The Tech

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IBM To Install Giant Computer In Compton Laboratories By 1957 For Research and Educational Use

The International Business Machines Corporation will install a giant high-speed computer for education and basic research at the Institute early in 1957.

The computer, an IBM Type 704 Electronic Data Processing Machine, will be the principal "component" of a new data processing center. Plans for the center, which will be in the new Karl Taylor Compton Memorial Laboratories, were announced jointly by Dr. James R. Killian, president of the Institute, and Thomas J. Watson, Jr., president of IBM.

IBM will not only install the machine but will contribute to the maintenance and operation of it, both with money and with personnel. The company will also make a grant to support studies of research assistants, both from MIT and from other New England colleges.

Co-operation with Neighboring Schools

Other colleges and universities in New England have been invited to share in the use of the machine for research and education of students in the techniques of automatic computation. The time of the 704 will be divided into three segments; one exclusively for MIT, one for other New England schools, and one for IBM's use. A committee made up of representatives of New England colleges participating in the program will advise on such questions as priorities for problems submitted to the machine and the suitability of problems.

Research assistants selected from graduate schools of the participating institutions will be trained not only at MIT but also at IBM's educational center at Poughkeepsie, N. Y. After their training, they will be able to assist in instruction in their own colleges and to assist other students and professors in programming problems for the top-level computers.

The 704 Computer

The 704 computer is built along the same lines as Whirlwind, the giant research computer completed by MIT four years ago, but is faster and more modern. In one second it can perform 40,000 additions or 5,000 multiplications of 10-digit numbers. Like Whirlwind, it has a magnetic core "memory", in which information is stored on thousands of tiny magnetized beads.

The IBM grant is part of a broad program to increase the number of computer specialists in the United States. There is now an acute shortage of computer-trained personnel. The company expects to make a number of similar grants to leading universities in other regions in the country.

To increase the supply of computer specialists, IBM has already made its Type 650 medium-size computers available to educational institutions for instructional purposes at substantially reduced rental. MIT was the first institution to receive a machine under this plan and has been operating it since early fall.

The 704 will be used in all digital computer courses at the Institute, according to Professor Philip M. Morse, the director of the computation center. Among the computer's other uses will be the School of Industrial Management's "operations research" program, in which data processing methods are applied to complex problems in manufacturing and distribution.

When the 704 is put into operation, Whirlwind will be turned back to full time use by Project Lincoln and the Department of Defense. Presently Project Lincoln and the Institute are splitting Whirlwind's time 50-50.

Inscomm Studies Efficiency Programs; Votes For Abolition Of Compulsory ROTC

Institute Committee registered its disapproval of the MIT ROTC program at its regular Wednesday meeting. A motion, by Arnold Amstutz '58, read, "Institute Committee recommends that the compulsory nature of basic ROTC be abolished." The motion was passed after a discussion period in which members voiced their opinions as to why the Institute maintains an ROTC program.

Amstutz himself scuttled the idea that MIT's land-grant status makes ROTC mandatory, by quoting an administration statement. George Luhrmann '56 suggested that MIT owes an "obligation to the government" and that to alter the program drastically might be like stepping into a "hornet's nest." "The program is maintained in deference to Dr. Compton (late Chairman of the Corporation)," said Ed Roberts '57, who quoted from a speech by the Doctor to prove his point. Oliver Johns '56 called on Inscomm to reflect the sentiments of the student body which, he said, are definitely against the compulsory program.

Irritated by perennial delays which have plagued Inscomm meetings all year, president Jack Saloma '56 presented the Committee with a set of recommendations aimed at "more efficient" (i.e. faster) meetings. The recommendations resulted from a study of Inscomm meetings by Eric Schonblom '56 which showed that the chief cause of delay is lack of information, on the part of members, about matters under discussion, which leads to long speeches by members who do not know what they are talking about.

Schonblom's study was based on an adaptation of the Bales Interaction Process (devissed by Mr. R. F. Bales).

The gist of the recommendations is simply that Inscomm members will be provided, in advance, with detailed accounts of all committee reports and motions, with the pros and cons of all pertinent questions elaborated upon, so that they may formulate their opinions beforehand, air these opinions briefly at the meeting, then vote.

Although the new efficiency plan does not go into effect until February, Inscomm succeeded in eliminating much of its usual delay. After requesting its Judicial Committee to look into the situation created by Voo Doo's "Cook to Crook" story, loaning $300 (short 90-day-term) to WMIT, and attending to various other matters, the Institute Committee achieved a 6:15 adjournment.

Theft Of Miss Mass. Publicity Pix To Cost '59 $30, Judcomm Reports

Theft of publicity pictures used in the freshman class "Date With An Angel" campaign will cost the class of '59 about $30 reported Fred Culick '56, chairman of Institute Judicial Committee. Not the first event of such vandalism this term, loss of publicity pictures also hindered the Alpha Phi Omega UMOC contest.

Culick stated that from now on any persons found guilty of such actions will be subject to Institute Judcom disciplinary action.

Should any persons in possession of Miss Massachusetts pictures return them to Litchfield Lounge, Judcom will not take action. Anyone found in possession of the shots will, however, be brought before the committee.

Commenting on the vandalism, Buddy Long '59, freshman council president, said that about forty pictures had been taken, twenty-five on one night from the main sales booth. The pictures are now being taken down at night, he reported.

Questioned on the success of the drive, Long answered that although the freshmen would definitely be in the black, they would probably not approach the goal of two hundred dollars profit. The probable $30 loss will swell their expenses which have already passed the budgeted figure of three hundred dollars. Sales through Wednesday night had already brought them around the break even point; but Long said "We're not going to make any money unless sales at Kresge, Saturday, are surprisingly strong." When questioned further, he approved $50 as a good approximation to their probable profit.

N. E. Band Plans February Concert

The MIT Baton Society this year will sponsor the fifth annual New England Intercollegiate Band. Eighty of the top wind and percussion instrument players in New England colleges and universities will meet at Kresge Auditorium during the weekend of February 11 and 12. The band will be conducted by Thor Johnson, who is the conductor of the Cincinnati Symphony Orchestra. In the concert on February 12, the Baton Society and the Intercollegiate Band will present David Bar-illan, an Israeli pianist, as their featured piano soloist.

The concert will be at 3:00 p.m. on Sunday afternoon in Kresge Auditorium. Reserved seats will be sold at $1.75, and unreserved seats at $1.25. The tickets are being made available by mail order. Those desiring tickets on this basis should mail their requests to: Band, Room 14-N236. The tickets will also be on sale at the door.

The program for the concert will consist of original compositions for band. It will be his first Boston appearance for Mr. Bar-illan, who, despite the fact that he is only 25 years old, has performed frequently both on this continent and in Europe. He will be featured, on this occasion, in the world premier of the concerto for piano and band by Starer. A complete program for the concert will be published in *The Tech* at a later date.

The players in the band are selected by special auditions. The fact that Thor Johnson is conducting the band is particularly significant in that this is the first time in New England history that a collegiate band has been conducted by a prominent symphony orchestra conductor.

In preparation for the performance Sunday afternoon, members of the band will arrive at the Institute Saturday morning. They will rehearse that morning and afternoon. A dinner and dance have been planned for them for Saturday evening. A final rehearsal Sunday morning will complete their preparations.

WMIT

WMIT will cease broadcasting on Monday, January 16, at 1:00 a.m. following Sunday Spotlight. It will resume operations on Registration Day of the spring term at 5:00 p.m.

Dorm Con Debates New Hours For Open House

A motion for revision of the open house rules is now before Dormitory Council. Officially it would, if accepted, be an amendment to the Dormcon by-laws and must, therefore, be posted in the minutes for at least one week before it can be voted upon.

The motion was presented at a dinner meeting held at the Graduate House last Monday. It would, if passed, extend weekday hours from the present 5:00-8:00 p.m. to 3:00-9:00 p.m. and stretch the Friday and Sunday hours to 12:00 noon to 1:00 p.m., the present Saturday hours. These hours would apply during reading period and vacations as well. Extensions would be made for Junior Prom, Dorm Christmas Formal, Dorm Weekend, Mil-Ball, A-Ball, New Year's Eve and All-Tech Dance, if it should be continued. Under the proposed amendment, house committees could restrict, but not extend, the hours for their individual houses.

Student responsibility for breakage was the other main item of discussion. Dormcon weighed the problem of responsibility, both financial and disciplinary, without coming to a conclusion in the form of a motion.

Monday, February 6, registration day for the new term, is the date scheduled for Dormcon's next meeting.

Engineer Hoopsters Rout Worcester Tech, 80-69 As Vergun, Jordan, Hallee Lead Beaver Scorers

Rebounding from last week's 60-59 loss to Harvard, the Beaver varsity basketball team coasted to an 80-69 win over Worcester Polytechnic Institute last Wednesday night on the home court. The Engineers jumped off to a quick 4-0 lead and were never headed, although WPI narrowed the gap several times.

Co-Captain Dee Vergun '56 was high man for the winners, hitting 20 points although he played less than half of the game. Mac Jordan, sophomore forward, bucketed 17 and Larry Hallee '56, looked extremely good, getting 15 points in the second half. James Cheney was high for Worcester with 18.

Co-Captain Bernie Benson '56 opened the scoring with a set shot from the circle and the Engineers were on their way. With Vergun, Jordan, and Norm Howard '57, dominating both boards, and Jordan and Vergun hitting well, the Beavers jumped to a 14-6 lead early in the first quarter. WPI closed the gap to 14-10 but Vergun hit two quick jump shots, one from deep in the corner, to increase the margin. Howard and Jordan added baskets and Vergun, Paul Larson '58, and Jordan, free throws to run the score to 25-17. Four quick foul shots and 2 field goals by the losers tied the game at 25-25, with 6:57 remaining in the half. Vergun and Larson re-

Bernie Benson Drives in to Score

entered the game at this point and John Patierno '56 came in at the other guard. After a minute of scoreless play, Howard broke the tie with a beautiful drive shot and Vergun followed with a layup and a jump, in between which came a tip by Jordan and a set by Patierno, to give the Engineers a sudden 35-25 lead. A spell of bad floor play by the home team enabled Worcester to close the gap to 37-34 but Jordan hit a driving layup with less than ten seconds remaining to give the Beavers a five point lead at intermission.

Rebounding played a big part in the first half as Tech pulled off 42 free balls to 23 for the losers. Howard and Vergun grabbed 11 apiece and Jordan took 10. The scoring difference came from the field where the Engineers hit 17 out of 51 shots for a 33.3% average while holding WPI to only 41 shots, of which they made 13 for a 31.7% average.

Benson opened scoring again in the second half on a set shot and Howard followed with a close in field goal. Hallee started the second half since Vergun had four fouls and immediately caught fire. He carried the rebounding load through much of the period and also led the scorers. He hit two free throws with about 5 minutes gone and followed immediately with a tip in. This ran the score to 51-40. Hallee hit from the outside and tipped again to keep the spread at ten points.

Vergun came back in at this point and combined with Jordan and Howard to run the score to 73-61 before he picked up his fifth foul with four minutes remaining. WPI put on a three-quarter court press with eight minutes remaining but fine play by guards Benson, Larson, and Matty Matsuo '56, rendered it practically

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CORRECTION

The "Lounger" which appeared in the last issue of "The Tech" was written by James D. Robertson '56, not by Paul Abrahams '56 as originally credited.

The Tech

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HINDSIGHT

Today's issue is the next to last one of Volume LXXV. The time is suitable for a reexamination of the editorial year. In looking back over all the occurrences since February, 1955, a few things which should be of genuine interest and concern to the undergraduate body stand out.

On the credit side: the Discrimination Conference was eminently successful in its aim to "provide a place for exchange of ideas and. . .for the furtherance of understanding." This fall came the announcement that another MIT fraternity had gotten rid of its restrictive membership clause, decreasing the number of discriminatory chapters here to nine. The amazing success of the student-organized Henley Fund Drive brought help from the Institute in sending the Varsity Lightweights to their second straight triumph on the Thames. A million-dollar bequest of the late David F. duPont '56 makes possible athletic improvements heretofore beyond hope of attainment in any reasonable length of time. The dedication of the Kresge Auditorium and Chapel brought wonderful new facilities on the scene. The Auditorium in particular—with its use in the opening performance of the Boston Symphony Orchestra, in a presentation of the opera "Don Pasquale," and at the opposite extreme in a program of contemporary jazz—has firmly entwined itself in the cultural scene. Mention might here be made of the continued excellence of the Concert Band, perhaps the best in New England; and of the meteoric rise of the Dramashop, resurrected by the skill of Professor Joseph D. Everingham to an extremely important place in our extra curricular life.

The debits are there, too: the biggest waste of time, both for Institute Committee and *The Tech*, was the Senior Ring situation, important not for the money involved so much as for the body blow dealt student government's prestige. In the eyes of the rank and file of students Inscomm's refusal to act with firmness and conviction was an embarrassing but clear-cut case of misconduct. The reconsideration of the Commons question, at a time when everyone thought the Intolerable was about to be dispensed with, was an unfortunate "crown of thorns" to be pressed down on those who must eat Dining Service food under cumpulsion.

FORESIGHT

These are some of the things which the students must await in the days to come.

The students have been promised that the Ryer Committee report, to be completed in the spring, will settle the question of commons. The fate of East Campus, perhaps the physical expansion and alteration of the Institute in the immediate future will be delineated.

The attempt to place students—in some advisory capacities at least—on certain faculty committees concerning themselves with student affairs should be renewed with vigor in the direction of educating the Faculty to the potentialities of responsible student assistance.

The locus of the power to fix Open House Rules in the dormitory system—delegated on a trial basis to the Dormitory Council—comes up for reexamination at the end of the next term. The discussion here should be interesting.

The continuance of attempts by the Institute to purchase the Armory for refurbishment as a gymnasium should produce a final result—positive or negative—sometime this year.

The Brown Committee, appointed by the President to review our academic and educational policies, should make its report in the spring, with perhaps some interesting observations on the present educational process and possibly even some suggestions for major alterations.

The clock promised for Walker Memorial's dining hall should make its appearance rather shortly.

'TWAS FUN

This review of Volume LXXV's major preoccupations of past and future brings nearly to a close the term in office of the present Managing Board—those of us who are still left. It has been our pleasure to serve the undergraduate body to the best of our abilities.

We wish LXXVI good luck and the same opportunities for service and education—especially of self—which we enjoyed.

the college world

by Ken Mitzner '58

Since the Supreme Court segregation decision, the race problem in the South has been brought into focus more sharply than ever since Reconstruction. There have been many outbursts of reaction, such as the Till case, but there have also been many advances against the monster of race hate. Now, Duke University's students, through their paper, the Duke *Chronicle*, have expressed the opinion that they too are fed up with what they term a "barbaric tradition."

Now, the *Chronicle* has been no slouch as far as racial progress goes. As early as 1927, the *Chronicle* advocated the formation of inter-racial student groups; most recent of its campaigns before the recent complete denunciation of segregation was an attempt to desegregate performances of a school play, so that students of a near-by Negro college could attend.

But the paper has now stopped gnawing at the fringes of the issue and has bitten right into the meat of the segregation problem. In a vigorous editorial, the *Chronicle* has requested (and essentially demanded) an explanation from the Board of Trustees as to why Duke is segregated.

Attacking the argument that segregation is "traditional", the editors point out the fact that any institution which aims at national prestige must rise above any traditions of "provincialism". As to segregation in particular, the paper branded it as a glaring denial of the democratic and religious principles on which Duke was founded, and a shameless example of hypocrisy. The "separate but equal" doctrine was blasted, first by asserting that segregation must imply inferiority as there can be no other reasonable grounds for it, and then by comparing the facilities of Duke and North Carolina College, a neighboring Negro school.

Hitting at the practical side of the issue, the *Chronicle* asks how our nation can hope to lead the fight for freedom "while black laws are still being enforced, while racial hatred takes the shape of murder, kidnapping, suppression, and injustice. . ." "and, pointing out the close connection between such atrocities and the workings of alleged tradition," . . . while we at Duke declare the Negroes are inferior beings. . ." The effect of the segregation issue on our Far Eastern relations is brought out as the geatest tragedy of Southern absurdity on the race issue.

Examining the results of desegregation, the *Chronicle* shows that the pressure of rising applications and the probable gradual entry of Negroes would prevent any detrimental results from integration. In short, the issue is summed up with three-word analysis of the whole issue:

"Segregation is wrong."

Robert Anderson Delivers Lecture In Dramashop's Celebrity Series

by Charles Spangler '59

Robert Anderson, author of "Tea and Sympathy", spoke to the Institute community Monday night "On Being a Playwright." It was the second in the celebrity series sponsored by Dramashop designed to bring those interested in dramatics into contact with notables of the modern-day drama. The topic was a general one, and the talk informal. Mr. Anderson had prepared no actual outlined speech and referred to topics of interest as they occurred to him.

He told in great detail what the theatre really is today and the problems that he, as a playwright, faced in his productions. There are many problems associated with getting a play rolling of which the average theatre-goer cannot be aware. There is, first of all, that seemingly immense period of time between the first "dream" of the play and the final product. During this time a playwright has to use all his dramatic craft to write his play, if his play is ever to be produced. After the play is considered in its final form by the writer, he must then find the right producer to present it. The choice can make or break a play. Once the producer has been found, the real work begins.

The casting of the actors for the play is a major step in its production. They must be able to fit the part, act the part, and live the part. The actors are the only people that the audience sees, and they must be able to get out of the play what the author meant it to contain. After the actors come many more facets of production. There is the staging, set-designing and construction, directing and the inevitable rehearsing. When all these things are combined and tied with a neat little ribbon marked Broadway, then the play is ready.

Mr. Anderson told briefly about the opening night of "Tea and Sympathy" and the anxiety of waiting for the morning reviews that can mean so much to the success or failure of a play. Then when the play is stamped with the seal of success come countless appearances, talks, contracts or movie rights (which to the playwright mean more headaches, compensated for, however, by a large amount of cash), and demands for donations to charities, setting up scholarships for young deserving playwrights, and finally law suits claiming literary theft. And then again, the infinite number of compromises that have to be made during the production stage—some actors are unavailable, some actors and directors seem to think that lines should be changed—all these things are integral parts of a playwright's "hidden" life.

After having felt he had talked unaided long enough (although his audience was far from bored), Mr. Anderson held an open question and answer period with the audience. The questions were many and the answers were well supplied. Then Mr. Anderson, Professor Everingham (faculty advisor to the Dramashop), and any of the audience that wished to, retired to the Green Room for the remainder of the evening to further discuss playwriting and drama in general.

Techmen In K. Of C. Track Meet

A group of eight runners, one junior and seven sophomores, were named this week by coach Oscar Hedlund to represent MIT in the annual Knights of Columbus track meet in the Boston Garden tomorrow evening. The Tech trackmen are entered in each of the two relays on the Varsity College Relay portion of the evening's program. America's top amateur athletes will be competing in this opening meet of the winter indoor circuit. Stars already registered for the affair include Wes Santee, Rev. Bob Richards, Charley Jenkins, and many more.

Although handicapped by the short period of preparation time since the Christmas vacation and by the poor weather this week, coach Hedlund has high hopes for fine performances by his two young but experienced teams. In both heats, especially the two mile battle, the trackmen have drawn an impressive list of opponents. The one mile relay team, composed of Ed Bell, Bill Duffy, Roxy Ernsberger, and Dick Murdock, all sophomores, will run against Williams, Wesleyan, Bowdoin, and Worcester Tech. Pete Carberry '57, Glenn Bennett '58, Ed Carter '58, and Todd Fandell '58 will face Boston University, Providence College, U. of Massachusetts, Brown, and Holy Cross in their two mile test.

Basketball

(Continued from page 1)

seless. With less than two minutes maining and the Beavers holding a 5-62 lead, coach Scotty Whitelaw leared the bench. The reserves showed p fairly well, with Jack Safirstein hitting a jump and Pete Hohorst 7 bucketing two from inside and ding a free throw. That closed out he scoring and brought the final score 80-69.

The Beavers again dominated rebounding in the second half, taking to Worcester's 16. They hit 15 of shots for a 40.1% average while Worcester dunked only 13 of 39 for 3.3%. The next game finds the Engineers entertaining the Coast Guard Academy Saturday night in Rockwell. Game time is 8:15 p.m.

Vergun 37 Point Total Shatters Scoring Mark

The basketball managerial staff announced today that co-captain Dee Vergun has officially broke the MIT record for points scored in one game. The big bespectacled center set the new mark of 37 points against Lowell Tech last Thursday on Lowell's band box court as he hit consistently in the first half with his renowned one hand sets and jumps from 15 to 25 feet out. In hitting his peak, Vergun surpassed the old scoring mark of 36 points set by Russ Kidder, captain of the '52-'53 basketeers. Kidder, an expert from outside, set the previous record in December of '52 against American International College of Springfield. Since the Lowell game, Vergun has dropped off some from his previous phenomenal scoring pace of over 30 points per game, and he is presently unofficially averaging 29 points a game, which unofficially ranks him seventeenth in the country.

Tech Fencers First In Triangular Opener

MIT's Fencing Team took first place in a triangular meet held here last Saturday with the University of Connecticut and Bradford Durfee Technological Institute. There was no question of superiority as Tech scored 36 points compared to UConn's 26 points and Bradford-Durfee's 19 points.

At the end of the first round of bouts, all three teams were neck and neck due to Bradford-Durfee's early supremacy in sabre. However, in the next two rounds Tech began piling up a comfortable lead and never again was in any trouble. The fact that Tech's scoring improved as the match progressed indicated the team gained much from the meet. It is believed that Tech will be much more formidable in the future with the added confidence afforded by this victory.

The outstanding performance of the match was turned in by Tech's foil team composed of Whiting, Levine, Edwards, and Quist. They won 14 out of 18 bouts. The Epee team with Strawson, Bristol, Kusik, and Dorris picked up 12 points while the sabre team with fencers Reis, Miller, Weyermeister, and Meeker scored 10 points.

This week Silvio N. Vitale, Tech's fencing master, will take his team to Trinity College for the second meet of the year. This promises to be a harder fight than last Saturday's match, but team captain Harvey Levine expects a victory.

Tufts Mermen Edge Tech, 47-37

The MIT varsity swimming team lost to Tufts Wednesday despite some fine swimming by several MIT men. In the opening medley, MIT took first with the team of Al Hortman '58, Paul Cotter '57, and Bill Veeck '58. Tufts took both first and second places in the 220 and 50 yard freestyles.

The MIT record of 1:45 for the individual medley was broken twice when Harvy Duane '58 came in first with a 1:43.7, and Al Johnson '58 placed second with a 1:44.8. Ed Bryson '57 was edged out of first in the diving.

Veeck and Frank Salz '57 took second and third respectively in the 100 yard freestyle and in the 200 yard backstroke. Johnson and Hortman took first and second slots. Tufts took both first and second in the 440 freestyle relay.

In the 200 yard breaststroke, Fred White '56 hit a 2:47.8 to break his own school record of 2:50. The final score was Tufts 47, MIT 37.

MIT Outstanding In Development

Computer To Be Used In Analysis Of Programs

by Warren W. Heimbach '59

With the announcement that MIT is to receive a new computer from International Business Machine the question arises as to what is the value and the purpose of such a machine to the various departments here at Tech. Professor Eli Shapiro, Associate Dean of the School of Industrial Management, states the overall program of that department as follows:

"Scientific research of the last fifteen years has developed many basic principles applying to information flow and physical systems which should have counterparts in the economic-personnel-materiel systems of industry. In addition to these basic principles, the electronic and the data-processing developments of the last few years make available a new family of tools which the executive can employ as aids to making management decisions.

"The School of Industrial Management is now engaged in an orderly, thoughtful and imaginative effort to see how it can proceed into the frontier of management for the future by more drastic adaptation of some of the research methods, computational procedures, and principles of dynamic information flow found in the technical departments of the Institute."

The indispensability of the electronic computer to research and engineering laboratories is an accepted fact. However, the increasing importance of the computer to industry in the fields of production, marketing, accounting, and other non-technical areas is often overlooked. To be able to fully understand this, one must realize that there are basically two types of computers. The first, used mostly by engineers and scientists, is the type of computer which takes a relatively small amount of input, performs upon it a large amount of work or calculation, and delivers a relatively small amount of output. This type of computer was the first to be developed and as a result is the most familiar. The second type of computer, used mostly by management, is an outgrowth of the trend toward managerial use of computers. It was developed to take a vast amount of input, perform upon it a relatively small operation, and deliver a vast amount of output. This process is essentially one of data processing and statistical research. The latest computers, such as the one MIT is to receive, are designed as a compromise between these two extremes and will function satisfactorily for either of the above purposes.

Several of the many areas in which management has found the computer to be of significant importance are those of payroll and inventory accounting. Several of the larger corporations have found that the computers can work out a payroll in a short time which formerly may have taken many people several days. Also in accounting, one insurance company has found that its computer can process policies at the rate of 50,000 per hour. Sylvania Electric which has many small retail and wholesale stores as well as manufacturing plants throughout the country is constructing a data processing center with closed-circuit lines

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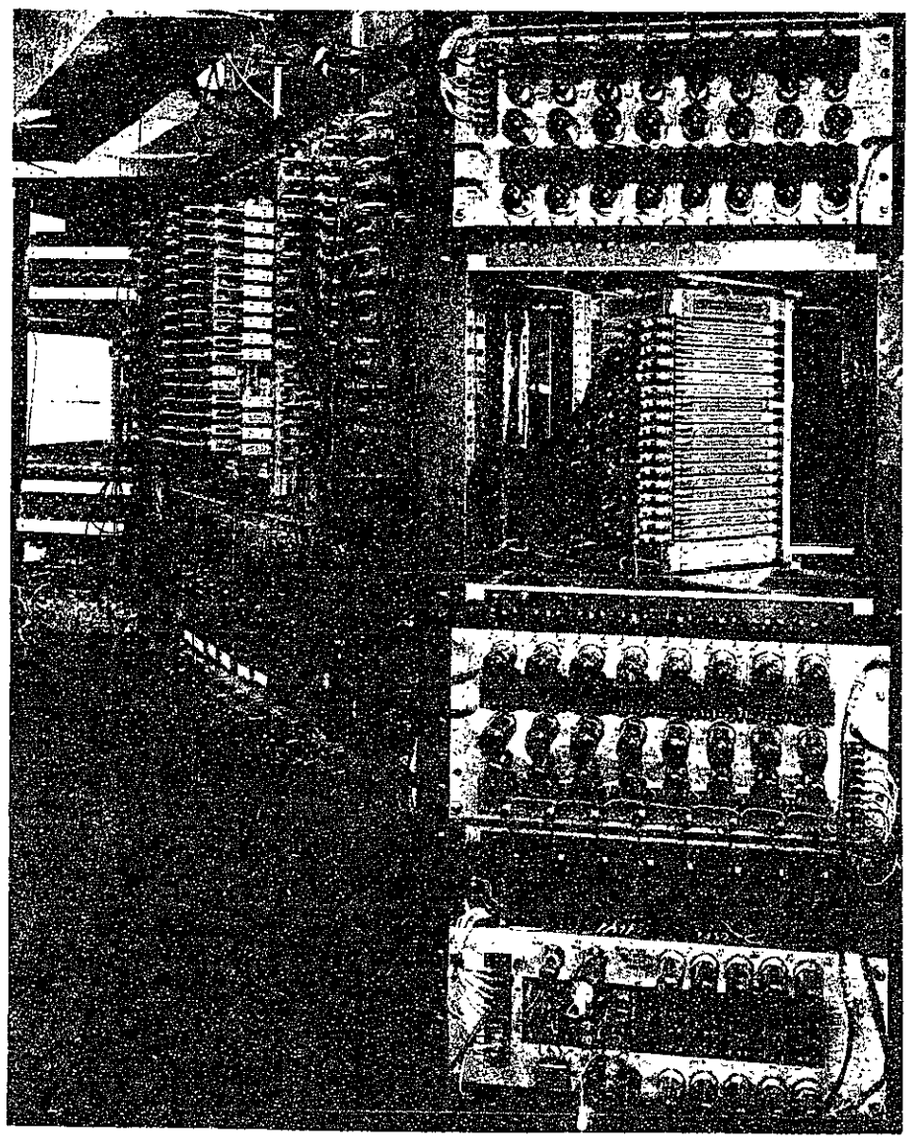

Whirlwind I Magnetic Core Memory

Memory Component In IBM 704A Developed At MIT For Whirlwind

by James D. Robertson '56

The concept of magnetic core memories was evolved at MIT, and since the beginning of the development of large scale digital computers, MIT has maintained leadership in the field. The new IBM 704A computer, which will soon become part of MIT's facilities, further substantiates this fact as this new computer employs a magnetic core memory.

The theory of employing magnetic cores made from materials having square-loop hysterisis characteristics was originally developed at MIT by Dr. Jay W. Forrester in 1949. This theory appeared in a paper in the Journal of Applied Physics in 1951, the same year that William Papian, a Tech student, wrote a thesis on his work in trying to find an ideal material to use in the cores. The material necessary for this application, in addition to having an approximately square hysteresis loop, must lend itself to mass production of small cores having a rapid switching rate and a high degree of reliability. Papian continued his search for suitable materials in the MIT Digital Computer Lab. The work done by these men, now connected with the Lincoln Lab, led to the construction in 1953 of the first core memory for Whirlwind, the digital computer presently in operation in the Barta Building. A second memory followed shortly after during the same year.

It is the square-loop characteristic of the cores that makes magnetic memories possible. It must be mentioned that the binary system on which the computers operate allows the presentation of information in the form of a "one" or a "zero".

The information put into the core memory is controlled by the current

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And Use Of Computing Devices

Dr. Phillip M. Morse

Memory Component

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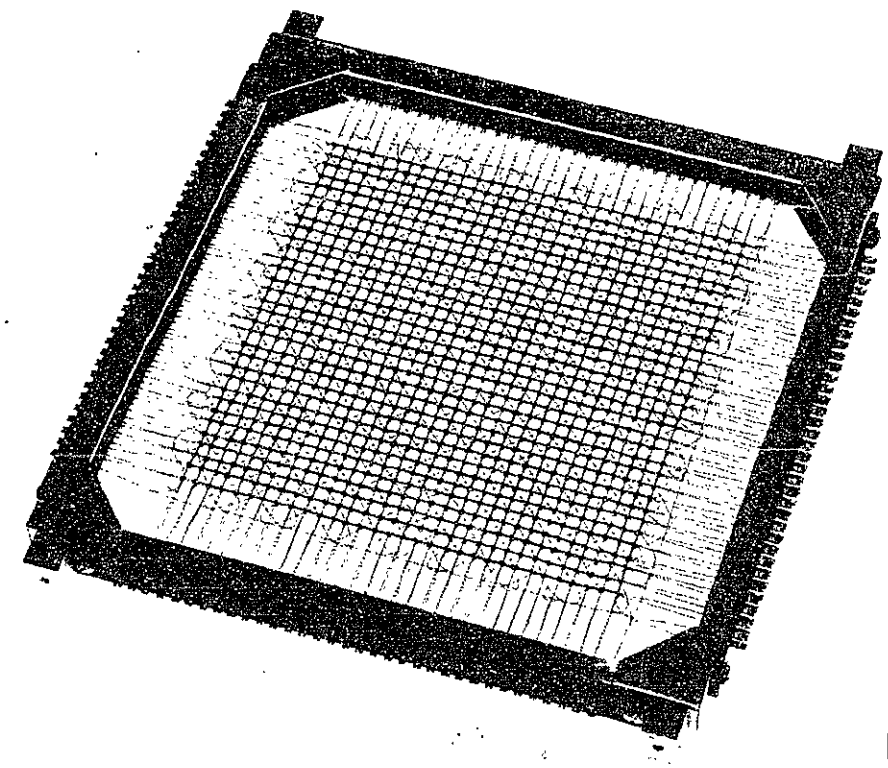
sent through the core. Four wires go to each core, the x and y for establishing the location of information to be retained, a "sensing" lead for "reading out" the information, that is, obtaining it from the memory, and an inhibitor which is used as part of the function of restoring the state of the memory after it has been "read out." It must be noted that the "reading out" process destroys information in the memory. The restoration process is known as "rewrite."

The voltage output is a function of the change of flux in the core. When the core contains a "zero" and is pulsed for "read out", the flux change is negligible and the output is essentially zero. On the other hand, if the core contains a "one," the change in flux creates a substantial output as there is movement on the curve all the way from point "one" to "zero." The "reading out" process in itself always leaves a "zero" in the core. Immediately after the reading pulse, a rewrite pulse occurs which restores the value of "one" to the memory core, if it originally contained a "one." If the core originally held a "zero", it is further necessary to provide an inhibit pulse. The total read-write cycle time for Whirlwind is less than 10 usecs.

The cores are placed in matrix fashion in digit planes. These planes are placed parallel to each other in a vertical stack. The x-y windings on the numerous digit planes are connected in series with each of the other planes so that whole "words" are obtained in that period of 10 usecs as each bit of the information making up the entire word is extracted from the selected cores simultaneously. Thus, an enormous amount of information can be handled each second.

The Whirlwind memory consists of two banks of 16 digit planes each containing 1024 cores. In addition there is a 17th plane used for checking. The Memory Test Computer at Lincoln Laboratory likewise contains 17 digit planes, but unlike Whirlwind each plane contains 4096 cores. Under development at Lincoln Labs at the present time is a memory employing 37 digit planes. Each one of the digit planes in this memory will have 65,536 cores. This means that it will be able to store 2½ million useful bits of information! From this it would seem that MIT will go right on in its present leadership role in the field of digital computers.



A 32 x 32 Memory Plane Used in Whirlwind I

Institute Leading Computer Center

Besides having the giant computers, Whirlwind and the new IBM 704, MIT has many smaller machines. The Institute also offers the most comprehensive set of courses in the automatic computation field.

The Office of Statistical Services has an IBM Type 650 computer, which will perform 200 operations in a second (as compared with the 704's several thousand operations per second). This machine is used in educational, scientific, and accounting problems where the ratio of operator programming time to machine operation time is high. An hour of the 650's computing time is worth about $30, while an hour of Whirlwind's time would cost a user $250.

The Institute has an IBM Card Programmed Calculator, which runs on punched cards not unlike roll cards. This computer's time is worth $15 an hour. It also has an IBM 604, a relatively small machine with a limited memory that was one of the first of the mass-produced electronic calculators.

Though the Differential Analyzer was dismantled over a year ago, the Institute is not without analog facilities. It has a number of Reeves Electronic Analog Computers (REACs).

Many of the research departments have their own computing facilities. Both the Instrumentation Laboratory and the Dynamic Analysis and Control Laboratory have a number of machines.

Courses in Computation

Last year MIT offered 11 courses primarily concerned with automatic computation. Of these courses, eight were given by the Electrical Engineering Department. One of the electrical engineering courses was 6.25—Machine-Aided Analysis, an introductory survey course for undergraduates. Two of the other courses were given by the

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notices

ACTIVITIES COUNCIL

Nominations are now open for Class B representatives to the Activities Council. Interested candidates should submit a written notice of their candidacy, signed by themselves and by the president of the organization they represent, to Alan Budreau, Baker 530, or Philip Bryden, Ware 203.

UAP PETITIONS

Starting today, January 13, nomination petitions will be available at the Institute Committee Office in Walker Memorial for the office of Undergraduate Association President and Vice President.

ORGAN RECITAL

Lawrence Moe will give an organ recital in the MIT Chapel this Sunday, January 15, at 3:00 p.m. He will play works by Buxtehude, Schlick, Cavazzoni, Martini, Bruhns, Franck, Lebegue, Scheidt, and J. S. Bach. Mr. Moe is organist at St. Paul's Cathedral, Boston.

Computer Center

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Department of Mathematics and the remaining course by the Mechanical Engineering Department.

Fourteen more courses touched on computing machine application or on machine design. These courses were given by the departments of mathematics, mechanical engineering, chemical engineering, electrical engineering, aeronautical engineering, and economics and the School of Industrial Management.

In addition, the Whirlwind staff has been giving short courses in machine coding methods each term.

The use of MIT's computing machinery and the content of the computation courses are both supervised by the Committee on Numerical Analysis and Machine Computation, an Interdepartmental group formed four years ago to correlate departmental activities in these fields. The committee, which is headed by Professor Philip M. Morse of the physics department, contains men from the departments of electrical engineering, physics, mathematics, and mechanical engineering.

MIT Computer

(Continued from page 4)

to its many branches. It will be so set up that accounting statements (other information also) can be recorded on punch cards at the branches and then processed at the central office.

Computers also have proved valuable in the area of production control. For instance, when management has decided how much production of which products there is to be, this information is fed into the computer. Programmed for the computer is all the necessary information about how many and what kinds of component parts are needed, the labor force required, the necessary tools and machines, and all the other input factors necessary to produce the given output. The crank is turned and out comes all the required information.

Hand-in-hand with production control is inventory control. The computer makes it possible to maintain a perpetual inventory of all stocks and supplies. As soon as the inventory of an item gets down to a predetermined level, the computer makes it known. An order is then issued to replenish the stock of this item.

Another area closely allied with production control is that of market analysis. The computer will have stored information about the sales in a specified area over a given time period. When current material of a like manner is fed into it, the computer compares the current information with the stored information, and on the basis of this comparison is able to, for example, make estimations on future sales for the given area.

Here at MIT the School of Industrial Management is vitally interested in computers and their applications to management. Investigation and experimentation is now being carried on and more is being planned to determine how, when, and where it is economically most practicable to make use of computers.

One of the problems to be explored is the preparation of consolidated financial statements. With a set-up similar to that of Sylvania, what is the best way to program all the data that must go into a consolidation statement? Another area to be explored is that of developing a system for processing current information through prediction models dealing with the level of the economy, business trends, sales of stocks, etc. in order to obtain up-to-date results. Linear programming of information to be computed is also under study. Linear programming is a mathematical optimizing device whereby a process can be analyzed to determine the optimum arrangement of input and output, which in turn would optimize profits. For example, take the case of an oil company with refineries in several cities whose markets exist not only in these several cities, but also in many other cities throughout the country. The problem now is to compute how best to route the traffic in shipping oil from the cities where the refineries are located to all the other cities where the markets exist so as to minimize the shipping costs. Linear programming has many applications, one of difficulty is in properly preparing the information.