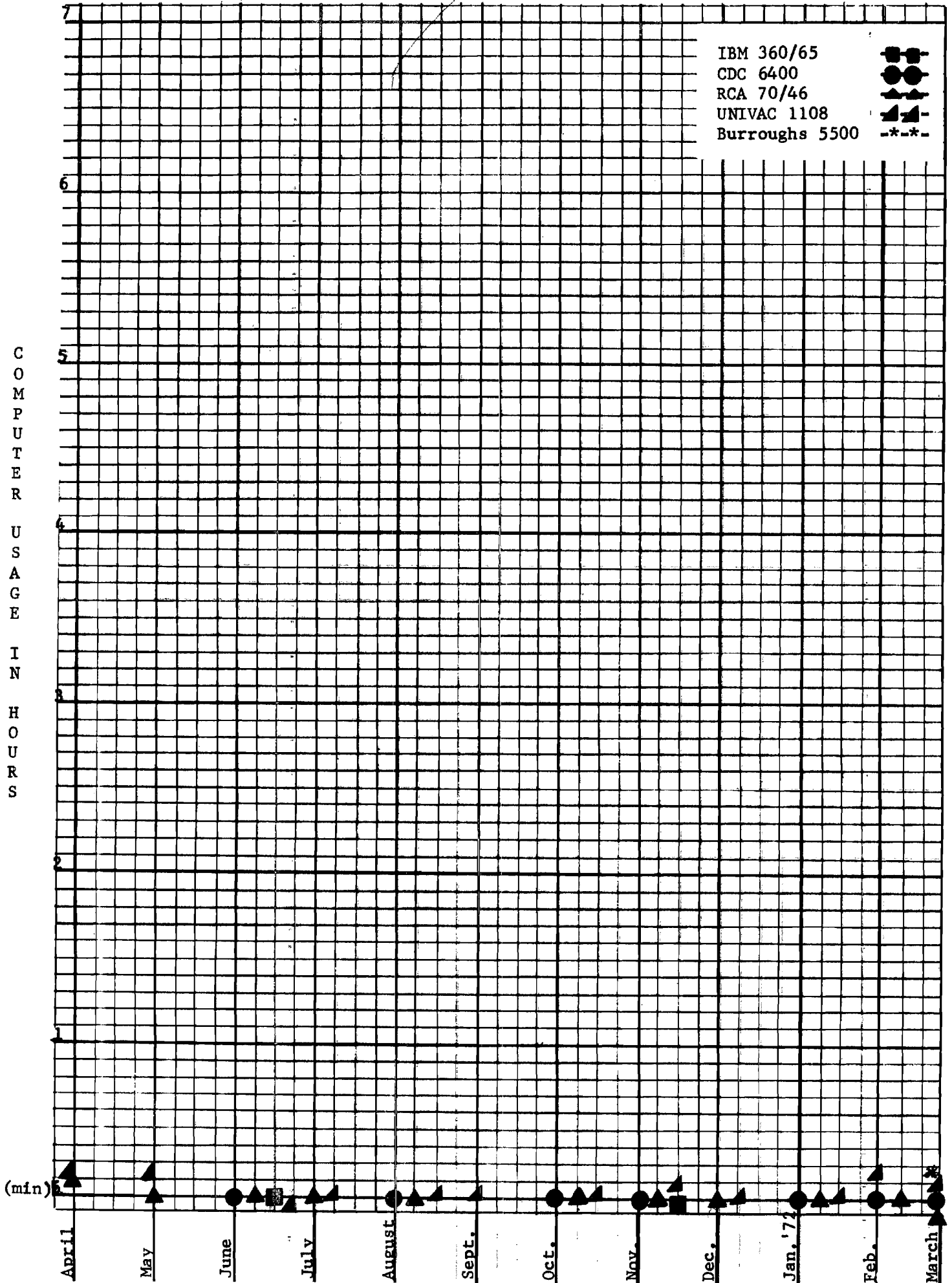
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71								10						8	
May								3						14	
June			44			44		2						2	
July								1						4	
August						7		1						5	
September														3	
October						7		3						5	
November			1			21		3						11	
December									18					4	
January '72						17		1						6	
February					1				24					14	
March					1				36		1			8	
TOTALS	45			3 36			25 18			1			1 24		

Remote Equipment: (2) NCR 260 and ASR 33

Telephone Line Configuration:	<u>Location</u>	<u>Access Point</u>	<u>Termination</u>
	Marietta	--	Atlanta

# KENNESAW JUNIOR COLLEGE

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MACON JUNIOR COLLEGE

Grant GJ-1038

Jack H. Ragland  
Principal Investigator

W. Thomas Bass  
Campus Coordinator

Macon Junior College continued participation in the University System Computer Network from April 1, 1971 to March 31, 1972. The college has a Model ASR 33 Teletype which communicates with the CDC 6400 and the IBM 360/65 at the University of Georgia. The facility is located in the Science and Mathematics Building with easy access during building hours, and sign-up during off-hours. Several faculty members including the Campus Coordinator are available in the immediate vicinity for consultation.

Faculty usage has been largely limited to Mathematics, Chemistry, Biology, and Physics. This appears to be partly an accessibility-imposed limit and partly a problem of familiarity. Other faculty have been invited to use the facility, both verbally and in writing. The Art Department has shown some interest in geometric plotting, principally due to some students using such plots as a foundation for acrylic paintings. Psychology has shown interest in students running some "T" tests. The developmental reading faculty would use CAI-type programs, if such were available.

A two-hour computer science course, Math 141, has been continued this year. Student demand has allowed this course on alternate quarters, averaging about 12 students. The course has emphasized BASIC programming, with a low priority on mathematics and a high priority on the students' interests. The Chemistry Department has relied heavily on terminal usage, particularly for laboratory classes.

The procedure there has been considerably revised to use CAI, "canned", and student-written programs. A computer-dependent laboratory was employed in Physics (to be reported at the 1972 Conference on Computers in the Undergraduate Curricula). Mathematics faculty used plotting routines and other "canned" programs. The Biology Department is preparing to use statistics programs for laboratory analysis. An estimated 200 students used the terminal in these various programs throughout this period.

A science course for non-science students, newly offered this quarter, used the computer to examine population growth situations. A striking feature of the students in this course was their great interest in the facility. One art student examined a large number of the other libraries in the state in an attempt to ferret out interesting programs. Also, a visiting group of students from a local high school exhibited similar interest in the computer, particularly in a program for the design of an antenna for FM reception written by a Macon Junior faculty member.

# MACON JUNIOR COLLEGE

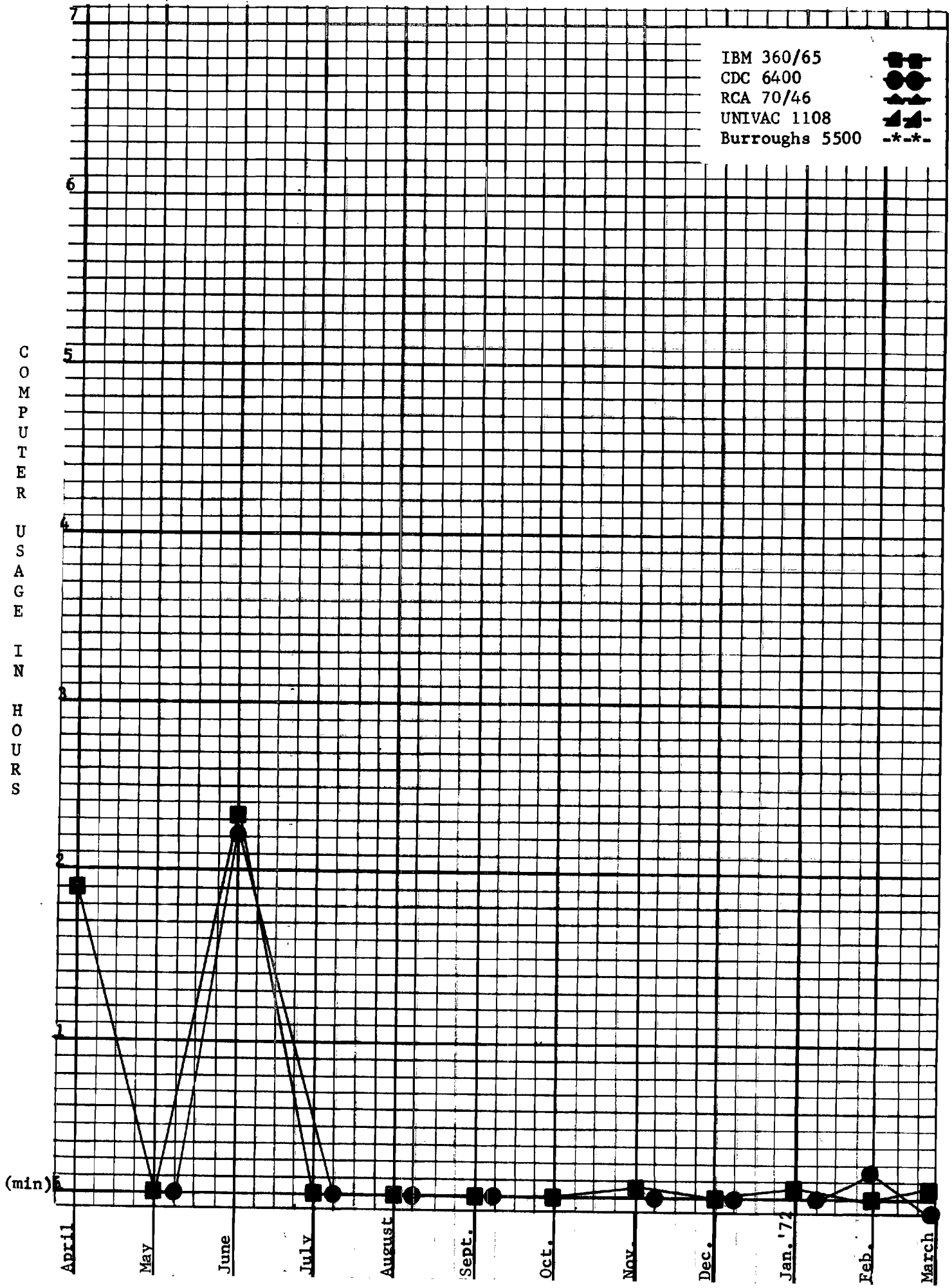
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71	1	55													
May		8				17									
June	2	20		2	15										
July		7				25									
August		7				54									
September		2				3									
October		5													
November		9			2										
December		5			1										
January '72		8			2										
February		3			13										
March		7			4										
TOTALS	5	16		2	38	39									

Remote Equipment: ASR 33

Telephone Line Configuration: Location      Access Point      Termination  
    Macon                      Macon                      Athens



# MACON JUNIOR COLLEGE



MEDICAL COLLEGE OF GEORGIA

Grant GJ-1039

Russell Morse  
Principal Investigator

Richard E. Pogue  
Campus Coordinator

The following equipment is available at the Medical College to permit use of the IBM 360/65 in the University System Computer Network:

IBM 2780 Remote Batch Terminal, with operator coverage approximately 30 hours per week. Use during other hours is permitted by faculty and students trained in terminal operation.

IBM 2741 Interactive Terminal, available to qualified faculty and students upon demand.

The 2780 Terminal operator is a qualified computer programmer and offers assistance in use of the terminal and in debugging programs. In addition, several faculty members are available on a limited basis for consultation in computer use and data analysis.

The primary method for encouragement of faculty use of the Network is through the limited consultation activities of the several faculty members mentioned above. The limitations on their available time represent the major barrier to increased use of the Network, and efforts are being made to establish faculty positions with primary responsibility for supporting research and educational uses of the computer and analytical techniques.

Student use is encouraged primarily through consultation on student research projects and through offering of electives to medical students. Students who take a programming course which uses the IBM 360/30 also provide some student users of the terminals. Current plans are to transfer student course work to the Network terminals within the next few months. The primary barrier to increased student use of the Network is again the shortage of available qualified faculty.

Major accomplishments during the past year include joint use of the 2741 and 2780 in specific research projects and use of the 2780 to compile and debug programs for a Nova 800 minicomputer in the Neurobehavioral Science research laboratories. In the former, the 2780 is used to establish data bases on the IBM 360/65 which are then manipulated and analyzed through the 2741. This has been very effective in providing an efficient and flexible method for analyzing large data bases. Use of the IBM 360/65 to compile and debug programs for the Nova 800 minicomputer is saving considerable staff time in program development and also permits concurrent use of the Nova for research purposes.

As a result of satisfaction with current Network operation and the potential for improvement inherent in the recently-developed plans for centralizing operations on one computer, the Medical College has decided to use the Network as the primary facility for supporting general research and education. Procurement of common network terminals with increased capability at a lower cost together with better rationalization of the communications network in the State are needed developments which the Medical College supports wholeheartedly. The growing interest by faculty and students in computer utilization which is already in evidence on campus, together with the above-mentioned institutional plan, will make the Medical College an even greater user of the Network. The Network experiment supported by NSF has been a significant success at the Medical College of Georgia, and the continuing development of the Network from its current base will permit MCG to accommodate expansion in research and educational computing to a degree not otherwise possible within resources currently available to the institution.

# MEDICAL COLLEGE OF GEORGIA

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71	1	33													
May	1	30													
June	2	7													
July															
August	1	21													
September		48													
October	1	3													
November	1	58													
December		41													
January '72	1	15													
February		55													
March		58													

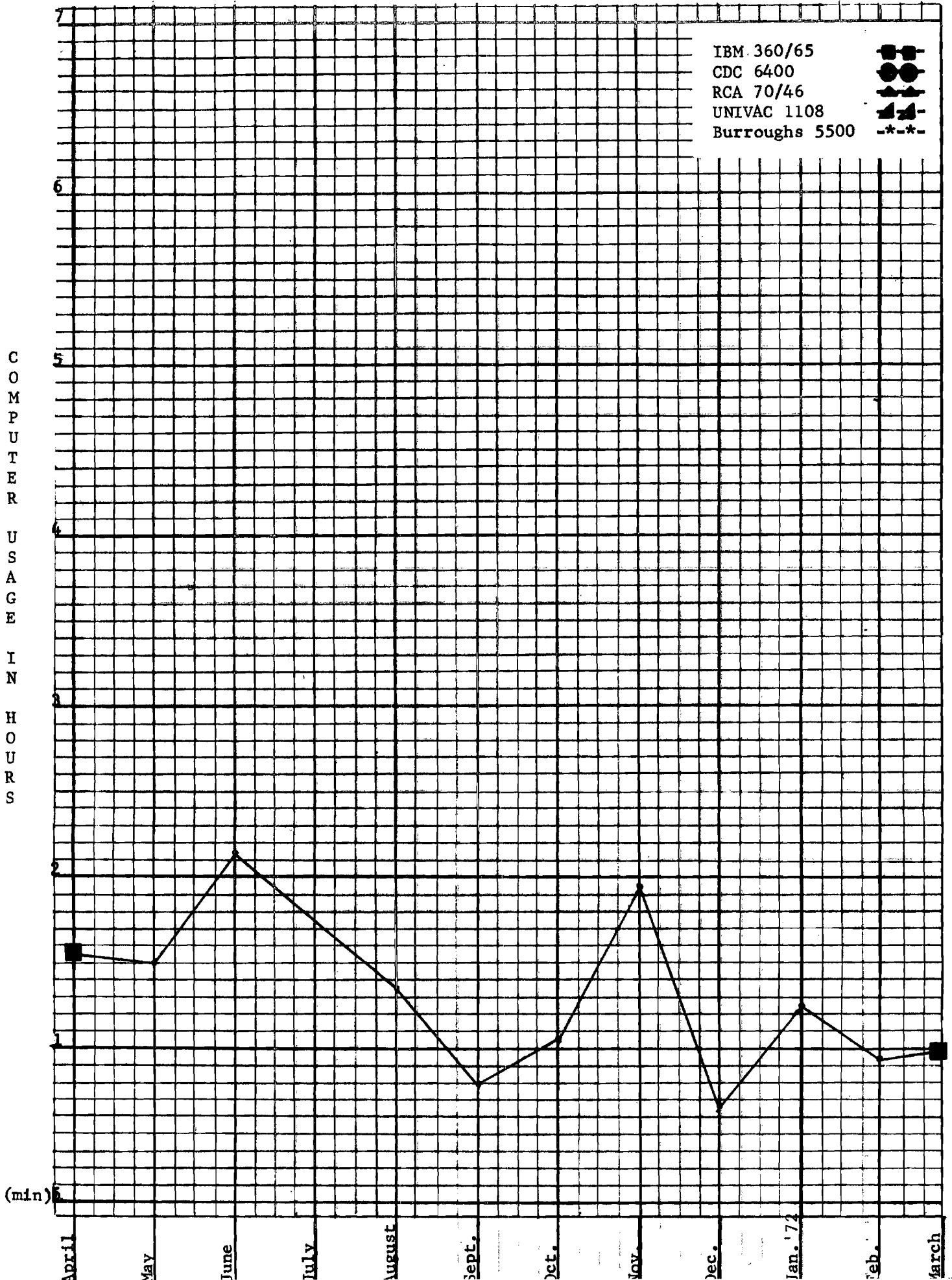
TOTALS 14 9

Remote Equipment: IBM 2741 and IBM 2780

Telephone Line Configuration:	Location	Access Point	Termination
	Augusta	Augusta	Athens
	Augusta	Augusta	Athens

# MEDICAL COLLEGE OF GEORGIA

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MERCER UNIVERSITY

Clarence E. Bell  
Campus Coordinator

Mercer University leases two ASR teletypes and two KSR thermal printer terminals, with one of each in the chemistry department and the mathematics computation laboratory. These terminals operate with two leased lines, and are available 60 hours per week to students. One computer specialist has been hired by the mathematics department to direct and improve the utilization of these terminals. He and several students are available for programming consultation.

Faculty members at Mercer have been invited to participate in seminars for the study of programming techniques, but response has been slow. Several faculty members in the soft sciences have indicated an interest in the Dartmouth tapes, but there has been no real usage of those. There is currently a move to institute an applied statistics course in psychology which will instigate heavy use of the computer facilities. This move is mostly due to certain introductions to the computer made by the computer specialist. The chemistry faculty has stepped up its computing usage in the past year, and has been aided in many ways by advice from the Campus Coordinator's office.

Two courses in beginning and intermediate computer methods are offered for credit. The courses are at present based on BASIC and FORTRAN, but use other systems as well. Two non-credit courses, an introductory programming course for freshmen and a seminar for those interested in computer methods, have been offered with fair success.

A course in the social effects of the computer has been approved by the curriculum committee.

Most of the research work with the computer has been done by Economics students attempting to use the machine to alleviate their calculating chores. Mercer also has a number of students in statistics who make a great deal of use of the machine in their discovery of key ideas in statistics.

At the present time, an effort is being made to make available to faculty members the names and description of those programs which will most likely benefit them. This work, the task of one man, is pre-empted by many other duties, but is progressing steadily each week.

Although there is a mild interest on the part of the faculty, the student interest in the programming courses and possible relevant applications has been great enough to overload, at times, the terminals at Mercer. It is easy to see the day when equipment will be inadequate.

A local report to the Dean of Liberal Arts is currently being prepared which concerns the overloaded computing activities at Mercer this academic year. It is felt here that if the switch to the CDC 6400 adversely affects the response in the systems, computer time can always be purchased from the Georgia Institute of Technology. Response and availability have become considerations because the computing activity at Mercer is growing at a rapid rate. The Dean is aware of the situation and is in support of a moderate amount of academic computer development at Mercer.

It is felt here that there should be more ports available on the CDC 6400 if it is to be used as the single Network computer. It is very difficult to teach students to overcome their frustration at not being able to connect with a machine. Even though this admittedly is a part of programming, it distracts students from learning techniques and drives them away from the terminals.

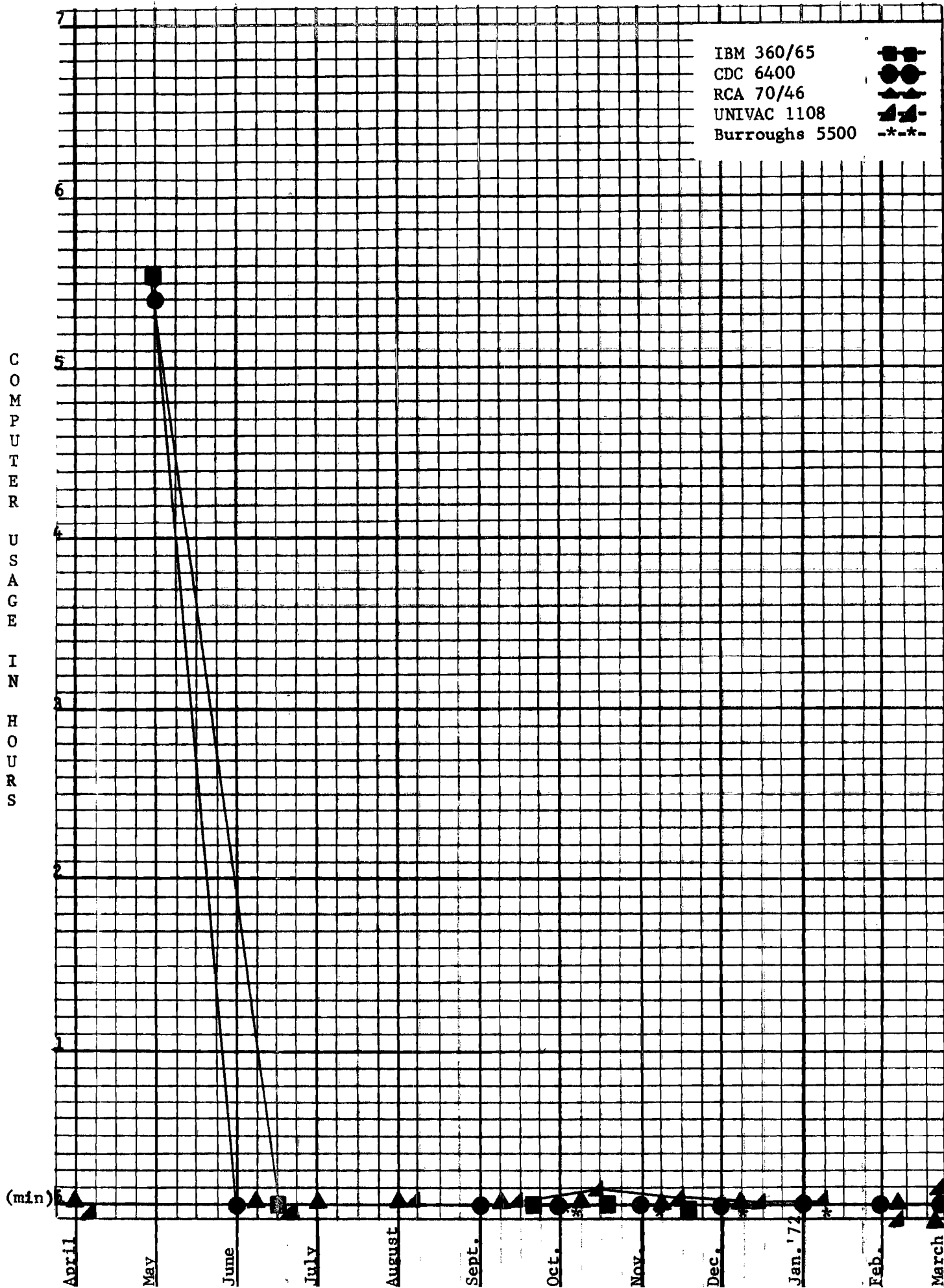
MERCER UNIVERSITY

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71								6							15
May	5	29		5	24										
June			58			30		2							22
July								2							
August									30					2	
September			12			12		1						3	
October			21		5			2				18		10	
November			18		3			4			2			7	
December					2				36			18		6	
January '72					3							30		5	
February					1				42			36		5	
March					5				18			18		6	
TOTALS	5	30	49	5	43	42		19	6		4		44	37	

Remote Equipments: (2) ASR 33 and (2) NCR 260

Telephone Line Configuration:	<u>Location</u>	<u>Access Point</u>	<u>Termination</u>
	Macon	Macon	Atlanta
	Macon	Macon	Atlanta





MIDDLE GEORGIA COLLEGE

Grant GJ - 1040

Harry D. Crawford  
Principal Investigator

James Brown  
Campus Coordinator

Middle Georgia College is a two-year, coeducational, residential institution located in Cochran, Georgia. Computer facilities at Middle Georgia during the year April 1, 1971 to March 31, 1972 consisted of an IBM 1050 terminal. The terminal remotes over an Athen's business line accessing both the CDC 6400 and the IBM 360/65 at the University of Georgia. The terminal is available to students and faculty from 10:00 AM until 10:30 PM Monday through Friday. Student assistants are available for assistance to users twenty hours per week.

The primary method for encouragement of faculty use of the computer facilities is through the limited consultation activities of the Campus Coordinator and the Division Chairman. Student use is encouraged primarily through consultation in weekly seminars which student assistants participate in. These seminars are open to all students and faculty interested in learning CPS-PL/I.

Computer Science courses and non-computer science courses rely on the terminal to study basic concepts, to solve problems and to aid research.

Established Computer Science courses include the following:

Business 215	Data Processing Systems
Business 216	Application of Data Processing
Business 217	Systems Analysis Design
Engineering 100	Introduction to Digital Computers

Non-computer science courses which utilize the terminal in course work are:

Math 100	Fundamental College Algebra
Math 102	College Algebra
Math 107, 108, 109, 207, 208	Calculus
Math 200	Statistics
Physics 201, 202, 203	College Physics
Chemistry 101, 102, 103	General Chemistry

Utilization of the 1050 terminal has grown continuously during this report period. For example, during February 1971, logged connect-time was 72 hours compared with 122 hours for February 1972. The month of February was used since that was the last full month the IBM 1050 was in use. An ASR 33 replaced the 1050 in March 1971.

Even though utilization has improved during the reporting period, the number of faculty members using the terminal has not increased as rapidly. Additional encouragement from the administration is needed to stimulate faculty interest. The Campus Coordinator needs to make more contact with the non-science faculty, and, in order for the faculty to become familiar with the operation of the terminal, more seminars need to be held.

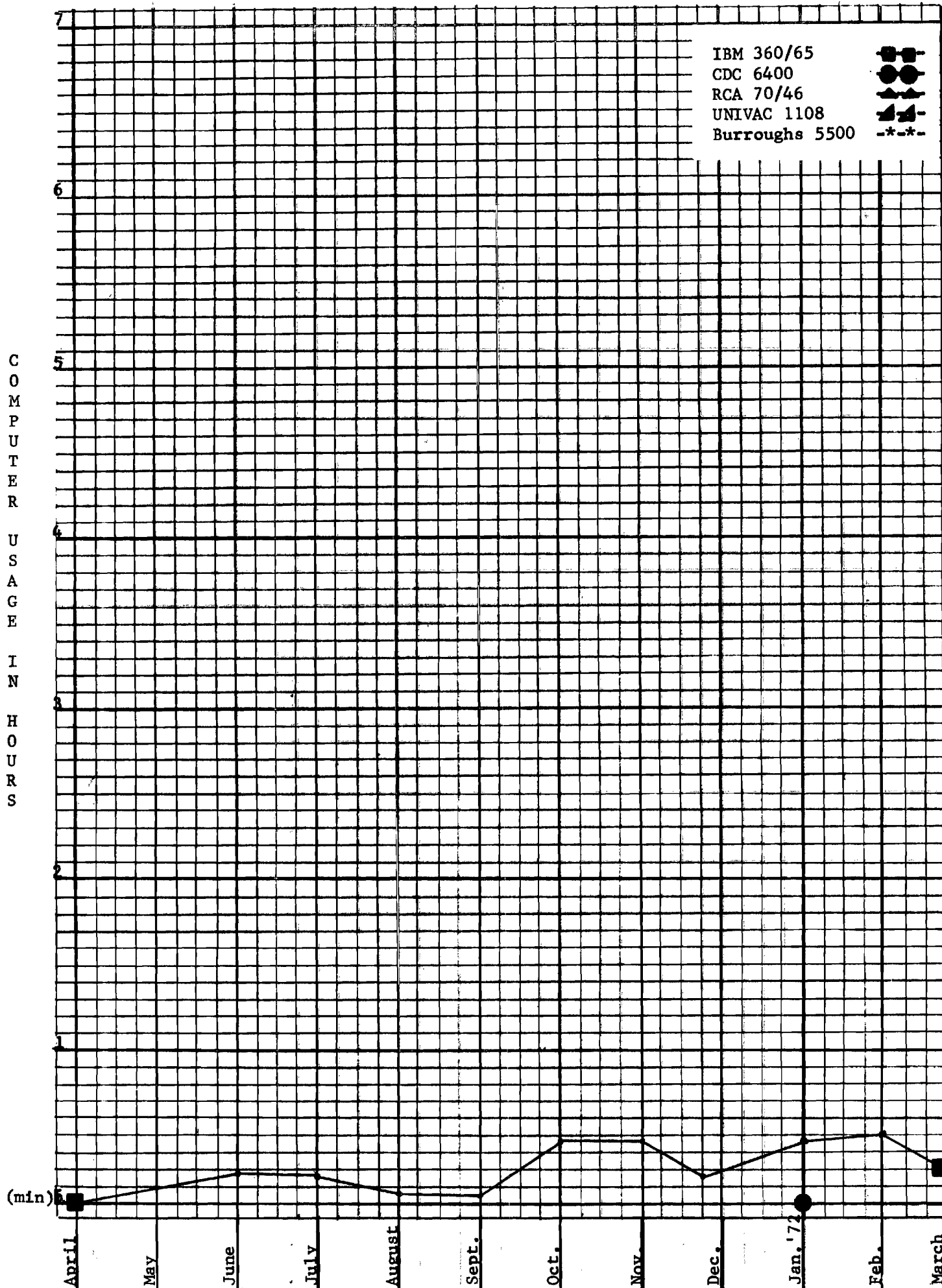
MIDDLE GEORGIA COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		5													
May															
June		17													
July		15													
August		10													
September		8													
October		29													
November		29													
December		16													
January '72		29			5										
February		30													
March		18													
TOTALS	3	26			5										

Remote Equipment: ASR 33

Telephone Line Configuration: Location Access Point Termination  
Cochran Warner Robins Athens

# MIDDLE GEORGIA COLLEGE



## NORTH GEORGIA COLLEGE

M. C. Wicht  
Campus Coordinator

North Georgia College in Dahlonega, Georgia is a senior, coeducational liberal arts institution offering baccalaureate programs in the arts and sciences. In the fall of 1968, two teletypes were installed sharing one FX line to Atlanta, and a contract was signed with a commercial Time-Sharing system. In 1970, two additional teletypes and another Atlanta FX line were added in the fall when North Georgia started using the computer facilities at the three central sites: University of Georgia, Georgia Institute of Technology, and Georgia State University.

At the present time there are four teletypes at three different campus locations at North Georgia, each capable of accessing four computers at the central sites via either of two Atlanta FX lines. These facilities are available for student and faculty usage daily from 7 a.m. to midnight with capable personnel available nearby each location during normal working hours.

A two-hour Introductory Programming Course (several sections offered each quarter and even at night one quarter) and a five-hour Business Data Processing course (about every other quarter) are sources of actual computer programming instruction (Basic is the main language). A course in numerical analysis is offered yearly. Extensive use is made of the computer as an aid to instruction in math, chemistry, and physics courses: analytic geometry, calculus, differential equations, modern algebra, probability and statistics, surveying; general, organic, physical, and analytic chemistry; general physics, mechanics, electricity, electronics, and others.

To inform faculty members with current changes in services and facilities, a local memorandum is issued monthly. Handouts on terminal usage and available public library programs are available for class distribution.

In the area of research, at least three new faculty members (in Physical Education, Political Science, and Psychology) have used the terminals for statistical work for their Ph.D. dissertation. In addition, other faculty members in Math, Physics, and Chemistry have used them for personal research. Several advanced students have worked on programs for labs for their instructors in Business Administration, Physics, Chemistry, and Math, and other students have used the computer for statistical research in various fields instead of doing the computations by hand. There have been several contributions to the Georgia Tech Public Library of programs by faculty members.

The primary use of the computer has been with introductory programming courses and assistance to instruction in other courses.

There is a definite need for more teletype terminals and a Remote Job Entry capability with line printer and card reader. The two main obstacles to more widespread usage are insufficient terminals and apathy and indifference of several liberal arts departments on campus. It would have been to the advantage of North Georgia College to have originally bought the teletypes and a multiplexor; the college plans to do this in the future.

# NORTH GEORGIA COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71								23						5	
May								4						9	
June		9			9			9						2	
July					19				36					20	
August					17									3	
September						16			30					3	
October			18		2			5						5	
November					5			10				6		7	
December					1			3						5	
January '72					1			9			1			3	
February					2			9			1			7	
March					1			2			1			4	
TOTALS		9	18		57	16	1	15	6		3	6		1	13

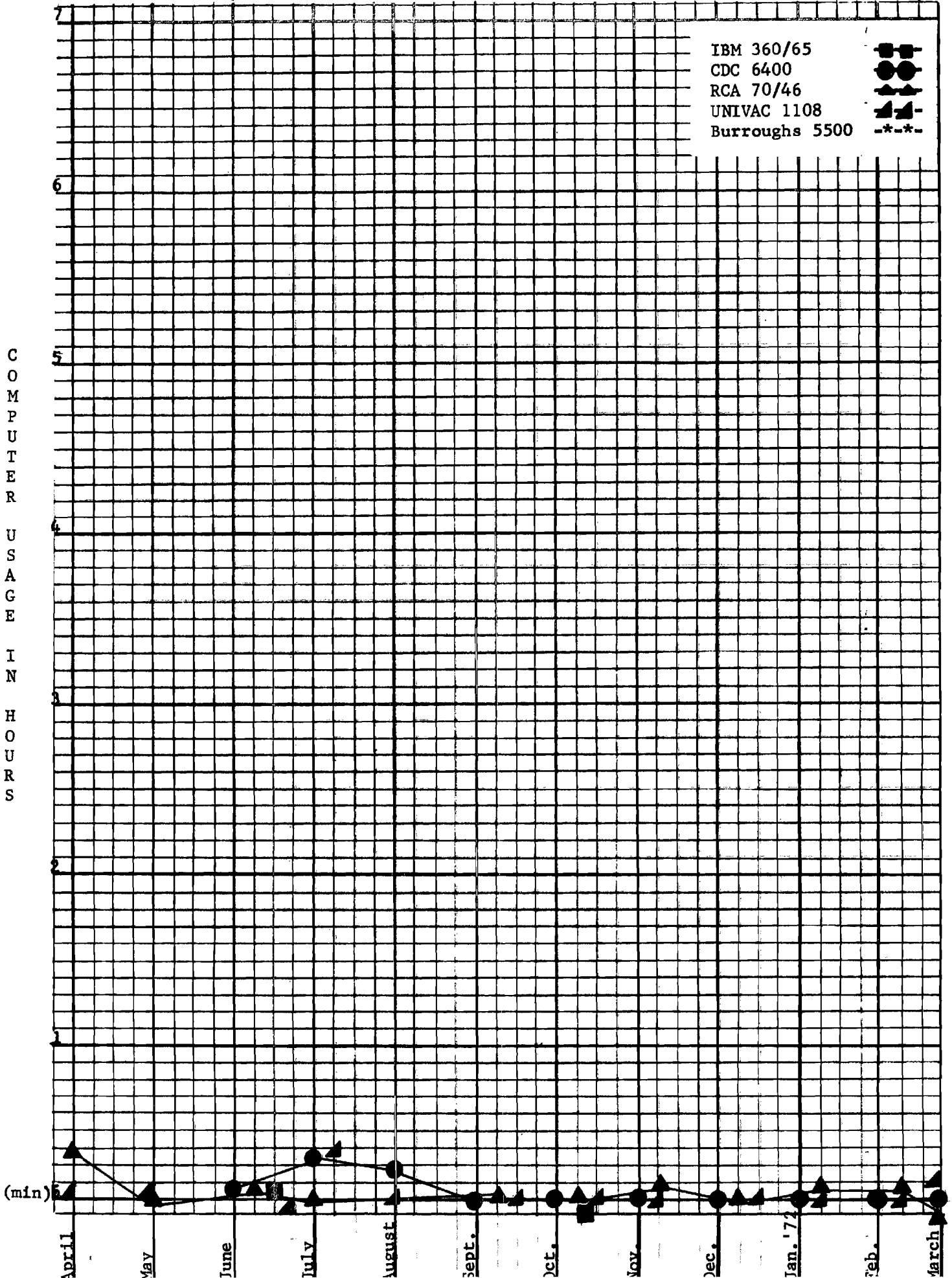
Remote Equipment: (4) ASR 33

Telephone Line Configuration:	<u>Location</u>	<u>Access Point</u>	<u>Termination</u>
	Dahlonega	--	Atlanta
	Dahlonega	--	Atlanta



# NORTH GEORGIA COLLEGE

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Paine College

Grant GJ - 1149

Thomas C. McCain  
Principal Investigator  
Campus Coordinator

During fall semester 1971, there were 19 students enrolled in a course in computer programming (Math 125) at Paine. The IBM 2741 terminal was used by these students at the Medical College of Georgia located across the street from the Paine campus.

An Athens business line and an ASR 33 teletype were installed in December 1971. A computer programming course was offered for nine students during spring semester 1972.

Other courses utilizing the terminal are:

Bio 425	Ecology and Environmental Biology	3 students
Bio 434	Introduction to Biological Research	3 students
Math 120	Basic College Mathematics	27 students

The ecology course used the terminal for computer simulation of population dynamics laboratory. The biological research use was simply for acquaintance with use of the computer, and the mathematics course used the computer to do simple programs to find solutions to problems in basic mathematics.

# PAINE COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71															
May															
June															
July															
August															
September															
October															
November			1			2									
December															
January '72															
February			1			1									
March			1			2									
TOTALS	3			5											

Remote Equipment: ASR 33

Telephone Line Configuration: Location      Access Point      Termination  
    Augusta              Augusta              Athens

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IBM 360/65  
CDC 6400  
RCA 70/46  
UNIVAC 1108  
Burroughs 5500



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April

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Jan. '72

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SAVANNAH STATE COLLEGE

Grant GJ-1042

Martha Wilson  
Principal Investigator  
Campus Coordinator

The physical facilities available for use in the Computer Science Program at Savannah State College include the following:

<u>Unit Description</u>		<u>Hours Available</u>
IBM 1130 Computing System (8K - single disk)		8:00 A.M. - 9:00 P.M.
IBM 1132 Printer		
IBM 1442 Card Read - Punch with synchronous adapter		
IBM 2741 Interactive terminal		8:45 A.M. - 4:45 P.M.
5 Keypunches	Administrative	8:00 A.M. - 4:45 P.M.
1 Verifier	Academic Use	4:45 P.M. - 9:00 P.M.
1 Collator		
1 Sorter	Administrative	8:00 A.M. - 4:45 P.M.
1 Reproducer	Academic Use	4:45 P.M. - 9:00 P.M.
1 Decollator		
1 Burster		

All facilities listed above are available from 9:00 - 12:00 on Saturday for academic use, if desired.

The personnel available for assistance at these facilities includes the following:

- 1 Computer Center Director
- 1 Keypunch Operator
- 6 Student Assistants (15 hrs./wk.)
  - 2 Operators
  - 3 Keypunch Operators
  - 1 Programmer-Operator

1 Instructor - (2/3 Administrative - 1/3 Instructional)

1 Full-time Instructor (on loan from IBM)

Several instructors in the departments of Math, Business, Natural Science and Technical Science.

During the fall quarter, an APL seminar (3 hours per week) was held for Math, Science and Business faculty. During winter quarter, two FORTRAN seminars (3 hours per week) were held for the same groups. Also during winter quarter the Technical Science and Math faculties were encouraged to use COGO (a coordinate geometry program) in class work. A machine design course and an advanced programming course were combined so that the students could write FORTRAN programs to model their machine designs. Presently, the advanced machine design class is using an IBM supplied program for gear design.

The Business faculty, throughout the year, has been encouraged to incorporate marketing and sales simulations on the 1130 in their class work and also to use the programs in the College of Business Administration Library at the University of Georgia using CPS. Due to constraints imposed by shortage of personnel, the Business faculty did not have time to implement this plan. However, one faculty member was encouraged to learn subject matter and teach BAD 301 (winter quarter).

Math and Science faculties have been encouraged by Dr. Leyden and college computer personnel to use CPS/BASIC to illustrate mathematical and scientific principles and problem solving techniques. This is presently being done in Calculus I, II and III, Physics, College Algebra, Trigonometry and Theory of Equations.

The Computer Science courses which have been taught this year are:

Math 306 Basic Computer Programming (FORTRAN)

Math 307 Basic Computer Concepts (Advanced FORTRAN and 1130 Computing System)

Math 499 Mathematical Research

BAD 301 Introduction to Business Data Processing

ACC 440 Accounting Data Processing Systems

The use of APL (4 weeks) was found useful as an introductory approach to the teaching of FORTRAN but was abandoned as being too costly in time utilization of the 1130 console. Some solution to this problem is being sought perhaps through the use of BASIC with the new network arrangement.

Students in Math 307 completed a number of projects which have been useful in making needed administrative applications for the College.

During fall quarter, a seminar for clerical staff was conducted 3 hours per week to promote along this group of personnel an understanding of Data Processing principles. The interest level of faculty, staff and students in Computer Science has remained high throughout the year, especially among the Science and Math departments. The utilization of physical facilities might have been higher if the placement of the interactive terminal could have been changed so that the limitation on budget would not have curtailed its availability. Internal problems of various kinds have continued to impede progress; however, many of these problems are now in the process of being solved and the coming year should be a banner year. Hopefully, more terminals will be strategically placed so that the student body and faculty as a whole may become more intimately involved.

SAVANNAH STATE COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		6													
May															
June		3													
July															
August		1													
September			36												
October		2													
November		5													
December		1													
January '72			9												
February		1													
March		2													
TOTALS		21	45												

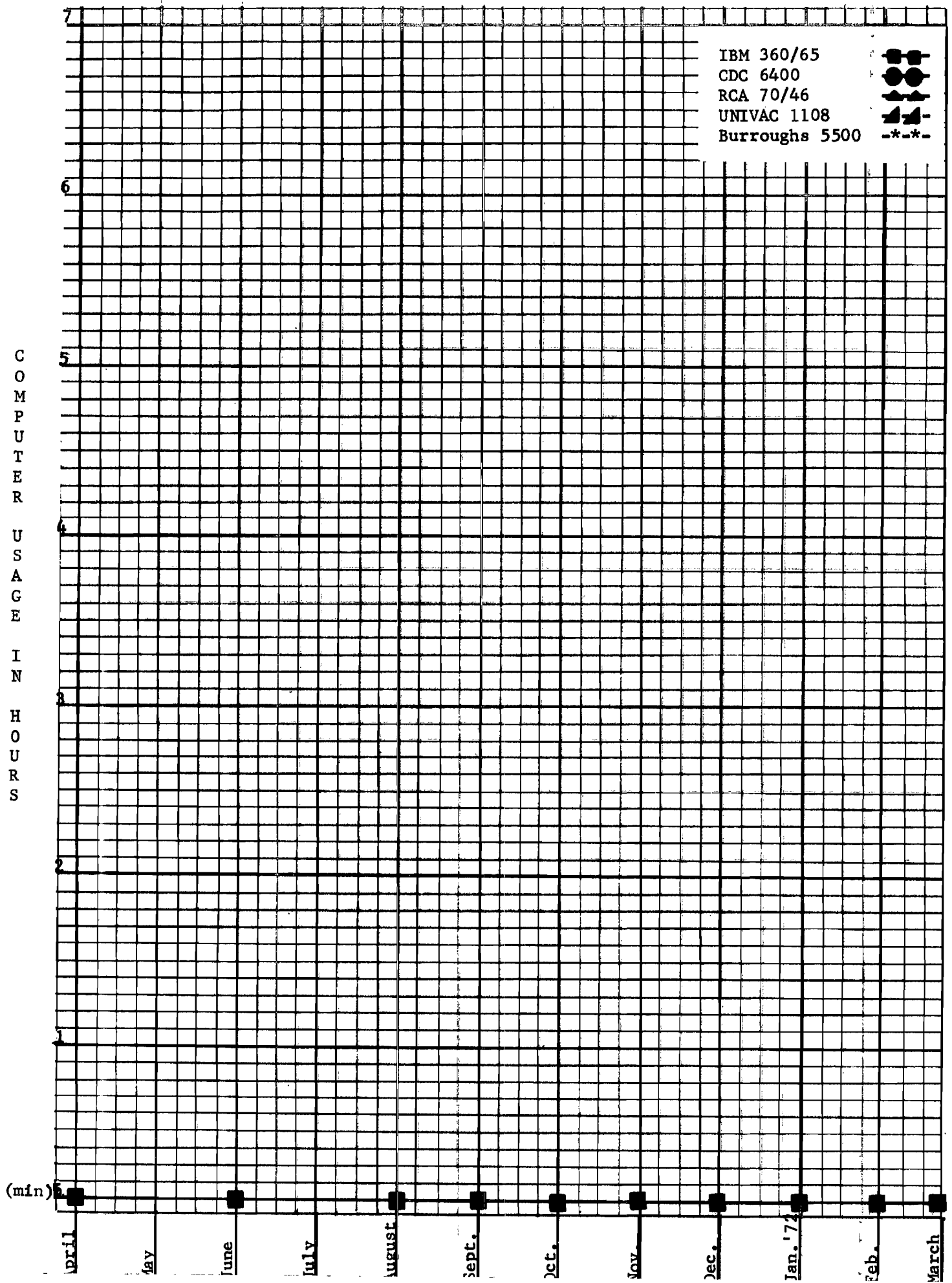
Remote Equipment: IBM 2741 and IBM 1130

Telephone Line Configuration: Location Access Point Termination  
Savannah Savannah Athens



# SAVANNAH STATE COLLEGE

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SOUTH GEORGIA COLLEGE

Grant GJ-1043

Robert R. Johnson  
Principal Investigator  
Campus Coordinator

After a slow and agonizing start in 1970-71, South Georgia College made several changes which dramatically affected the use of the computer capability on the campus. The original terminal selected for Network use was the IBM 1050 with the card reader, and installation was made in the data processing room. Following a year of virtual inactivity on the part of students and faculty, a thorough study was made of the situation. Two things were immediately apparent. In the first place, the 1050 provided access only to the 360/65 at the University of Georgia; the card reader was an unnecessary item of equipment; and the cost of the terminal was excessive, considering the use it received. Secondly, the location of the terminal virtually eliminated any chance that it might be effectively utilized.

To rectify these mistakes, an application was submitted to the Budget Bureau to replace the IBM 1050 with two ASR-33 teletypes with paper tape. The application was approved and installation occurred during the month of October, 1971. One terminal was placed in a classroom of the Division of Business Administration, and the other was placed in a research lab in the Science and Math Building. One communication line is shared by both terminals, but access to the CDC 6400 in Athens is provided (in addition to the 360). A new faculty member knowledgeable in the use of computers joined the Division of Science and Mathematics in September. A faculty member with training and experience in computer operations was put in charge of the terminal in the Business Administration classroom.

Utilization increased immediately. By the end of the fall quarter, the hours of connect time had more than doubled that of any comparable time. The use

of the facilities has increased to the point where instructors are now requesting additional terminals. Availability of the equipment to the students and the faculty is from 8:00 A.M. to approximately 10:00 P.M. Mondays through Fridays.

The Math and Science instructor offered a night course through Continuing Education in the use of the computer. Eight faculty members availed themselves of the opportunity to learn how a computer could assist them in classroom instruction.

SOUTH GEORGIA COLLEGE

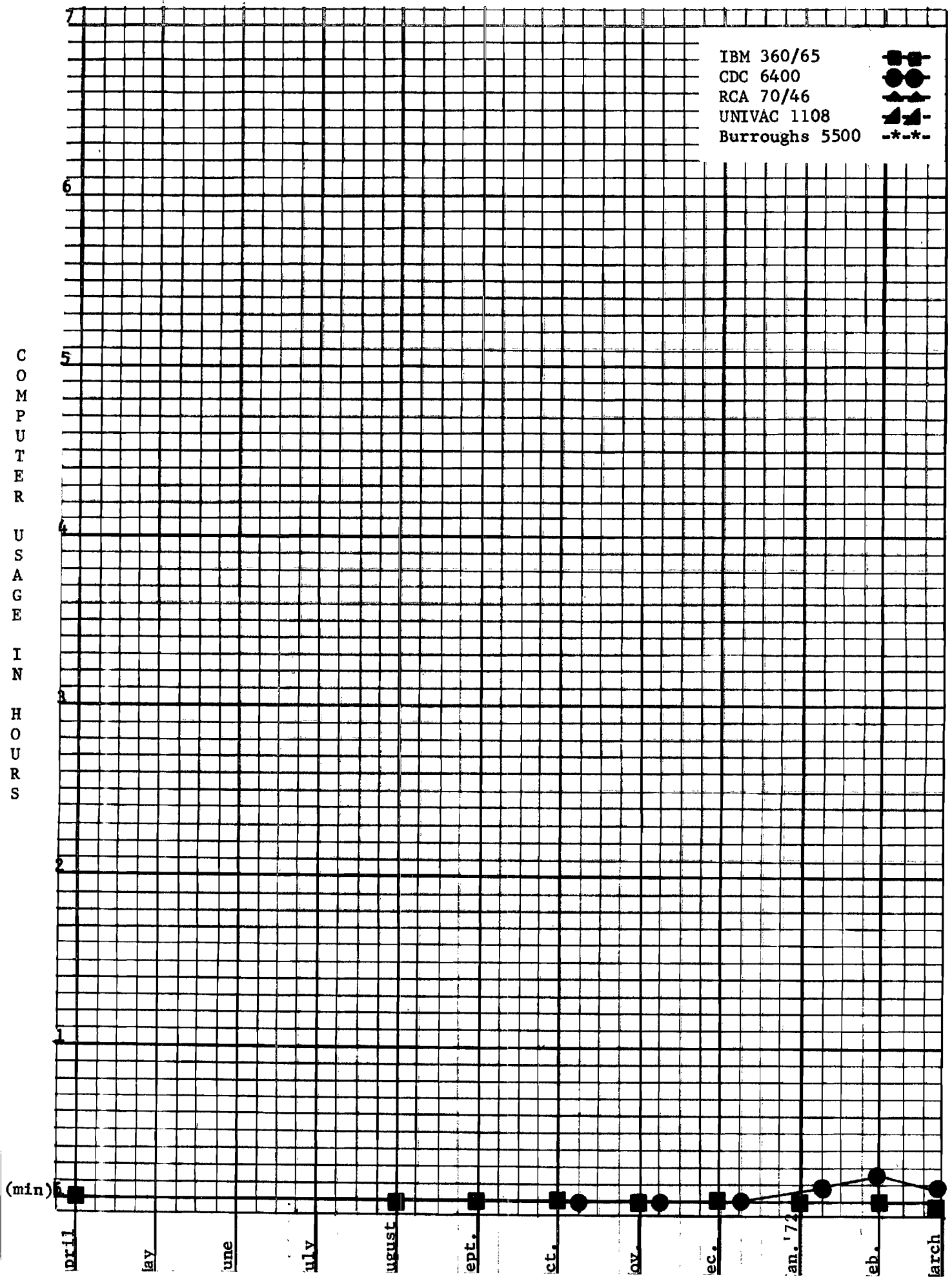
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		1													
May															
June															
July															
August		1													
September		1													
October		2			1										
November		1			3										
December			31		2										
January '72		1			11										
February		1			14										
March		1			6										
TOTALS		9	31		37										

Remote Equipment: (2) ABR 33

Telephone Line Configuration: Location Access Point Termination  
    Douglas      Alma      Athens

**SOUTH GEORGIA COLLEGE**

# COMPUTER USAGE IN HOURS



VALDOSTA STATE COLLEGE

Grant GJ-1044

Sam W. Brooks III  
Principal Investigator

Robert C. Moore  
Campus Coordinator

Computer facilities available for use in the Computer Science program at Valdosta State College include the following:

- One Univac 9200-II
- One ASR 33 Teletype
- One 026 IBM Keypunch
- One 1710 Univac Keypunch
- Three 029 IBM Keypunches
- One 056 IBM Verifier
- One 082 IBM Sorter
- One 085 IBM Collator
- One 514 IBM Reproducer
- One 548 IBM Interpreter
- One 402 IBM Accounting Machine

The Univac 9200 is available for students from 8:00 A.M. to 5:00 P.M., Monday through Friday, and for faculty from 8:00 A.M. to 2:00 A.M., Monday through Friday. The ASR 33 is available for students and faculty from 8:00 A.M. to 2:00 P.M. every day. The phone line is shared by the Univac 9200 and the ASR 33, so it is a cooperative venture at all hours.

Generally speaking, there are two faculty members, one student, and three full-time computer center employees available from 8:00 A.M. to 5:00 P.M. Monday through Friday to assist persons with problems.

To encourage computer use by faculty members, the acting Campus Coordinator taught a seminar during winter and spring quarters, 1972, on Basic Programming open to all faculty. Approximately 15 faculty members and 45 students attended. In addition, the acting Campus Coordinator gave five lectures to a group of nursing majors in Nursing 410.

In addition, several courses use the computer in their work--for instance in Physics, Sociology, Psychology, Business, Accounting, and Marketing.

The following computer science courses have been established:

Math 495-695	Basic Programming
Econ 209	Introduction to Computer and Information Science
Econ 309	Computer Science for Business and Economics
Bus Ad 809	Information Systems
Acct 300	Introduction to Computer Use in Accounting

Student and faculty interest is increasing. Approximately 200 students (out of a student body of 3800) come in direct contact with the computer each quarter and the number is increasing.

VALDOSTA STATE COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		1						9						5	
May		1				4		4						40	
June		1				37		9						9	
July			18			10		7							
August			3			50		2						25	
September			13					1						32	
October		1						10						14	
November			38			13		15							
December			3					1						52	
January '72			19			4		5						18	
February		1			1			3						42	
March			3			58			54					17	
TOTALS		6	37		3	56		1	6	54				4	14

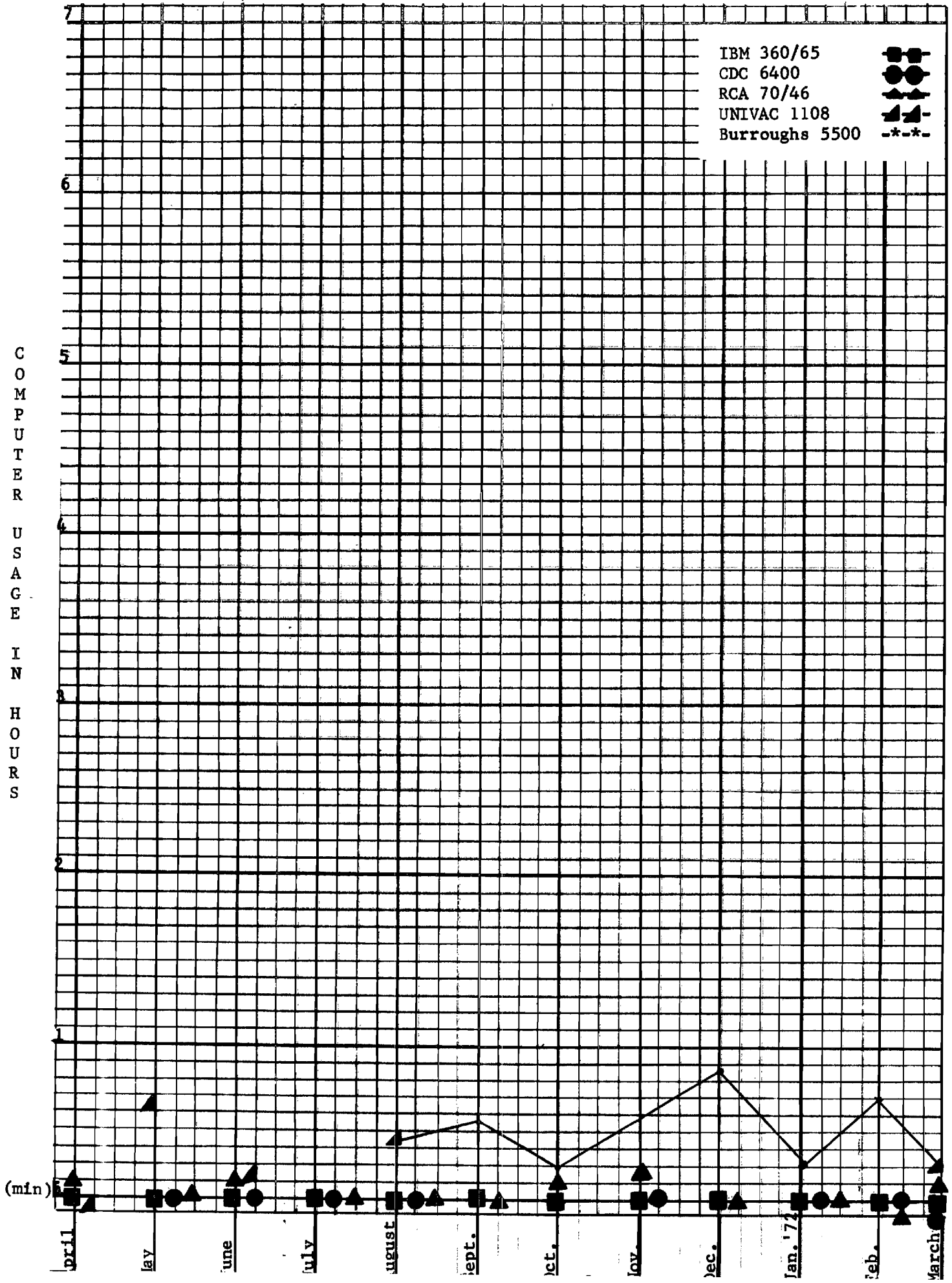
Remote Equipment: ASR 33 and Univac 9200

Telephone Line Configuration: Location Access Point Termination  
Valdosta Valdosta Atlanta



# VALDOSTA STATE COLLEGE

COMPUTER  
USAGE  
IN  
HOURS



WESLEYAN COLLEGE

Virginia Johnson  
Campus Coordinator

The computer facilities on the campus of Wesleyan College consist of an ASR-33 teletype terminal and an Atlanta business phone. The terminal is located in a classroom in the Science building and is readily available to interested faculty and students. Three computers may be accessed through the terminal: the UNIVAC Series 70/7 at Georgia State University, the UNIVAC 1108 at Georgia Institute of Technology, and the CDC 6400 at the University of Georgia. The terminal is available for use to students and faculty from approximately 7:30 A.M. to 10:00 P.M. Monday through Friday. Also, the students may use the terminal on Saturdays during the daylight hours. The only exceptions to the above hours are when the classroom is being used by one of the computer classes. There are generally two faculty members available for assistance throughout the day, and two student assistants are available upon request by the students.

Two members of the Mathematics Department are the only regular faculty users; however, the terminal is used occasionally by three other professors: one in Art, one in Psychology, and one in Biology. It has been difficult to interest other faculty members in the use of the terminal. Dr. Don Leyden of the University of Georgia was invited to the campus to meet with members in the sciences and to discuss applications. The response was poor, and there has been no detectable increase in interest as a result. During February, the Mathematics Department offered a night course in BASIC programming for faculty members. Again, the response was poor, and after the initial interest subsided, there has been little follow-through.

The Mathematics Department offers two sections of a three hour per week course in BASIC computer programming. Each section is limited to 10 students due

to the fact that only one terminal is available for use. The response to this course has been good. It may be taken either for a grade or on a credit/no credit basis.

The terminal is used by several classes in Mathematics at various times. Students who have taken the BASIC course previously continue to use the terminal in other courses, such as Art, Education, and Biology. Three faculty members have used the terminal in their research, two using their own programs and one using canned programs. Efforts to encourage use of the terminal by other faculty members have failed. Lack of interest on the part of the faculty may be due to the fact that the terminal has only been in use on the campus since April, 1971. Perhaps as more and more students use the terminal in conjunction with their work in other courses, their professors will become interested.

Hopefully, another terminal and a course in FORTRAN IV which has been requested by students will be added during the 1972-73 school year. It has been decided to charge a lab fee of \$5.00 per student to help cover expenses.

WESLEYAN COLLEGE

Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71								14							
May															
June									48					1	
July									24						
August									18					2	
September								2						1	
October								10						1	
November						7		16							54
December						12									6
January '72								15						4	
February					1			7						2	
March					2		5	19						35	
TOTALS				3	19		6	24	30					47	

Remote Equipment: ASR 33

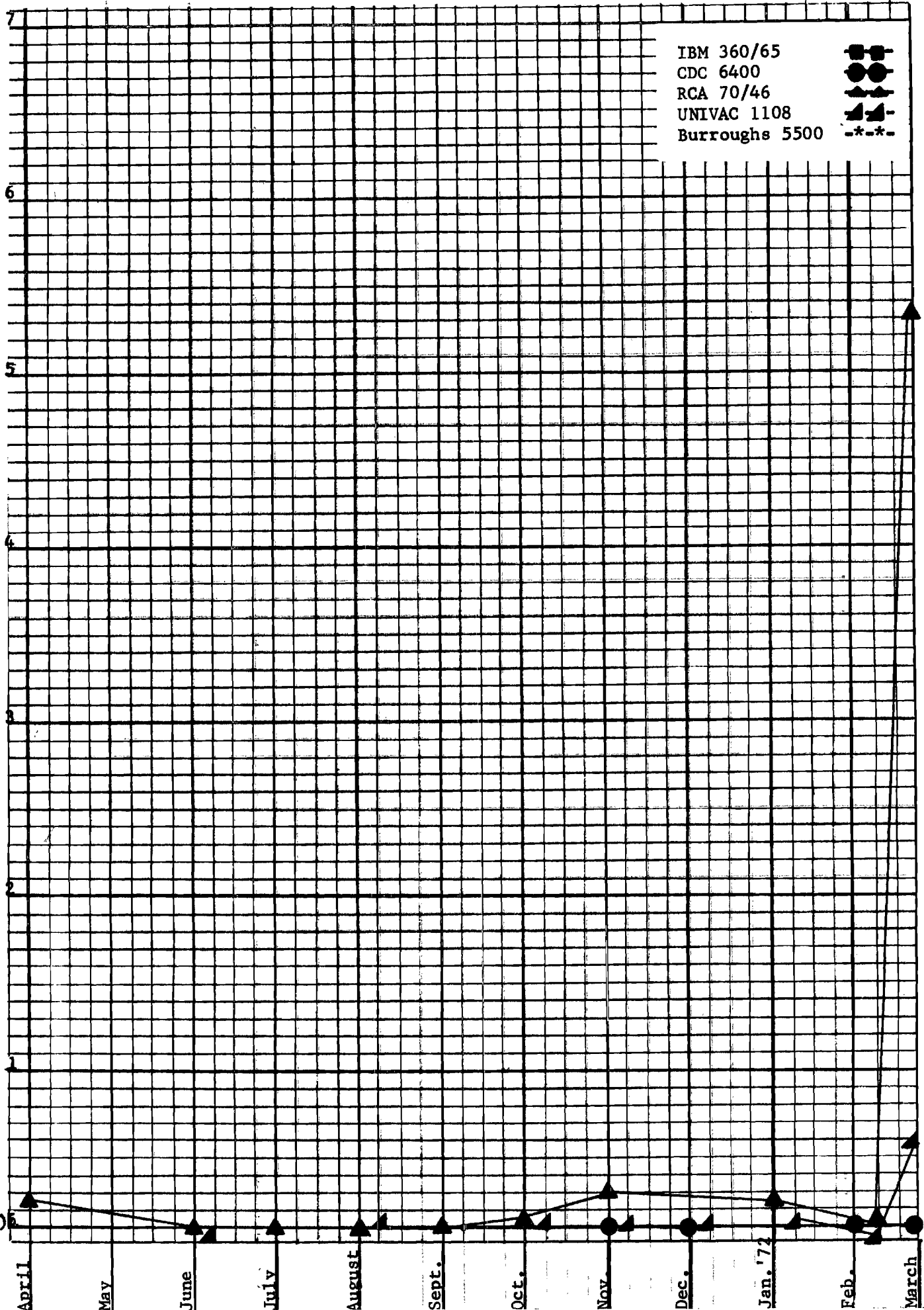
Telephone Line Configuration: Location      Access Point      Termination  
    Macon                      Macon                      Atlanta

# WESLEYAN COLLEGE

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IBM 360/65    ■■■  
CDC 6400    ●●●  
RCA 70/46    ▲▲▲  
UNIVAC 1108    ▲▲  
Burroughs 5500    \*-\*

(min)



## WEST GEORGIA COLLEGE

J. Alan Irby  
Campus Coordinator

West Georgia College is attempting to provide a complete range of computing services to the entire college community. The computing facilities have greatly expanded over the past few years. For batch processing, there is an IBM 360/40 that is utilized for administrative uses as well as instruction and research. Three interactive terminals which are operated through the University System Computer Network form a vital part of the total services provided by the Computer Center.

The Computer Center currently operates the IBM 360/40 on a 24-hour schedule and the interactive terminals are available 16 hours a day. In addition to the staff necessary to support the administrative users, the Computer Center employs full-time staff members who provide consulting and programming assistance to the instructional and research users.

The college offers a large number of Computer Science courses ranging from beginning programming through systems programming and computer organization. The Computer Science courses are taught jointly by the Math faculty and the Computer Center personnel. Students majoring in the sciences may choose a minor in Computer Science. The enrollment in Computer Science courses averages around 150 students per quarter.

The various disciplines within the science area have been using the computer in support of instruction and research for some time. During the past year a large increase in computer use has occurred in the non-science areas as well. Statistical packages have been used extensively, as well as mapping and simulation programs. The heaviest non-science users are from the departments of Accounting, Business Administration, Sociology, Political Science, and Geography.

The Computer Center has been conducting a series of seminars for the past few years. The purpose has been to inform the faculty of ways the computer could be used in their particular disciplines and how the faculty members can best take advantage of the services of the Computer Center. These sessions have been well attended and are responsible for much of the increased computer usage.

WEST GEORGIA COLLEGE

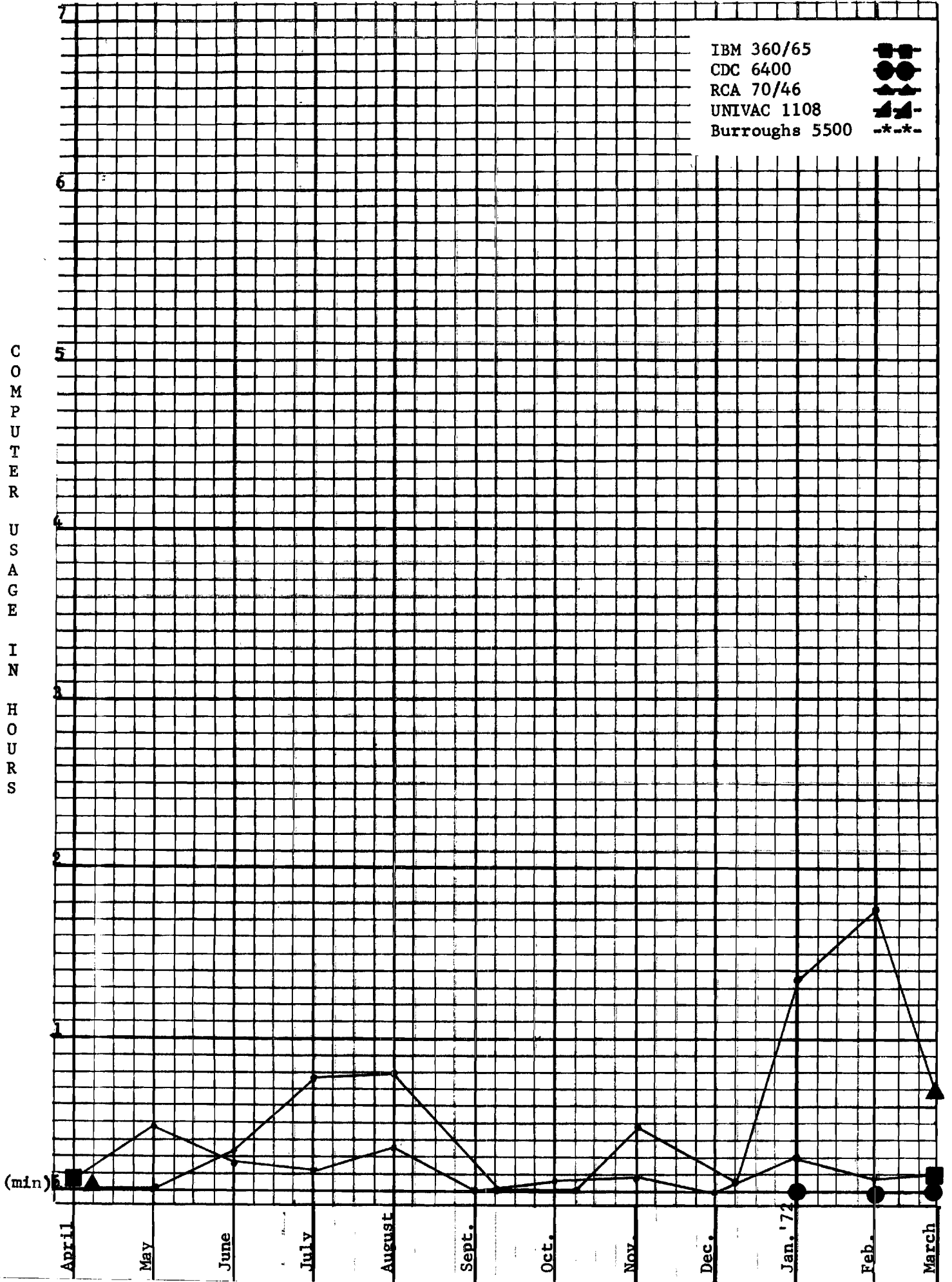
Month	IBM 360/65			CDC 6400			RCA 70/46			Burroughs 5500			Univac 1108		
	Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.			Hr.-Min.-Sec.		
April '71		8						4							
May		28						6							
June		15						19							
July		13						46							
August		20						49							
September		2						4							
October		9						7							
November		10						28							
December		4						8							
January '72		18			6		1	20				48			
February		10			10		1	45			44				
March		11			5			41			23				
TOTALS	2	28			21		6	37		1	7	48			

Remote Equipment: IBM 2741 (2) ASR 33

Telephone Line Configuration: Location Access Point Termination  
Carrollton -- Atlanta



# WEST GEORGIA COLLEGE



**APPENDIX A**  
**CENTRAL SITE REPORTS**

GEORGIA INSTITUTE OF TECHNOLOGY

Grant GJ - 1055

I. E. Perlin  
Principal Investigator  
Computer Center Director

There are now approximately 70 demand mode terminals in use on the UNIVAC 1108. This number is approximately double those accessing the U 1108 at this time last year. Of the 66 110 baud terminals, 28 are Network school terminals. Of the eight 300 baud terminals, four are Network school terminals and three of the five 2000 baud terminals are Network users. To make access easier for these terminals, Rich Electronic Computer Center (RECC) is continually increasing and upgrading its communications facilities with additional data sets and communications terminal modules.

Nine staff members are available for assistance directly to Network users. Assistance has been in the form of programming, operations, and administrative help. In addition to direct contact with users, a series of manual publications have been written and distributed to remote users. They include:

- a. "The B 5500 Time Sharing System Preliminary Notes" - June 1971.
- b. "Numerals -- A Conversational and Nonconversational Numeric Analysis System for the Burroughs B 5500" - August 1971.
- c. "GTL Programmers Reference Manual for the Burroughs B 5500" - December 1971.
- d. "Basis -- Burroughs Advanced Statistical Inquiry System" - January 1972.
- e. "WIPL Users' Manual for the Burroughs B 5500" - February 1972.
- f. "Programmers Reference Manual for the UNIVAC 1108 EXEC 8 Executive System" - revised February 1972.

Other publications include a number of memoranda on user information and a quarterly newsletter, the "RECC NEWS."

The training and assistance to Network users is ongoing, with RECC staff assisting with programming and operations problems.

As was noted in Future Plans of last year's report, a BASIC seminar was conducted at Mercer University in Macon on April 7, 1971. Also, a three-day seminar held in June 1971 on uses of the computers in the classrooms was conducted at Georgia Tech, utilizing classroom instructors experienced in the use of computing for their particular course work and field of study.

On two separate occasions, August 10, 1971, and February 21, 1972, RECC staff members presented at the Coordinator's Conference information on the UNIVAC 1108 and the Burroughs B 5500 such as news, updates, recent developments, and library programs available. In particular, information was presented on the Dartmouth Library which is available on the UNIVAC 1108 for use by interactive terminals at remote sites off campus.

RECC continues to strive to upgrade its system and to inform its users of such and to inform new users of the current system and how to use it. To accomplish these goals for better service, many manuals and memoranda are published as stated above.

Along with the continued support of the Network with hardware, software, and programming assistance, two new manuals are nearing the printing stage with more in the planning and development stage.

GEORGIA STATE UNIVERSITY

William H. Wells  
Campus Coordinator  
Computer Center Director

Georgia State University in downtown Atlanta has made available the time-sharing facilities of its RCA Spectra 70/46 to Network users. In December, 1971, an RCA 7 (now referred to as a UNIVAC Series 70/7) central processing unit was installed at Georgia State, and conversion from the 46 to the more powerful 7 was affected in mid-March. Core memory of the new Series 70/7 is 512K bytes, twice that of the 46, and the 7 is roughly four times faster than the 46.

The establishment of a User's Services Group at the GSU Computer Center in August, 1971, has enabled the Center to provide consultant services for users during all hours when the terminals are up - including weekdays, evenings, and weekends.

There are some 600 programs available to users of the Series 70/7. In addition, the Computer Center has published a good deal of user information. This material includes course outlines utilizing "canned programs" which have been developed at Georgia State in areas which range from Business Administration to the Arts and Sciences. A comprehensive User's Guide to the GSU Computer Center, supplementing the technical manuals from the manufacturer, was distributed to user schools in September. The Center also communicates with its users, internal as well as "remote," by means of a monthly newsletter, THE LINK, which conveys news and announcements to users and includes as "Systems Notes" a selection written by the Systems Programming Department.

During the period covered by this report, Network schools accounted for 4.2% of the total number of tasks performed on the 46 and the 7, and 4.6% of the

total number of connect hours. On the following page, a chart listing these Network users shows the number of tasks run by each school and their total number of connect hours.

With the installation of the UNIVAC 70/7, Georgia State is in an even better position to offer time-sharing services to the Network, and users will find that remote terminal access to the system is greatly improved.

## No. of Tasks

## Connect Time (hours)

Acct. No.	User	April- June	July- Sept.	Oct.- Dec.	Jan.- March	Total	April- June	July- Sept.	Oct.- Dec.	Jan.- March	Total
701	Clayton Jr. Coll.	114	5	46	52	217	33.33	2.23	30.99	40.54	107.09
703	No. Georgia Coll.	284	12	133	153	582	60.63	1.87	31.37	50.92	144.79
704	Valdosta State Coll.	155	89	148	107	499	57.30	32.57	41.55	22.37	153.79
705	Abraham Baldwin	35	21	40	38	134	14.85	8.43	37.87	38.51	99.66
706	Ga. Tech - Sou. Tech.	292	3	67	2	364	107.56	0.40	28.39	2.42	138.77
708	Armstrong State	348	52	173	480	1,053	87.32	12.68	38.96	146.45	285.41
709	West Georgia Coll.	96	252	230	855	1,433	43.55	90.02	72.90	384.12	590.59
711	Ga. Coll. Milledgeville	116	7	6	25	154	66.77	5.47	0.92	9.63	82.79
717	Dalton Jr. Coll.	32	1	22	24	79	14.40	0.08	6.37	4.75	25.60
718	Floyd Jr. Coll.	0	0	96	47	143	0.00	0.00	52.97	22.63	75.60
723	Kennesaw Jr. Coll.	117	29	58	25	229	38.32	8.72	20.73	5.25	73.02
731	Mercer Univ.	65	29	33	10	137	38.02	7.73	10.05	1.02	56.82
732	Clark College	98	0	0	91	189	65.30	0.00	0.00	66.96	132.26
733	Wesleyan College	102	19	51	202	374	66.00	6.93	18.68	42.49	134.10
TOTALS		1,854	519	1,103	2,111	5,587	693.35	177.13	391.75	838.06	2,100.29

UNIVERSITY OF GEORGIA

Grant GJ - 1054

Lu Penn  
Campus Coordinator  
Computer Center Director

James L. Carmon  
Principal Investigator

Several additions and significant modifications have been made to the University of Georgia's Computer Center equipment resources during the past year.

In November 1971, a CDC 6638 disk replaced one of the 6603 disks on the CDC 6400.

In December 1972, a CDC 23141 multi-spindle disk drive was installed on the IBM 360/65. This addition provides much needed on-line storage capability for remote schools utilizing the 360/65.

Equipment for a tie-line connecting the CDC 6400 and IBM 360/65 was installed in January 1972. This equipment attached to the CDC 6400 included a CDC 6681 Data Converter, A CDC Peripheral Processor, a Data Channel, a CDC 3266 Communications Terminal Controller, a CDC 311 Data Set Adapter, and two CDC 358 Transceivers.

The reconfigured CDC 6400 computing system plays two roles:

- 1) a front-end processor to the IBM 360 for the Network remote batch terminal, and
- 2) a remote station itself to the IBM 360.

As a front end processor, the 6400 offers the remote user the capability of submitting jobs to be processed by either computing system.

The Computer Center staff through User Services provides telephone consulting to Network users and seminars, workshops, and consulting on the local



campuses coordinated through the Network central office. Major assistance is in the areas of problem and control languages, debugging teleprocessing procedures, and running "canned" programs. Additional help is provided on direct access management and documentation maintenance. Also, on a more limited basis, assistance is provided on a systems level for program applications, i.e., logical organization, file handling, etc.

Seminars on bibliographic search services have been used to introduce these services on remote campuses throughout the Network. Presentations and remote demonstrations of the on-line text search system have been given at Georgia Institute of Technology, Georgia State University, Mercer University, West Georgia College and Georgia College.

Documentation on a computer language, AMTRAN (Analytical Mathematical Translator), developed by Computer Center staff is now available to Network users. A new extended version of the system, which includes disk storage of programs and global variables, has been implemented during the year. This version functions in only 8K of 16 bit word core and exceeds in capability any presently available small computer implementation of any interactive programming language. A new language, SIGMA (System for Interactive Graphical Mathematical Applications), was defined during the summer of 1971, and an implementation of it for the CDC 6000 series is under development at CERN in Switzerland. In a cooperative effort, a research scientist from CERN will join the Computer Center staff for the summer of 1972 to implement an AMTRAN computer on the CDC 6400. Within the Network, schools with IBM 1130's have become enthusiastic AMTRAN users.

Publications produced by the Computer Center staff for Network distribution include:

The "Bulldog Byte," a monthly newsletter containing user information on operating systems, schedules, subroutine packages, etc.

"BMD Programmer's Guide," - March, 1972.

"Permanent File Management System for the CDC 6400," - March, 1972.

"Functional Specifications for the CDC 6400 - to - IBM 360 Interface," - May, 1971.

"A concept by Concept Description of the AMTRAN Language," - November, 1971.

"AMTRAN 70, Proceedings IFIP Congress 71 Ljubljana, Yugoslavia," - 1971.

"Some Applications of AMTRAN," - November, 1971.

"CPS User Load/Save Analysis," - January, 1972.

"6400 INTERCOM V3 Users Guide," - November, 1971.

**APPENDIX B**  
**COMPUTER REQUIREMENTS**  
**COMMITTEE REPORT**

REPORT  
OF  
COMPUTER REQUIREMENTS COMMITTEE  
OF  
UNIVERSITY SYSTEM COMPUTER NETWORK

Submitted  
November 19, 1971

The report is divided into three areas:

- A. A summary of the required hardware.  
A formula to calculate hardware requirements  
for any campus.
- B. A cost budget for hardware and communications  
for 1972-73 and 1973-74.
- C. Recommendations.

Computer Requirements Committee

Dr. Ouida Dickey - Berry College  
Dr. Leonard Daniel - Clayton Junior College  
Dr. Bill Dalton - Fort Valley State College  
Mr. Bill Smith - Dalton Junior College  
Mr. Al Irby - West Georgia College  
Dr. Russell Helm - Georgia Southern College  
Mr. Dale Sherman, Chairman - Abraham Baldwin Agricultural College

COMPUTATION OF HARDWARE REQUIREMENTS  
FOR ACADEMIC USE ONLY

USERS	NUMBER OF STUDENTS		HOURS PER DAY
	YEARLY	QUARTERLY	
Introduction to Computing	4,443	1,388	(1) 463
Computer Science Courses	4,106	1,283	(2) 171
Casual Users	14,383	4,495	(3) 374

- (1) 1388 users @ 20 min = 27,760 min = 463 hours per day  
 (2) 1283 users @ 2 jobs per day = 2566 @ 4 min per job =  
 10,264 min = 171 hours per day  
 (3) 4495 @ 5 min = 22,475 min = 374 hours per day

Total number of low speed devices:

Introduction to Computing	463 hours
Casual Users	<u>374</u> hours
Total	837 hours

837 hours divided by 6 hours per day per teletype = 140 teletypes

Total number of medium speed devices:

Computer Science Courses      171 hours

171 hours divided by 8 hours per day per device = 22 terminals

# COMPUTER REQUIREMENTS COMMITTEE

## ENROLLMENT DATA FOR 26 INSTITUTIONS

YEAR	TOTAL ENROLLMENT	TOTAL USERS
1970	58,000	6,700
1973	63,489	23,051

### 1973 USERS

<u>TYPE</u>	<u>YEARLY</u>	<u>QUARTERLY</u>
Introduction to Computing	4,522	1,413
Computer Science Courses	3,899	1,215
Casual Users	14,640	4,575

## STANDARD PROFILE PER 1000 STUDENTS ENROLLED

### Option A:

Introduction to Computing	1.12 Keyboard Terminals
Casual Users	0.91 Keyboard Terminals
Research-Faculty	0.30 Keyboard Terminals
Computer Science Courses	0.40 Batch Terminal

### Option B:

Introduction to Computing	0.34 Batch Terminal
Computer Science Courses	0.40 Batch Terminal
Research-Faculty	0.10 Batch Terminal
Casual Users	0.91 Keyboard Terminal

## REFERENCE TABLE Terminal Hardware (per 1K enrolled students)

<u>Function</u>	<u>Low Speed</u>		<u>Medium Speed</u>
Intro	1.1	or	0.3
Casual	0.9		N.A.
Hard Core	N.A.		0.4
Research	0.3	or	0.1
Admin (non-Fiscal)	N.A.		0.3-0.6

COLLEGE	ENROLLMENT 1972	LOW SPEED		MED SPEED OR MAIN FRAME		COMMUNICATION LINES		TOTAL HARDWARE & COMMUNICATIONS
		#	AMOUNT	#	AMOUNT	#	AMOUNT	
Abraham Baldwin	2,300	5	3,900	1M	46,000	6	19,200	69,100
Albany Junior	1,607	3	2,340	1S	21,600	4	10,320	34,260
Albany State	2,259	4	3,120	1S	21,600	5	10,320	35,040
Armstrong State	3,181	3	2,340	1S	21,600	4	10,560	34,500
Augusta College	3,110	5	4,680	1S	21,600	7	8,604	34,884
Brunswick Junior	975	2	1,440			2	5,376	6,816
Clayton Junior	2,600	3	2,340	1S	21,600	4	2,400	26,340
Columbus College	3,900	4	3,120	1M	46,000	5	8,100	57,220
Dalton Junior	1,200	2	1,560	1S	21,600	3	8,448	31,608
Floyd Junior	990	2	1,560			2	2,256	3,816
Fort Valley State	2,625	4	3,120	1S	21,600	5	11,100	35,820
Gainsville Junior	1,200	2	1,560	1S	21,600	3	3,228	26,388
Georgia College	2,208	4	3,120	1S	21,600	5	16,260	40,980
Georgia Southern	6,500	0		1L	67,000	3	12,000	79,000
Georgia Southwestern	2,740	3	2,340	1S	21,600	4	6,212	30,152
Kennesaw Junior	1,909	3	3,600			3	900	4,500
Macon Junior	1,900	3	2,340			3	3,528	5,868
Middle Georgia	2,200	4	3,120	1S	21,600	5	9,360	34,080
North Georgia	1,350	3	2,340	1S	21,600	4	13,824	37,764
Savannah State	2,600	5	3,900	1S	21,600	6	13,316	38,816
South Georgia	1,300	3	2,340			3	8,640	10,980
Valdosta State	3,700	7	5,460	1S	21,600	8	23,040	50,100
West Georgia	6,400	6		1L	172,000	6	8,000	180,000
Berry College	975	4						
Clark College								
Wesleyan College	491	2						
		87	59,640		633,400		214,992	908,032

In MED SPEED or MAIN FRAME under #, S=small, M=medium, L=large. This is not indicative of the normal way computers are classified, but in relation one college to another.



1973

COLLEGE	ENROLLMENT 1973	LOW SPEED # AMOUNT	MED SPEED OR MAIN FRAME # AMOUNT	COMMUNICATION LINES # AMOUNT	TOTAL HARDWARE & COMMUNICATIONS
Abraham Baldwin	2,500	7 5,460	1L 132,000	8 81,680	219,140
Albany Junior	1,738	4 2,120	1S 24,000	5 12,192	39,312
Albany State	2,406	5 3,900	1M 46,000	6 12,192	62,092
Armstrong State	3,493	7 5,460	1S 24,000	8 50,160	79,620
Augusta College	3,235	6 4,680	1M 46,000	7 27,760	78,440
Brunswick Junior	1,025	3 2,540	1S 21,000	4 11,712	35,852
Clayton Junior	3,000	3 2,540	1S 24,000	4 2,400	28,940
Columbus College	4,391	5 3,900	1M 70,000	6 9,528	83,428
Dalton Junior	1,300	3 2,340	1S 24,000	4 10,944	37,284
Floyd Junior	1,080	2 1,560		2 2,256	3,816
Fort Valley State	2,750	6 3,120	1S 24,000	7 15,156	43,836
Gainesville Junior	1,275	2 3,900	1S 24,000	3 3,228	28,788
Georgia College	2,372	4 3,120	1S 24,000	5 16,260	43,380
Georgia Southern	6,850	5 3,900	1L 95,000	6 10,980	109,868
Georgia Southwestern	3,054	4 3,120	1S 24,000	5 9,452	36,572
Kennesaw Junior	2,100	4 4,800		4 1,200	6,000
Macon Junior	2,000	3 2,340		3 3,528	5,868
Middle Georgia	2,350	4 3,120	1S 24,000	5 9,360	36,480
North Georgia	1,550	4 3,120	1S 24,000	5 17,040	44,160
Savannah State	2,750	5 3,900	1S 24,000	6 13,316	41,216
South Georgia	1,400	3 2,340	1S 21,600	4 12,380	36,320
Valdosta State	4,070	8 6,240	1M 46,000	9 25,820	78,060
West Georgia	6,800	8	1L 192,000	8 10,000	202,000
Berry College	1,050	4			
Clark College					
Wesleyan College	550	2			
		111 77,740	934,200	368,532	1,380,472

In MED SPEED or MAIN FRAME under #, S=small, M=medium, L=large. This is not indicative of the normal way computers are classified, but in relation one college to another.

## Computer Requirements Survey Committee Recommendations

The Committee would like to take this opportunity to commend those persons who were instrumental in the organization of the Computer Network. Those persons at each individual unit of the University System of Georgia are also commended for their mutual support and cooperation since both of these are essential in making a large system such as this Network a workable one. It is the Committee's desire that this Computer Network continue to function under the University System of Georgia and that all means be used to further increase its growth and general usefulness.

Three major items were considered by the Committee in formulating its recommendations. The first item considered was the necessity of providing adequate computer equipment for the individual state universities and colleges. The second was to implement and encourage more efficient usage of this equipment by all units. The third basic item considered was the provision of an economically efficient system. The Committee's recommendations are categorized into the following areas: Network Organization and Administration, General Network Modifications, and Applications.

### I. Network Organization and Administration

#### Recommendation I-A

The Committee recommends that the present hierarchical structure of the Network based on a Campus Coordinator representative from each unit be continued and special advisory committees be appointed as needed. It is recommended that the Campus Coordinator body act as a representative body and the feelings (obtained as a majority vote) of this body be considered in all major decisions involving the Network.

#### Recommendation I-B

It is recommended that the role of Campus Coordinator be specified. In order that each unit operate effectively, the Committee recommends that each Campus Coordinator be a person experienced in the field of computing. Further, it is strongly recommended that the Campus Coordinator be employed on a 12-month basis with 50% released-time from teaching duties and that he have sufficient staff and budget to develop the individual unit's capacity to the fullest. It is further recommended that the technicians responsible for the computer operation be employed on a 12-month basis.

#### Recommendation I-C

It is recommended that equipment scheduling be maintained at each unit to better facilitate the usage of the computer by all divisions of the unit. A detailed log reflecting the various uses of the computer at each unit should be kept in order that priorities can be established when necessary.

#### Recommendation I-D

It is the considered opinion of the Committee that all facilities at each unit, particularly support equipment such as keypunches, be made available to personnel and students for academic use for as long a period each day as necessary. This period should be at least equal to that of the unit's library hours of operation and longer when possible.

#### Recommendation I-E

The Committee recommends that each private college of the State on application be included as part of the University System Computer Network.

#### Recommendation I-F

It is recommended that the University System Computer Network give support to and work closely with the secondary school systems throughout the State in

curriculum development and other areas of mutual interest. It is further recommended that each unit work closely with the local secondary school system in the automation of administrative processes such as registration and record keeping. It is recommended that computer services be provided on an available computer time basis to the local secondary school systems.

## II. General Network Modifications

### Recommendation II-A

It is the opinion of the Committee that the communication load increase from the various units to the central site will require major changes in the present communication linkage and distribution of computer capacity within the Network. It is recommended that each unit have some stand alone capability and that a sufficient number of secondary sites be established with concentrator line-transmission to a larger central site as well as to all other secondary sites. It is recommended that transmission from all units either terminate by choice at a secondary site or pass through a secondary site to the central site.

### Recommendation II-B

It is the considered opinion of the Committee that a central site and a number of secondary sites necessarily must be established with the central site not located on any campus. The location of the central site should be chosen on the basis of economic operation and service to all units. Further, this central site as well as each secondary site should be of such physical size as to provide for adequate computing equipment and for further expansion. The central site should have sufficient computing equipment to provide for the projected usage that will be required of it. Further more, this central site should have sufficient staff to carry on operations as well as the educational requirements of the Network.

It is further recommended that hardware and communication specifications for the unified network system be written. It is also recommended that those specifications be written with the expressed intent that all hardware be obtained from a common manufacturer. It is recognized that this will provide a basis for expecting a lower bid proposal from computer equipment manufacturers. It is recommended that all computer equipment expenditures be made directly by the University System of Georgia on behalf of all of its units. The use by all units and the various secondary sites of equipment of a common manufacture increases system compatibility and will facilitate equipment transference between units as necessary.

### III. Applications

#### Recommendation III-A

The Committee recommends that a concerted effort be made by all units to establish a comprehensive data base, such as the one the Western Interstate Commission for Higher Education (WICHE) has recommended. This data base should be as uniform as possible among all units and should include all facets of the college administrative structure. The immediate initiation of this program is strongly recommended by the Committee, since sufficient computer facilities are now available to each unit throughout the Network.

The Committee further recommends that each unit make use of its equipment and the Network in developing a strong and comprehensive administrative data processing system. This system should be, as far as possible, standard throughout the University System for the following reasons:

- a. To allow for the sharing of computer programs and system analysis work.
- b. To facilitate the orderly flow of required data from one unit to another.
- c. To make use of the talents of those persons who are knowledgeable throughout the University System.

Recommendation III-B

It is recommended that a concerted effort be made to establish a uniform core curriculum in Computer Science throughout the University System of Georgia.

Recommendation III-C

The Committee recommends strongly that efforts by all units be made in utilization of computers as instructional aids in all courses where feasible. It is further recommended that an evaluation of the use in college courses of Computer Assisted Instruction (CAI) be made.

Recommendation III-D

It is strongly recommended that an effort be made by the University System of Georgia to initiate a Statewide program on Curriculum development, utilizing the computer where feasible.

COMPUTER REQUIREMENTS SURVEY

Institution \_\_\_\_\_

Date Prepared \_\_\_\_\_

President \_\_\_\_\_

Campus Coordinator \_\_\_\_\_

		<u>Estimate</u>		
<b>FALL ENROLLMENT</b>	<b><u>1970</u></b>	<b><u>1971</u></b>	<b><u>1972</u></b>	<b><u>1973</u></b>
Number of students in 1st or 2nd years	_____	_____	_____	_____
Number of students in 3rd or 4th years	_____	_____	_____	_____
Number of graduate students	_____	_____	_____	_____
Total	_____	_____	_____	_____
 <b>FACULTY</b>	 <b><u>70/71</u></b>	 <b><u>71/72</u></b>	 <b><u>72/73</u></b>	 <b><u>73/74</u></b>
Total Number	_____	_____	_____	_____
Number who will use computers for their research work	_____	_____	_____	_____
Number who will teach computer science courses	_____	_____	_____	_____
Number who will use computers in other courses	_____	_____	_____	_____
 <b>COURSES (From Attached Worksheets)</b>	 <b><u>70/71</u></b>	 <b><u>71/72</u></b>	 <b><u>72/73</u></b>	 <b><u>73/74</u></b>
Computer Science (CS):				
Total number of students registered for an introductory programming course	_____	_____	_____	_____
Total number of students enrolled in other CS courses	_____	_____	_____	_____
Non-Computer Science:				
Total number of students enrolled in courses which use the computer	_____	_____	_____	_____
 <b>TOTAL</b>	 _____	 _____	 _____	 _____

ADMINISTRATION (Indicate the appropriate data processing code for each function)

70/71

71/72

72/73

73/74

Data Processing Codes

M=Manual

B=Bookkeeping or Calculating machine

N=NCR 500 type

T=Tab equipment

R=Remote processing thru Network

C=Stand-alone computer

O=Outside contract

NA=Not Applicable

Function

Admissions

Registration

Grade-reporting

Transcripts

Institutional Research

Alumni

Housing

Library Acquisitions

Library Circulation

Student Accounts

Financial Aid

Budgeting

Personnel Records

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ADMINISTRATION (continued)

70/71

71/72

72/73

73/74

Data Processing Codes

M=Manual

B=Bookkeeping or Cal-  
culating machine

N=NCR 500 type

T=Tab equipment

R=Remote processing  
thru Network

C=Stand-alone computer

O=Outside contract

NA=Not Applicable

Function

Accounts Receivable

Accounts Payable

Payrolls

General Ledger

Purchasing

Auxiliary Enterprises

Physical Facilities

General Inventory

Vehicle Control

Student Activities

Others \_\_\_\_\_

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EQUIPMENT	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>	<u>73/74</u>
Number of NCR-500 or equivalent	_____	_____	_____	_____
Number of Tabulating Machines	_____	_____	_____	_____
Number of Terminals:				
Low-speed (TTY, etc.)	_____	_____	_____	_____
Medium-speed (2780's, etc.)	_____	_____	_____	_____
Number of Computers:				
Communicating with Network	_____	_____	_____	_____
Non-Communicating	_____	_____	_____	_____
PERSONNEL (EFT - Including Student Assistants)	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>	<u>73/74</u>
Managers and/or Supervisors	_____	_____	_____	_____
Computer Programmer/Analysts	_____	_____	_____	_____
Computer or Terminal Operators	_____	_____	_____	_____
Unit Record Operators	_____	_____	_____	_____
NCR 500 Operators	_____	_____	_____	_____
EXPENDITURES	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>	<u>73/74</u>
Cost of all Data Processing equipment including peripheral and unit record:				
Annual payment if purchase	_____	_____	_____	_____
Annual payment if lease	_____	_____	_____	_____
Annual maintenance cost	_____	_____	_____	_____
Annual Personnel Cost	_____	_____	_____	_____
Annual Cost of Supplies	_____	_____	_____	_____
Data Communications	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____
INCOME	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>	<u>73/74</u>
Institution Funds Available	_____	_____	_____	_____

Please attach a statement of goals and descriptive summary of computer requirements.

### Other Academic Courses

70/71

## 71/72

## 72/73

## 73/74

**TITLE**

HOURS

**Fall**

## Winter

## Spring

## Summer

**Total**

**Fall**

## Winter

## Spring

## Summer

Total

**Fall**

## Winter

## Spring

## Summer

Total

Fall

## Winter

# Spring

## Summer

**Total**

TOTAL

**TOTAL**

TOTAL

TOTAL

### Computer Science Courses and Hours

## 70/71

Fall	Winter	Spring	Summer	Total
------	--------	--------	--------	-------

71/72

Fall	Winter	Spring	Summer	Total
------	--------	--------	--------	-------

72/73

Fall	Winter	Spring	Summer	Total
------	--------	--------	--------	-------

73/74

	Fall	Winter	Spring	Summer	Total
1960-61	87	100	100	100	387
1961-62	100	100	100	100	400
1962-63	100	100	100	100	400
1963-64	100	100	100	100	400
1964-65	100	100	100	100	400
1965-66	100	100	100	100	400
1966-67	100	100	100	100	400
1967-68	100	100	100	100	400
1968-69	100	100	100	100	400
1969-70	100	100	100	100	400
1970-71	100	100	100	100	400
1971-72	100	100	100	100	400
1972-73	100	100	100	100	400
1973-74	100	100	100	100	400
1974-75	100	100	100	100	400
1975-76	100	100	100	100	400
1976-77	100	100	100	100	400
1977-78	100	100	100	100	400
1978-79	100	100	100	100	400
1979-80	100	100	100	100	400
1980-81	100	100	100	100	400
1981-82	100	100	100	100	400
1982-83	100	100	100	100	400
1983-84	100	100	100	100	400
1984-85	100	100	100	100	400
1985-86	100	100	100	100	400
1986-87	100	100	100	100	400
1987-88	100	100	100	100	400
1988-89	100	100	100	100	400
1989-90	100	100	100	100	400
1990-91	100	100	100	100	400
1991-92	100	100	100	100	400
1992-93	100	100	100	100	400
1993-94	100	100	100	100	400
1994-95	100	100	100	100	400
1995-96	100	100	100	100	400
1996-97	100	100	100	100	400
1997-98	100	100	100	100	400
1998-99	100	100	100	100	400
1999-00	100	100	100	100	400
2000-01	100	100	100	100	400
2001-02	100	100	100	100	400
2002-03	100	100	100	100	400
2003-04	100	100	100	100	400
2004-05	100	100	100	100	400
2005-06	100	100	100	100	400
2006-07	100	100	100	100	400
2007-08	100	100	100	100	400
2008-09	100	100	100	100	400
2009-10	100	100	100	100	400
2010-11	100	100	100	100	400
2011-12	100	100	100	100	400
2012-13	100	100	100	100	400
2013-14	100	100	100	100	400
2014-15	100	100	100	100	400
2015-16	100	100	100	100	400
2016-17	100	100	100	100	400
2017-18	100	100	100	100	400
2018-19	100	100	100	100	400
2019-20	100	100	100	100	400
2020-21	100	100	100	100	400
2021-22	100	100	100	100	400
2022-23	100	100	100	100	400
2023-24	100	100	100	100	400
2024-25	100	100	100	100	400
2025-26	100	100	100	100	400
2026-27	100	100	100	100	400
2027-28	100	100	100	100	400
2028-29	100	100	100	100	400
2029-30	100	100	100		

**TITLE**

HOURS

TOTAL

TOTAL

TOTAL

TOTAL

APPENDIX C

REPORT ON  
INSTRUCTIONAL UTILIZATION

A Report on  
The University System Computer Network  
Instructional Utilization

Donald E. Leyden  
Department of Chemistry  
University of Georgia  
Athens, Georgia

Introduction:

This report was prepared after one day visits to fifteen of the twenty nine colleges and junior colleges in the University System Computer Network. It is planned that each campus in the network will be visited by March 15, 1972. The project was entitled "Chemistry and Science Winter Quarter Project". The initial purpose of these visits was to provide assistance and advice to faculty in chemistry and other physical science areas related to the utilization of computer facilities in undergraduate instruction. However, it became rather obvious that the problems pertaining to lack of use of these facilities were much more complicated than anticipated, and that delivery of some free computer programs and consultation with the faculty was not the answer. Although each campus has unique features and problems, a general, deeper set of problems exists. By in large, the local problems and their solutions are meaningless unless the broader ones are solved first. An oversimplified, but operational, statement of the problem is lack of faculty and student utilization of the facilities. Assuming the goal is to obtain broad spectrum use of the computer facilities now available on each campus for undergraduate instruction, the problems as seen by these visits will be outlined in detail, and recommendations based upon hours of discussion with faculty, students and Campus Coordinators will be made.

It should be made clear that this report is not concerned with use of the computer facilities for administrative purposes. In addition, the utilization of the facilities for select projects or by small groups is not considered. By in large, these groups use only a small percentage of available time on the facilities. The report is written by a teacher who has used computers in teaching in support of teachers who would like to use computers in teaching. It is the conviction of the author of this report that the remote computer terminal is the most useful teaching device since the adoption of the blackboard.

A statement of the problems:

1. According to the information obtained in private conversation with the Campus Coordinators, approximately 2-5% of the faculty utilize the presently available computer facilities in any way related to their teaching effort. To state an isolated example of the magnitude of the waste, one Campus Coordinator stated that with the exception of a few hours per week of administrative use he had a \$2,200 per month toy. He was as concerned about this problem as anyone. Many Campus Coordinators, however, write off the problems by stating there is a general apathy or lack of interest on the part of the faculty. In certain cases I am sure this is true. However, let us explore the situation. The most obvious initial users of computers are faculty members in the physical science areas. This is in part because they deal with numerical problems in the classroom and laboratory. By using the computer, they may introduce material

in more quantity because of time saved when the student does computations on the computer. They may introduce greater quality because the student can solve problems that might otherwise be extremely time consuming or complicated. If this is true, why are these faculty members not using the computers? At these colleges, the normal teaching load is 15 contact hours (generally, three courses). Under an ideal situation, a chemistry professor will have only one laboratory section for each course. This means he lectures three hours per day three days per week and operates (he has no assistants) 9 hours of laboratory two days per week. Under these ideal conditions, he has a total of twenty-seven (27) contact hours per week. Usually, though, there is more than one laboratory section per course so that he has 33 or 39 contact hours per week. These people ask only for the time required to introduce computers and develop programs in relation to their teaching. It is not a lack of interest in these cases, as much as a lack of experience coupled with an honest lack of time. There are exceptions, of course.

Now consider a faculty member in humanities. For example, a language or social science professor has a fifteen hour load. He lectures three hours per day five days per week. No time was allotted for the chemistry professor for preparation; therefore, the language professor has a comparable load of 15 contact hours per week. Why does he not use the computer facilities? In my visits, not one language, history or other humanities professor on a campus of a State Institution came to talk with me. Most state flatly that computers cannot be used in their field. They do not have the



awareness of what others in that field are doing. This is only partially their fault. There has not been a mechanism for making them aware.

In summary, to simply accuse the faculty of lack of interest to justify the low utilization of the local facilities is only a partial truth. Equally important is the fact that time incentive and education of the faculty have not been provided, at least not in a successful way.

2. Approximately 10% of the student body have gained access in any way to the computer facilities. This is in line with the faculty utilization. For example, two faculty members in Business Administration may be active users. They may have a total of 150 students which amounts to 10% of the student body on campus. At the same campus, students in math, chemistry, physics, etc., may not use the computer at all.

3. As illustrated by the above example, there is a tendency to have a small group of users on each campus. The discipline may vary between colleges. The user group is frequently the original group which participated in the campus NSF proposal two years ago. There is apparently some type of barrier established which prevents other disciplines from using the facilities. This barrier is frequently imaginary.

4. This so called faculty apathy does have some basis for justification. There was no academic involvement at the start so that teachers who were experienced users could consult with faculty members in their respective disciplines. The entire Network was established

with a built-in bias in favor of the previous user. In an attempt to correct this, teams or individuals of computer programmers were sent for short courses or even one day lectures on computer programming. These presentations were completely over the head of the novice faculty member and did nothing to help him. Much worse, the presentations so overwhelmed many of them that they were permanently frightened away from any further efforts to help them. Even yet, the emphasis at many of the sites is on programming rather than utilization. The simple fact is that one can be a very poor computer programmer and still make effective use of the computer. As an example, at one campus I spent approximately three hours in a small room with four faculty members in chemistry. Only one of these people had prior experience with computers. A major portion of the time was spent discussing the philosophy of using computers in teaching chemistry. One faculty member proposed a specific problem from freshman chemistry and asked what he could do with a computer to better illustrate that problem. In less than ten minutes we had written a program. One week later the Campus Coordinator reported to me that this faculty member had written eight computer programs for use by freshmen students, another had written five, and that students in a physical science course were preparing their own programs.

5. The system of "Campus Coordinators" is not working. This I believe to be a major source of the problems in the present organization of the Network. There are some reasons:

(A) Some of the appointed Coordinators are exceptionally qualified; however, they are completely overloaded. As an example,

there is one young Coordinator whose training would qualify him for a position in a major university in a better job market in his field. His present assignment includes teaching the usual 15 hour load, preparing a major administrative program, acting as Campus Coordinator, and serving on an important committee for the Network. What can be expected of this man in terms of counseling and assisting his faculty?

(B) There are cases of what I call, for lack of a more descriptive term, "flunky" appointments. These are usually first or second year instructors or assistant professors who may have had no prior computer experience. At one campus, the President told me that he did not support the computer facilities on his campus. I was told by the faculty that the President had made clear to them that if and when the college was called upon to provide financial support of the facilities, he would not do so. The Campus Coordinator at that college was one of the most concerned and cooperative I have met. Yet he has little background in computer utilization and cannot help his faculty. I am suspicious that this type of appointment is made by those administrators who do not want these facilities on their campus. These decisions may be based on legitimate budget priorities.

(C) A third situation which seems to create problems is appointment of administrators as Campus Coordinators.

On these sites, the Coordinator may have what appears to be one or more full-time positions already, such as Dean, Registrar or Comptroller. These Coordinators are properly more concerned with administration than instruction, and may not be in a position to relate to the problems of the faculty. In at least one case such as this, an assistant is appointed to keep things going. However, this assistant has no administrative control over decisions concerning use or hardware selection and distribution.

(D) Finally, the Campus Coordinator's quarterly meetings are apparently accomplishing very little. The attendance is less than desirable. In discussion with some of the Coordinators, the typical agenda was criticized. I have attended only one of these meetings. I found nothing of value in the presentations to help solve any of the problems which exist. I believe the criticism has a legitimate basis. I, in turn, criticize the Campus Coordinators for not demanding more informative meetings.

6. Perhaps one of the greatest faults in the Network is the lack of a mechanism for exchange of experiences between sites, and particularly between active faculty users. In fact, there is no "network". There are twenty-nine colleges or junior colleges which have been provided with computer facilities in various degrees and from various vendors. There is no standardization of hardware. There is no common library so that programs at one campus may be utilized at another campus. There was once a call for programs so

that a library could be started. A few schools or individuals responded, but there was no follow-through by the Network. This, of course, was discouraging to everyone. Not only is there no sharing of experience or developments, but worse, there seems to be an almost open antagonism between the sites. There are two sites in one town which are five miles apart. Both colleges are on the Network. Both have large installations. Both are paying roughly \$21,000 per year for the facilities. Neither has significant instructional utilization. Administrative utilization amounts to a few hours per week. As far as I could ascertain, there is no communication between these sites. In a second city, there are three sites which behave in a similar fashion.

The above comments give only a description of the general view of the University System Computer Network. This Network represents a massive expenditure of State and Federal funds, which could well be utilized in many different areas such as teaching devices of a different nature, laboratory equipment badly needed at some colleges (and universities), and faculty salary increases so that better qualified faculty could be recruited. However, other states have effective computer networks. They are not to be considered a luxury in modern education. The variety and number of applications of computers leads to the inescapable conclusion that it is our responsibility to include them in the educational process. Georgia students must compete with graduates of other institutions for jobs in a tightening economy. It may come to the point that a girl may get a job in an airlines reservation office because she is already

familiar with the use of a computer terminal, whereas her competitor is not. Think then, of the chemists, engineering students, business students, information science students (modern librarians), and others who will be out of the competition without knowledge of computer utilization. In short, a decision is needed. Is the State of Georgia in a position to support computer utilization for undergraduate instruction? If the answer is yes, then we should have the best. If not, divert the fund to other pressing educational needs.

Recommendations:

Based upon conversations with faculty, Campus Coordinators, directors and assistant directors of computer centers, and my personal experience and observations, as well as some knowledge of other computer networks in the country, I present the following recommendations for consideration. These recommendations are intended as a first step. They are more a reorganization and evaluation than a call for massive additional funds. They are not directed at unique campus problems which must be approached on an individual basis, but rather at the operation and organization of the network.

1. The first step is to notify the faculty and local administrators whether it is the intent of the University System to keep the Network. Many people see no reason to initiate programs because of the pending termination of NSF support. The rumor factory is working overtime that many sites will lose their computer facilities in April of 1972. Of course, the remaining recommendations are based upon the assumption that the Network will be maintained.

2. I have used the term network in this report, but I have implied earlier that in fact there is no network. No recommendation or change in organization will bring about broad utilization of the present local campus hardware unless one major and extremely important change is made. That change is to place the entire Network on one computer. Operationally, I understand that this may in fact be several computers which appear as one to the user. The user should not be concerned as to how it is done, but it must be done. The University System Computer Network is the only one known to me which attempts to operate from more than one site. We have four computers located at three sites with colleges connected to them in a spaghetti like fashion. These computers are from four different vendors. Again, there is no standardization. There is no common library for the Network. Equally important, these computers are located at the major universities. The priority of service to the Network cannot be expected to be at the top. Instead, these computers must serve a variety of functions, and the centers are understaffed. Therefore, reorganization at this level is foremost. All other recommendations are secondary.

3. The Network office should have some number of Academic Counselors for Computer Utilization. These must be experienced teachers, not professional computer personnel. A minimum number seems to be two, one in sciences and one in humanities. Others in professional areas such as

business would be desirable. The purpose of these positions would be to provide initial information for the faculty member who wants to use the computer but does not know how or what has been done by others. This person should coordinate the development of program libraries in his areas. These positions may only be needed for one or two years to get the system going. Preferably, the personnel should be chosen from Georgia colleges as they can relate much better to the faculty, hardware, and Network than individuals from other schools and major universities. No one person should hold the position for more than a year, for he will rapidly lose contact with faculty problems. And, the Academic Counselors should be on leave from their campuses.

4. A faculty incentive program should be initiated. The problem as discussed above is time. The facilities are, by and large, present on each campus. I propose that funds be made available in the Network office to support 10-20 faculty members one-third time for one quarter each year. The individual faculty member would submit a written proposal to the Network which would be reviewed by a committee of faculty selected from the Network under the supervision of the Academic Counselor. The awards would be based upon the evaluation of the applicant's ability, the quality of his proposal, and the usefulness of his project to the betterment of the Network. Duplication of effort could be monitored. This or some other form of incentive will be



required. The local administrators are not accepting (perhaps under the present work load format) this type of activity as justified work load.

5. A more rigorous advising of hardware selection and distribution on the local campus is desirable. Under the format of the NSF support, each campus has the right to select its hardware and personnel. I support this principle.

I have commented on the personnel above. Equal problems exist with hardware selection. Most of the time this is a simple case of not knowing what is available. For example, those sites which have stand-alone equipment (such as an IBM 1130 or Univac 9200) frequently use their communication line to one of the large computers one or two hours per day. At the more remote sited,the line may cost \$200 per month. For an additional \$65 per month, a teletype may be placed in a given department and use the otherwise unused line. For undergraduate instruction, the teletype device is what is needed. (The exception to this is business and data processing areas.) Some sites are paying approximately \$25 per month for a Telephone Company device which could be replaced with an equally good (and perhaps more reliable) device for \$15 per month. At one campus, we estimated that by making such changes, the campus could obtain an additional communications terminal for approximately \$15 per month. The distribution of the teletype devices is critical. At one campus, a department which was involved

early in the Network and doing things of interest with a communications terminal had this terminal removed from their department to the computer center in spite of their protest. The utilization dropped and has remained low. A computer center, no matter how small, is a hostile environment for a student. The advantage of the inexpensive communication terminals is that the student and faculty can utilize a computer in their own house. This is very important.

6. A central purchasing facility should be established which would purchase hardware on a larger scale. This would result in huge savings. A central warehouse for teletypes should be available so that distribution based upon need and continued utilization can be more flexible.

7. A subscription journal or newsletter such as "Georgia Journal of Computer Applications in Undergraduate Instruction" should be initiated with the subscription rate adjusted to cover the costs of production. The Chancellor may suggest that publication in this newsletter be given appropriate consideration when evaluating faculty. (Not applicable to the major universities). This newsletter would serve several purposes. Hopefully, it would stimulate healthy competition among faculty. If properly accepted, the newsletter could provide a meaningful end to the efforts of a faculty member, which efforts would otherwise go unrecognized. The number of subscribers would be measured by the degree of interest in ~~computer utilization~~.

Summary:

This report represents essentially the opinions obtained by one person in conversation with many people. I believe it represents an accurate report of the current status of the Network. It was written in a rather informal way in an effort to state the situation clearly and with specific examples. Some of these examples may be challenged as to whether they apply generally to the Network. Of course, they do not. However, these examples do represent types of problems which were encountered. The problems encountered were not those expected upon embarking in this project. To solve these problems, a stronger degree of cooperation and communication between the top administrative level and the faculty will be required.

**APPENDIX D**

**PROGRESS AND PLANNING REPORT - MARCH 1972**

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Progress and Planning Report-March 1972

Overview

This month marks the end of two years of NSF funding to support the University System Computer Network. The overall progress of the Network will be described in the next report to NSF, but certain factors have become obvious, and are relevant to plans for growth and development.

The central factor is the economic inhibition caused by maintaining five computer systems to support Network users.

This plan proposes to align all users and Network support activities towards the CDC 6400 at the University of Georgia. Implementation date is September 1, 1972.

Initial Policy

The Network was conceived as a cooperative venture by the University of Georgia, Georgia Institute of Technology, and Georgia State University to meet the computing requirements of smaller institutions at the lowest possible cost. Initially, these requirements were undefined, but the Network was to provide assistance and assure an orderly development. Although several institutions had a head start and were ready to use the Network for administrative data processing, the majority concentrated on developing an academic program in accordance with the goals of the NSF funding which made the Network possible.

Ideally, the smaller institutions might have been served by a central computer system dedicated to that purpose. The low volume expected and the high costs associated with establishing a separate service center indicated that this was not feasible. The three supporting institutions had a limited amount of computer time available on each of four different computers, but none had enough time available to support the Network independently.

Within these constraints, the concept of universal access evolved. Since each of the four supporting computers had some special features in addition to the common capabilities, and each of the potential users were unsure of their requirements, the Network was established as four overlapping networks. In most cases, the equipment and communications system enabled a user at a smaller institution to gain access to more than one supporting machine and in many cases all four. Each user had the capability of "shopping" among these machines for the type and quality of service that satisfied his need. The costs associated

with this structure were not significantly greater than if the institutions had been arbitrarily assigned to only one of the machines.

This policy provided a great variety of service to the user and enabled the supporting sites to provide service without a major upgrade of their systems. This policy made the task of coordinating these activities more difficult, but the goal of low-cost service was met.

### Development

The equipment installed at the smaller institutions was of two types, an inexpensive, low-speed keyboard device used very much like a typewriter, and a medium-speed, batch terminal (in some cases associated with a small computer) which usually required a machine operator to interface between the user and the Network equipment. In general, the larger schools acquired the batch equipment and the others, the keyboard devices. This method of equipment was logical because the cost effectiveness of batch processing exceeds that of keyboard (i.e., interactive) operations.

The primary thrust of the Network was to support instructional and research activities, and as the participating units gained experience, it was noted that each type of equipment attracted different types of users.

There is no doubt that computers have had a significant impact on our society, and the student of today should have an opportunity to gain an understanding of this phenomenon. In the instructional area, each institution must consider the establishment of an introductory course in Computers and Programming. Most of the Network institutions currently offer this course under a variety of labels. It appears that either batch or interactive processing is a pedagogically sound method.

Some institutions have developed additional courses and implemented complete programs in data processing or computer science. These programs require a batch capability which may be supplied locally or obtained remotely through the Network. An institution which depends solely on interactive computing is poorly equipped to embark on this type of program.

The largest instructional market for Network services exists within the established disciplines where these services may rank with audio-visual equipment, library services and blackboards as instructional tools. Although computing services were initially used in mathematics and physical sciences, their usefulness in other disciplines has been realized. In this activity the low-speed interactive terminals are much more effective than batch services.

A computer can be effectively used by students to increase their comprehension of subject matter, and they are equally helpful to faculty members engaged in research activities. The research requirements are more specific and varied; i.e., a social scientist who wishes to analyze questionnaire data

would find a batch terminal appropriate; however, a keyboard device within his department would be more desirable for calculations, testing models, etc.

A criticism of the Network is that the equipment has not always been suited to the emerging requirements. It appears that the common need is for interactive support of established disciplines and the popular courses in insufficient low-speed devices to meet this need before considering a batch terminal. To support educational programs low-speed terminals must be as accessible to faculty and students as pencil sharpeners or even blackboards.

### Batch Operations

In institutions which have special research requirements, data processing programs or advanced administrative data processing systems, a batch operation is essential. These needs must be determined and the costs associated with local and Network processing must be compared.

In some situations - as is already the case with the larger institutions - significant local hardware is appropriate. Others are using a combination of local and remote batch processing. A third category consists of schools without a local computer which are processing large amounts of administrative and instructional work on a remote batch basis using one or more of the supporting sites.

In addition to an institution's local administrative requirements, the campus is called upon to supply information to the Chancellor's office as part of its reporting function, and in turn, to receive directional information from the Central Office. Under the present procedures it is not feasible to exchange this information over the batch network, but current planning may soon produce a standard reporting system which would make this possible.

The batch applications being considered are an automated interface system which allows campus users better access to the Georgia Information Dissemination Center (GIDC) at Athens and the feasibility of joint library operations which would interlock with the activities of GIDC.

Batch operations appear to be dependent on local institutional emphasis, such as research, data processing and computer science programs, or the design and funding of external supporting programs. Until more information becomes available on external programs, each institution must independently evaluate the feasibility of batch operations.

### Present Structure

During the last year, a CDC 6400 has been added to the list of supporting computers. These facilities currently provide service to 29 campuses including five private institutions. Two additional private institutions are planning to participate, and as new colleges become operational during the next few years, the number served will approach 40. The terminal equipment located at the remote sites consists of 13 batch and 39 low-speed circuits - all standard voice-grade lines - used to transmit data.

Three of the supporting sites are in Atlanta and two are in Athens. Each remote location has one or more communication lines which terminate in these cities. Assuming that the remote equipment is compatible with facilities at the supporting site (which is not always valid), the user has the ability to dial the telephone numbers associated with the computers in the city where his line terminates. There are also five circuits which connect computers in Athens with the Atlanta exchange. This intercity link enables some users who terminate in Atlanta to access the machinery in Athens.

Some of the lines which terminate in Atlanta are actually attached to the State of Georgia Centrex System. This enables users to take advantage of the OUTWATS long distance dialing capability of the Centrex System and thereby connect to Athens equipment as well as the sites in Atlanta.

Although the number of line terminations is evenly divided between Athens and Atlanta, many of the lines which terminate in Atlanta can also access equipment in Athens. Lines which terminate in Athens are restricted to the equipment at the University of Georgia.

Even though the Network circuits are routed through Federal (GSA) Telpak wherever possible, the actual communications costs are far above the theoretical costs of transmission. One area for consideration is the volume of traffic. A recent sampling of the daily usage of these circuits ranged from 30 minutes to 3 hours per school day. At these levels it is more economical to acquire the service on a full-time basis than to incur the charges of direct distance dialing. In theory, however, there is much capacity that we are paying for, but not using.

Excess capacity also exists on those circuits which connect low-speed devices to the supporting sites. These devices transmit at less than 300 baud (bits per second) over a voice-grade line which has a capacity of at least 2000 baud. Although additional expense would be associated with putting as many as 16 or 18 low-speed devices on one line, the resulting "multiplexed" circuit would use much more of the line capacity. Sub voice-grade lines which have recently become available under GSA offerings may provide an answer to this mismatch.



In multiplexing, it is appropriate to assume that all of the terminals which share the same line are located in the same exchange. More often in our case the terminals are scattered and different equipment is required for "multidropping". This method strings the terminals around the State like lights on a Christmas tree.

There are several techniques available which could reduce the communications costs of the Network, but they all require that computing services be supplied from one center. There does not appear to be any way to significantly reduce these costs and maintain the present five network configurations.

#### Utilization and Costs

Network utilization during the six month period Oct. 70 - May 71 was at a monthly rate of 7.75 cpu hours of CDC-6400 equivalent time. For the same period a year later, usage was at a monthly rate of 12.33 hours. Eighty percent of this usage was on computers at the University of Georgia. Using a linear projection, usage during 1972-73 will be 20 hours per month, but normally this growth rate is exponential, and a monthly usage rate of 44 hours should be anticipated. This cushion for growth and peak loads is also justified by estimating the effect of the periods when the academic community is not on campus.

Many of the participating institutions are non-residential and even those which have campus housing are noted as being "suitcase colleges". The result is that the 44 monthly hours of cpu time are required during the 22 non-weekend days of each month.

To continue the CDC-equivalency, the CDC 6400 is currently serving users at a monthly cpu rate of 115 hours. If all of the Network usage was added to the present load of the CDC 6400, the Network usage could amount to 30% of that systems workload - and more during prime time, the weekday, daylight hours.

Under the present structure, each of the five supporting computers must be geared for Network use. Consolidation of Network services into one machine should reduce the total cost of support.

The cost of the current usage (12.33 hours per month at \$300 per hour) is \$3700 per month. The pro rata share for each institution is \$128 per month. The cost of communications is currently \$9400 per month. Divided evenly between the 29 participants, this amounts to \$325 per month. This cost includes telephone companies, GSA, Georgia Building Authority, etc. for equipment and services.

The combined cost of communications and computer time is \$453 per month for the average user. This does not include the cost of local terminals and supplies, or any of the necessary supporting activities of the central sites. NSF communications funds have contributed \$3700 per month, but this resource will be depleted by June 30, 1972.

### Critical Reviews

The most complete report of the Network is the "First Annual Report to the National Science Foundation" which covers the activities from April 1, 1970 - March 31, 1971. Since that report several observers and groups have studied the Network's progress and problems.

A Computing Requirements Committee was established which submitted its report to the Assistant Vice Chancellor for Computing Systems in November 1971. It stated that the Network requirements for equipment would approach 140 low-speed devices and 22 batch terminals by the end of the two-year study period. Among several general recommendations it proposed consolidation of the Network services into one machine.

In December, the Governor's Reorganization Team reported on Network activities and proposed consolidation into one machine. It also stated that the Network approach was cost effective and should be "funded, fostered, expanded and perpetuated".

In January, a committee of representatives from the six largest institutions recommended that a central site be established.

In February, Dr. Don Leyden reported on Instructional Utilization following a two-month study and strongly recommended consolidation and standardization.

All of these reports are available and their common thrust is one machine to service the Network users. The response is to reconfigure the Network during July and August 1972 and support all users on the CDC 6400 at Athens.

The decisions must come from the users. Are the institutions convinced that there is a need for computing services which can best be served by a co-operative approach? Are they prepared to support a Network and participate in its further development? How should the costs be divided? How should the Network be administered?

### Restructuring

The University of Georgia Computer Center will provide first priority on the CDC 6400 to Network operations.

The Network will establish communications circuits to continue the present level of support.

The institutions will maintain their local terminals and underwrite the cost of Network operations.

A Network Advisory Council will be established with representatives of the participating institutions to establish procedures and recommend policies.

The Assistant Vice Chancellor for Computing Systems will provide overall direction.

The Network Coordinator will be responsible for Network operations.

Private institutions will be supported on a cost-recovery basis.

Units of the University System will benefit from funds allocated by the Central Office.

Institutions that wish to use computing facilities at Georgia State University or Georgia Institute of Technology will negotiate independently for service.

Every effort will be made to transfer users programs and files from Network computers to the CDC 6400 by September 1972.

Institutions will reconfigure their low-speed terminal equipment to Teletype (ASR-33) standards, and batch equipment to ASCII code.

Batch and interactive communications nodes will be established throughout the State which will provide efficient and expandable data links to the CDC 6400.

The Network will prepare proposals and seek outside funds to support its development.

### Implementation

Each institution should review its computing requirements and consider the prospect of participation in the Network beyond July 1972. In order to continue the technical planning necessary for restructuring, institutions should indicate their intent to continue Network operations prior to April 15, 1972. This information will enable the Network to complete the implementation schedule by May 15. Changes in equipment and circuits will begin July 1. Transfer of programs and files should be completed by September 1.

The Network Advisory Council should be established as soon as possible to consider questions of cost allocations and service priorities. It is proposed that the University System be divided into six geographical regions, with the units of each region selecting a representative to serve a one year term. Institutions outside the University System would select one representative. Candidates for Councilman should be prepared to meet regularly with users within his region in addition to Council meetings.

#### Summary

The University System Computer Network has provided computing services to institutions throughout the State. The NSF funds which created the Network will soon be exhausted. Network services are vital to Georgia. Based on two years of operational activity, it can be reconfigured and refunded to provide better service to more users at lower cost. The Network institutions have an opportunity to establish a new structure to meet their needs.

APPENDIX E  
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