Rationale for Vocational Programming in Barry County, Michigan

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RATIONALE FOR VOCATIONAL PROGRAMMING
IN BARRY COUNTY, MICHIGAN

by

James W. Sutherland

A Project Report
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Specialist in Education Degree

Western Michigan University
Kalamazoo, Michigan
April, 1979
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WESTERN MICHIGAN UNIVERSITY, ED.S., 1979

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PREFACE

The project represents my efforts to obtain a first hand look at industry in an administrative role and to tie it in with the development of a proposal for establishing new vocational programs in Barry County, Michigan. Deficiencies exist in vocational programming for eleventh and twelfth grade students in the five school districts within Barry County. It was intended to demonstrate in this report that Barry County has a need for comprehensive vocational training facilities in the metalworking and auto mechanics trades. Paradoxically the villages located on the edges of the county send many workers to nearby cities for work but are not aligned with any educational facilities in these cities to educate their high school juniors and seniors. Learning a skill would make the youngsters in these smaller communities more competitive in the labor markets of Kalamazoo, Battle Creek, Grand Rapids, and Lansing.
PHILOSOPHY AND COMMENTS

Training young people to become skillfully employed is a responsibility handled by people who are expected to have mastered the skills of their trade and have developed expertise as educators. Vocational teachers are an exceptional group of people who coordinate hand and mind ability to prepare students for the skilled trades. Whether it be medicine, home economics, business, agriculture, or many other areas of expertise the program requires competent teachers, administrators and leaders. Teaching industrial and vocational education for twelve years has made me acutely aware of the need for people who have a solid vocational background and the intellectual skills to become effective leaders. Many people use wrenches and welders expertly. Many other people are truly great inspirational leaders. But few are they who have labored to develop their skills and have observed their profession through such a spectrum that they have grown and developed to become program improvisers with the ability to administrate and to pioneer new concepts.

Business managers may argue the need to be hands-on experts. After all, leadership is a universal skill applied to many people in various situations. Throughout history charismatic people have become leaders of millions and shaped the course of civilizations. Within these soc-

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ieties other leaders have emerged due to their far-reaching vision, willingness to take responsibility, problem solving skill, expertise, personal strength, or love for fellow man. Some people function comfortably throughout their lives as workers and followers where others are compelled to be originators, developers and leaders.

Vocational education in the area of trade and industry is a coordinated effort between the local school district, area industries, and state and federal funding agencies detailed by the Michigan Department of Vocational Education.
CHAPTER I

DEVELOPMENT OF VOCATIONAL EDUCATION
PROGRAMS IN MICHIGAN

Introduction

During the past decade, life in America has been materially affected by a broad range of technological developments. As a result, American education is being challenged to provide youth and adults with expanded opportunities for becoming and remaining occupationally competent in the radically changing world of work.

Michigan's recently completed area studies of vocational-technical education consistently support the need for vocational education. They report, also, existing inadequacies in the extent and quality of vocational education in all regions of the State. These studies recommend the establishment of area vocational-technical education programs to serve better the occupational training needs of Michigan youth and adults.

This statement which has been approved by the State Board of Education is designed to provide suggested guidelines for the development of adequate vocational-technical programs on an area basis at both the secondary and post-secondary levels.

Definitions

The following terms are used frequently throughout this statement and require definition:

1
Vocational Education. The term "vocational education" re­fers to that phase of education designed to develop specific skills, abilities, understandings, attitudes, work habits, and appreciations encompassing specialized knowledge and information needed by youth and adults to enter and make progress in employment on a useful and productive basis. The term excludes education designed to prepare persons for occupations generally considered professional or which require a baccalaureate or higher degree. The term also excludes education which is intended for all students and is commonly known as General Education.

Technical Education. "Technical Education" is a phase of vocational education and refers to level of training and work capability. It is generally associated with semi-professional occupations which require broad technical competence based on proficiency in the application of mathematical, scientific or other principles.

Area Center. A building or complex of buildings designated by the State Board of Education to be used express­ly for providing vocational education programs.

Facilities. When used in this document, this term means buildings and equipment.

The Area Program Concept

The area vocational and technical concept emphasizes cooperative arrangements between two or more school districts, usually adjacent, or between high schools within
large districts for the purpose of operating jointly-shared vocational education programs for people in relatively large geographical areas or areas of high population density. The area concept includes, also, post-secondary vocational and technical programs on an area basis through strategically located community colleges.

The area concept is based upon the conviction that all persons should have easy access to quality vocational education programs directed to individual occupational preparation needs, abilities and interests.

The area program serves as a centralized extension of existing vocational programs in participating high schools. Any program for which a single high school has sufficient financial resources and students may be offered in that school. To participate in vocational programs not provided in their home high schools, students would be transported to another facility for occupational training.

The area program concept provides that students retain their identity with, receive their general education in, and graduate from their home high schools. An area vocational program has the following advantages:

1. It provides for a broader tax base distributed over a larger population than is usually present in a single school district.
2. It avoids unnecessary duplication of equipment, ser-
vices, and costs which might occur if two or more neighboring districts elected to offer identical or similar training programs.

3. It makes possible a broader range of curriculum offerings and, therefore, a more extensive program of occupational training opportunities.

4. It offers training opportunities to a larger number of persons than is possible in smaller schools serving single communities.

5. The area program concept is the best means through which single school districts lacking sufficient financial resources and/or students can provide adequate vocational education opportunities to enable all youth and adults to develop and maintain satisfactory occupational competence.

The Role of Educational Institutions In Vocational and Technical Education

To assure that all Michigan citizens who need it will have ready access to adequate occupational preparation, specific responsibilities rest with the high schools, secondary area vocational centers, community colleges, four-year colleges and universities, intermediate school districts, and the State Department of Education.

The K-12 District. Each K-12 school district should provide elementary and junior high school students with an opportunity to acquire wholesome attitudes toward work and
an awareness of the world of work.

These basic understandings should be integrated into the total school program by relating the student's basic education to the world of work. Some schools might elect to offer broad occupational exploratory programs at the junior high school level designed to further develop student interests, and would encourage and assist teachers and counselors to identify each student's interests and abilities prior to his high school entrance.

All K-12 districts should attempt to provide exploratory and prevocational programs at the junior high and early senior high school levels. These experiences should be organized as specific courses and be available to all students, and should include as many as possible of the major professional and non-professional occupational areas.

Vocational programs would not be generally offered until the later senior high school years, (grades 11-12). Each K-12 district should consider offering all programs for which it has sufficient resources and interested students.

Every K-12 district should provide guidance and counseling for students at all levels to assist each to identify individual interests and aptitudes. The effectiveness of all vocational education programs is dependent upon quality guidance and counseling.
The Secondary Area Vocational Center. The secondary area vocational center should serve to expand the vocational training opportunities of participating K-12 districts. Those programs which cannot be provided by each individual district for lack of sufficient student demand and/or financial resources might be successfully provided in the jointly-supported area center.

Secondary area vocational centers should, in most cases, serve students in grades 11 and 12 whose needs cannot be met by vocational education courses offered in their own schools. Students enrolled in the center would usually spend one-half time there and one-half time in their home schools; however, their identity should remain with the home school.

The Community College. Adequate vocational education programs must provide for continuing education. To accomplish this, each region of the State should be served by a community college or be part of a community college district. The community college should serve as the post-secondary area vocational-technical institution. In some instances, a university or college offering vocational-technical education programs in their region can serve this function. The community college should provide vocational and technical programs for post-high school students who desire to continue their education, and for out-of-school youth and adults in
need of training or retraining. Secondary area vocational programs could be operated by the community college if requested to do so by K-12 districts involved.

The post-secondary institutions -- community colleges and the four-year universities and colleges -- need to plan for providing the specialized occupational training programs not available in all areas of the state. Such a statewide plan is essential to avoiding undesirable duplication and competition and to make most judicious use of state and local funds.

**The Intermediate School District.** Intermediate districts should assist local school districts in any cooperative activities designed to facilitate and improve vocational and technical education programs. Where an area vocational center is desirable and cannot be provided within a single K-12 district, the intermediate school district can serve as the tax-levying and coordinating agency for developing an area program. The intermediate district would be required to enter into a contractual relationship with one or more of the constituent districts, or the community college, for operating the program. The intermediate district is not empowered by law to act as the operating agency for area vocational education programs.

**The State Department of Education.** The Department of Education recognized leadership as its principal role with respect to vocational and technical program development.
While the concept of local autonomy is well established in Michigan, the Department accepts responsibility for providing guidance in the decision-making process relative to local programs of education consistent with the provisions in the Michigan State Plan for Vocational Education. The Department of Education must assume a supporting role by assisting educational agencies in the developmental processes inherent in the continuous improvement of the total educational program.

Program articulation among K-12 districts, secondary area vocational centers, community colleges and four-year colleges and universities is essential. Without this, the educational program will be less effective in preparing Michigan citizens for full participation in society and in the world of work.

Organizational Patterns

A multiplicity of differences between the several regions within the state indicates that no single pattern of organization will effectively serve all regions. To secure maximum development of opportunities for vocational and technical districts, community college districts, four-year colleges and universities, and the State Department of Education must work cooperatively to plan and implement area vocational-technical programs. Official designation will be given by the State Board of Education.
specifically for area center buildings and operating districts.

A. Secondary Area Vocational Programs

1. When designated buildings are used, two or more secondary districts could provide cooperatively an area program by using any of the following four patterns:
   a. Buildings owned and operated by and located at one of the participating high schools, or
   b. Separate buildings owned by the intermediate district and operated by one of the cooperating school districts, or the community college serving the region, or
   c. Buildings owned and operated jointly by two or more K-12 districts under an inter-governmental contract, or
   d. Buildings owned and operated by the community college serving the region located at the college site in other locations accessible to all people in the area.

These programs could be financed locally in the following ways:
   a. By a tax levied by the intermediate district,
   b. By charter millage or additional millage levied by the community college district to operate secondary programs.
It is possible to finance some area vocational programs on a tuition basis. However, due to the undesirable aspects of tuition arrangements, they should be used on an interim basis only.

2. School districts of the first and second class could own and operate area vocational centers by using facilities strategically located within their district and officially approved by the State Board of Education as area vocational centers. Financing area programs would be the responsibility of the operating district.

B. Post-Secondary Vocational and Technical Education Programs

Post-secondary area vocational and technical education programs should be operated and financed by the community college, or by a four-year institution offering vocational-technical education programs, in each region of the State. Facilities should be located at the college site or in other locations readily accessible to all persons in the service area. If the region is also served by a separate secondary area vocational education center (as described in A.1.b., above), these facilities should be available to the community college for operating post-secondary vocational and technical education programs at times when not being used for secondary programs.
This procedure will eliminate needless duplication of facilities within the area and will permit maximum utilization of the secondary area facilities.

Geographically the educational region in and around Barry County is represented by the following diagram:

Limited vocational facilities located in the Hastings area could serve students in any of the five school districts on an Area Program Concept basis.
Definition of Vocational Education: Vocational education is specialized training designed to develop skills and abilities which will enable an individual to enter into or to progress in employment on a productive basis. Such training seeks to make every boy and girl more readily employable through offerings adapted to his interests and ability level. It also aids adults who need upgrading in their skills in order to cope with the heightening employment demands of modern society.

The Area Program Concept: The area vocational and technical concept emphasizes cooperative arrangements between two or more school districts and is based upon the conviction that all persons should have easy access to quality vocational education programs directed to individual occupational preparation needs, abilities and interests. It provides that students retain their identity with, receive their general education in, and graduate from, their home high schools. Such students would also participate in the extra-curricular activities of their home high school.

Rationale for Area Vocational Education:

1. It provides financial support on a broader tax base distributed over a larger population than is possible in a single school district.
2. It avoids unnecessary duplication of equipment, facilities and other costs which occur when two or more neighboring districts offer identical or similar
programs on less than a full time basis.

3. It permits the optimum utilization of specialized teachers who are in limited supply.

4. It makes possible a broader range of curriculum offerings and therefore, a more extensive program which is in keeping with the American philosophy of a comprehensive high school.

5. It offers greater training opportunities to a larger number of persons in relation to their personal interest and abilities than is possible in smaller school districts serving single communities.

6. It complies with the current recommendations of national, state and local studies concerning the most feasible methods of providing improved vocational education.

7. It is apparently the best known means through which small individual school districts lacking sufficient financial resources and/or students can provide adequate vocational education opportunities to enable all youth and adults to develop and maintain satisfactory occupational competence.

Each specific program area is given a code number which is used for funding purposes. One or more of these programs may be found in a local school district but in the past ten years the emphasis has been to develop area skill centers which cater to several school districts.
within a geographic area. Ideally this provides more education for the dollar by eliminating duplication of facilities and provides first rate instructors and programs. (See Appendix A.)

Philosophically vocational programs exist to train people to meet the job demands established by industry. Objectives are established which provide experiences as nearly identical as possible to those found on the job. It is with this understanding that a director of Vocational programing must be familiar with, and thoroughly understand, the organization of industry, its methods, structure, and expectations. Familiarity of this sort requires first hand experience and this is the reason I chose professional field experience in industry.
CHAPTER II

EXPERIENCE WITH E.W. BLISS, CO.

The E.W. Bliss Company of Hastings is an ideal organization to work in and gain first hand experience in industry. Bliss is a world-wide producer of heavy punch presses, a subsidiary of Gulf & Western, and employs 800 people. It is large enough to get a taste of corporate organization yet small enough to observe at first hand many skilled trades in the metal working industry. Industrial Engineering has initiated a many faceted project dealing with plant layout, machinery specifications, and energy conservation. I have been assigned to work on a coequal basis with an industrial engineer. My experience runs the spectrum from repetitive data collection to formulating decisions concerning equipment location, energy conservation, and material processing. Conducting this activity provides ample opportunity to discuss in detail the aspects of the situation with machine operators, foremen, superintendents, maintenance personnel, truck drivers, plant engineers, mechanical engineers, plant guards, hiring and personnel employees, business managers and office help. Everyone has something to offer which aids in forming a complete picture of the situation as seen through different eyes. All the people I talk to find
out who I am and many times the conversation turns to education and what are the schools doing to prepare kids for jobs in industry. Situations develop which are very informal and ideas are brought forth from both sides which clarify misunderstandings and provide for an exchange of information.

Plant engineering personnel encouraged me to make observations, present proposals, and take an active part in decision making. All of the experiences are going to be very helpful in assuming the role of a vocational program administrator. Nowhere in the normal realms of educational situations could I ever obtain similar experience. Formally, I have been assigned the following objectives:

A. Layout Entire Plant as is - ¼ scale
   1. Perform equipment analysis
      a. type
      b. horsepower
      c. swing capacity/table/fixture/etc.
      d. location
   3. relative capacity based on machine condition, speeds, feeds available, etc.
      f. recommend duty - (light, heavy, replace)
   2. Indicate material flow

B. Review and recommend Plant Layout Improvements
   1. Include staging in and out of material by depart-
ment/process

2. Take into consideration future plant product/volumes etc. for periods of 1,5,8 years in the future, beginning FY 1980-

C. Develop Energy Consumption Profile

In conjunction with layout information gathering, provide plant engineering with energy consumption lists to include:

a. type of equipment
b. type of consumption
c. productive, non-productive
d. volume of consumption
e. relative priority/potential

2. Recommend ways to improve profile.
CHAPTER III

USING THE FIELD EXPERIENCE

Using the professional field experience in conjunction with my formal education, several years work experience in metal working trades, and the last twelve years as a classroom teacher, I intend to apply it to the following areas:

I. Determining Industrial Employee Needs
   A. Identify specific job titles in Michigan
   B. Determine specific numbers by county
   C. Describe specific skills needed

II. Providing Vocational Facilities
   A. Determining geographic location
   B. Facility size and cost
   C. Specific machinery, equipment, and tools
   D. Determine instructor needs

III. Education and Industry Coordination
   A. Establishing Courses of study
   B. Developing course content
   C. Equipping laboratories
   D. Providing material
   E. Establishing channels of communication
   F. Provide for field trips and guest speakers
   G. Utilization of technical know-how

IV. Funding for Vocational Education
A. Local District Budget  
B. State reimbursement  
C. Federal reimbursement  
D. Industrial Grants and donations  

V. Added time Programming  
A. Summer school  
B. Adult Education  
C. CETA Program (See Appendix B)  
D. Apprenticeship training  
E. Shared time with area schools  
F. Contract scheduling  
G. A.W.S. certification  

VI. The Industrial Environment  
A. Labor union organization  
B. Management organization  
C. Job level status  
D. Job seniority and the bidding system  
E. Salary and hourly wages  
F. Fringe benefits  
G. Bargaining  
H. Retirement  

VII. Career Education  
A. Job description handbook  
B. Choosing a career  
C. Geographic employment guide  
D. Choosing a curriculum
E. Co-op experience
F. Job interview
G. Writing a resume
H. Job Application Form

Designing a standard form which contained the specific information needed by the Industrial Engineering Department was the first step. (See Appendix C). Information needed to be gathered on each of three hundred and seventy-seven different machine tools directly engaged in production. Although the work was very repetitive and time consuming, it gave me a very close look at a wide variety of machine tools. Some were small while others were extremely large and specialized. Unless an industrial arts or vocational education teacher had the opportunity to work in heavy industry, he would never have the opportunity to familiarize himself with the wide variety of machinery and processes found at E.W. Bliss. Having spent over one hundred hours in the production area, gave me ample opportunity to observe processes I have never seen before. Nearly all of the machine operators answered numerous questions and allowed me to familiarize myself with their machine. Among the most interesting were gear cutting machines, specialized grinding, numerical control mills, and the large Ingersolls which are twenty feet wide, sixty feet long and thirty feet high. Very few people are exposed to cutting machines of this size and the men who
run them are paid top wages.

Part of my assignment was to observe material flow and economic utilization of equipment. Perhaps this became the most beneficial part of my experience as I was encouraged to make recommendations to improve the process. In doing so I was able to talk to all of the machine operators on the second shift. Many of them had ideas on ways to improve production and eliminate unnecessary movement of stock and labor. Also information was obtained on the present condition of the machinery, its capacity, and the accuracy of its functions. A major task of the industrial engineer is to assign specific jobs to specific machines. As was pointed out many times, a job was placed on a machine which was no longer in condition to make the part accurately and economically. Their point of view did have merit in my estimation, and was worthy of discussion with engineering. Many recommendations were offered which reflected the opinions and ideas of the machine operators, laborers, and supervising employees. (See Appendix D.) All of the forms were presented to industrial Engineering personnel and were discussed. This has proven to be excellent experience for me working in the real world of industry and taking an active part in organization and management of people and processes.
CHAPTER IV

COORDINATING INDUSTRY AND VOCATIONAL EDUCATION

Vocational education programs in the skilled trades could benefit from an organizational approach which emphasized an up to date machine and tooling data retrieval system. Involving staff and students with detailed machine and equipment descriptions and organizing shop layout by processes provides for a better understanding of production practices. In addition, better job descriptions can be developed which indicate skills, working conditions, and salaries existing in industry at the current time. Work experiences could be developed which would require the student group to route the product through the shop including all pertinent speeds and feeds data necessary to machine and finish it. Routing material through a manufacturing plant requires a thorough knowledge of all types of machine tools and equipment, cutting tool capabilities, speed and feed calculations, physical properties of materials, and measuring and monitoring techniques. No other single job in manufacturing requires such a spectrum of practical knowledge. It is this knowledge that an educator needs to be an effective teacher of skilled trades. Gaining respect from industry is a long healthy step forward in developing education-industry coordinated
programs for preparing youngsters to be gainfully employed. Industry has the capability to provide vocational programs with expertise, surplus equipment, materials, resources, and co-op training positions.
CHAPTER V

CO-OP PROGRAMMING

Co-op training and experience as it now exists in many school districts is far removed from the ideal. Students are released one-half day to perform a menial job for a local employer at minimum wage. For this effort, in addition to money, the student receives three units of credit towards graduation. Jobs vary from car washers, shelf stockers, retail clerks, and janitors to farm laborers and gas station attendants. True co-op programs offer a student a specific course of study in an academic curriculum coordinated with work experience within the community their senior year. Unfortunately, this is not the case in most instances. Fast foods preparation and carrying out groceries is unrelated to any formal program that is being studied at school. All of these unrelated "Co-op" programs should be eliminated and all effort concentrated in establishing true co-op programs coordinated with a planned course of study.

Developing co-op programs in the skilled trades will require complete support from the State Department of Education, industry leaders and labor unions. As it stands in small communities at the present, labor unions oppose the idea on the grounds that these young people are threats to their job security. Effective communication
between educational representatives and labor leaders must develop to convince all that the proper training of young workers is vital to the strength of our nation's skilled labor force. Allowances have been made by the State Department of Education to allow sixteen and seventeen year old students to work in industry under supervised co-op training programs. Extensive guidelines have been developed which apply to the organization and administration of the program. Objections raised by labor unions have prevented participation by local school districts. Small non-union shops offer a partial solution but they are few in number and too small to accommodate more than one or two students. If industry and labor do not cooperate with education then the concept of co-op training should be forgotten and other avenues explored. Perhaps creating an industry within the educational setting would be a possibility. Should vocational auto mechanics or welding programs offer a service or a product under the supervision of a competent experienced instructor and operate at a profit? An operation of this type could be established and operated which would offer experiences as near to industry as possible. Small businesses in the area would have a concern that a school operated program would take business away from them. This is postulated on previous discussions and experience. If there is work to be done and shortage of labor to do it there
shouldn't be any complaints. If there is a shortage of work and an abundance of skilled labor then the school shouldn't be concerned with turning out laborers in an area filled with people. An analogy can be drawn with teacher education institutions graduating an over abundance of people in an area of limited need. The point is, if there is a need it should be met, if a need does not exist do not waste time and money on it.
CHAPTER VI

ESTABLISHING THE VOCATIONAL PROGRAM

Determining need is the key to establishing a vocational program. Based on need and corresponding to a sound philosophy, general and specific objectives can be established to meet the need. Under these circumstances money, time, and effort can be expended establishing a program suitable to industry, education, and government alike.

Barry County, Michigan is a very rural county with a population of 42,500. Located within the county are parts or all of the following school districts: Hastings Area Schools, 601 students in grades eleven and twelve; Thornapple-Kellogg Schools, 325 students; Delton-Kellogg Schools, 381 students; Maple Valley Schools, 272 students; and Lakewood Public Schools, 463 students in grades eleven and twelve. Vocational courses are offered in some areas in each of the five schools. In addition to the local school districts three Area Vocational Skill Centers are located in close proximity to Barry County. Thornapple-Kellogg in Middleville sends students to the Kent Area Skill Center in Grand Rapids. Lakewood utilizes a few spaces in the Lansing Area Skill Center. The Calhoun Area Vocational Center is located in Battle Creek but no school system in Barry County is linked up with it politically. Delton-Kellogg sends a few tuition students there yearly.
Hastings, the county's largest community, with a population of 7,500 is centrally located in the county with each of the other districts on the perimeter. Joining any of the area skill centers would mean a bus ride one way of forty minutes to an hour and fifteen minutes. Hastings school district voters turned down a millage proposal to annex to the Calhoun Center, which was felt by school officials to be the best choice. Delton has not made a move to annex nor has Maple Valley. Conditions make it feasible to run a limited vocational program in Barry County in the Hastings City area. As discussed earlier a needs assessment should be made which would determine the skills needed by area industries. Through my work at the E. W. Bliss Company I have been informed that industries in Barry County recently hired fifty-five machine operators who reside outside of the county because they could find no local residents with the necessary skill requirements. Statistics indicate that the unemployment rate in Barry County is 6.3%, compared to the national average of 5.7% over the last half of 1978. In addition many second and third generation welfare recipients reside in the county. Coupled with industry's needs plus the needs of the residents the indications are that a vocational facility that would serve high school students daytime and adults evenings would be feasible. Monies could therefore be obtained through state and
federal grants for vocational education in addition to funds available through CETA administration.

Indications are that the need exists in the two major areas of Machine Operation and Gas Cutting and Arc Welding skills. (see appendix E) Within a 25 mile radius of Hastings there are 21 industries which have need for these skills. (see appendix F) Hastings is the only school in the county which teaches vocational machine shop and vocational welding. Both of these courses are full and the laboratory is much too small. Welding is cramped in a corner utilizing 600 square feet out of 2239 square feet in the total facility. State guidelines demand a minimum of 130-150 square feet per student. At the present time one two hour block of machine shop is offered during the school year and a three hour block of gas cutting and arc welding is offered in the summer. Under these conditions alone it is reasonable to determine that larger facilities are necessary to properly house programs in each area. Adhering to the guidelines and programming for 20 vocational students in a two hour block would require 3000 square feet for each area alone. Currently the combined facility is used six hours daily, four hours of industrial arts metalworking and two hours vocational education. In addition the Adult Education program uses the facility five nights per week, three and a half hours per session. Adult Education sponsors one night per week welding and operates a CETA funded machine shop program four
nights per week. Combined, the two programs bring in many extra dollars for supplies and equipment to the school system. State reimbursement for added cost vocational programs operated during day school bring in additional funds. This is all happening in an extremely inadequate facility. Planning for this facility did not include separate laboratory facilities for each metalworking area. Consequently the growth of programming and increased demand for vocational education coupled with the voter's refusal to annex to a skill center has resulted in overcrowding and unsafe conditions. Federal monies exist which are designated for the development of new vocational facilities on a matching fund basis. All of the existing conditions make it seem reasonable to conclude that a new program and facility is possible. Hastings Area School district could not afford it on its own but the needs do exist. Industry needs skilled labor, citizens want evening courses, CETA is buying time for the unemployed, and all five schools in the county have students who desire training. Combining resources from five school districts with those of state reimbursement, federal grants, CETA funding, and industrial contributions should make it possible to expand the existing facilities to meet the needs of the people of Barry County. Drawings of the existing facilities, the proposed facilities, existing equipment, proposed equipment and cost figures have been included. (see appendix F).
Vocational advisory councils which work with specific subject matter areas are mandated by the State Department of Vocational Education. Since 1974 the advisory committee for Machine Shop and Welding has been composed of four men from area industry, one high school counselor, one junior high industrial arts teacher, and myself. This year we have added one graduate of the vocational program currently working in industry. Of principle concern the past four years has been our failure to align with a skill center and the subsequent inadequacy of the current facility to house vocational education. Program evaluation is an annual requirement for state funding, the results being overwhelming support to increase the current laboratory space.

Barry County isn't the only county in Michigan with this situation nor is Michigan the only state in the Union with these circumstances. Perhaps a model may be developed along with guidelines which could streamline and expedite the process of establishing vocational education in rural areas of need.
CHAPTER VII

VOCATIONAL WELDING PROGRAM PROPOSAL

Specifically I propose an addition measuring 40 feet by 84 feet adjacent to the machine shop and auto mechanics shop. Providing 3,360 square feet it will house a complete exercise, fabrication and testing facility. Upgrading of equipment, primarily in the gas cutting and welding areas, can be best accomplished in a new construction. Welding programs should be based on industrial needs and through an analysis of the area industry's needs the following outline of content has been established:

I. Job Classifications
   A. Hand Cutting
   B. Machine Cutting
   C. Gas Welding
   D. Brazing
   E. Arc Welding
   F. Metallic Inert Gas Welding
   G. Tungsten Inert Gas Welding
   H. Layout and Tack Welding

II. Safety
   A. Compressed Gas Cylinders
   B. Electrical
   C. Combustable Materials
D. Equipment
E. Clothing
F. Set-ups

III. Blueprint Reading
A. Sketching
B. Common Joints
C. Standard Forms
D. AWS Symbols
E. Principles of Design and Layout
F. Mathematics and Measurement
G. Cost Estimating

IV. Machine Tools and Power Equipment
A. Band Saw
B. Hack Saw
C. Power Shears
D. Ironworker
E. Drill Press
F. Pedestal Grinder
G. Belt Sander
H. Air Chisel
I. Disc Grinder
J. Hydraulic Tube Bender
K. Flame Cutter
L. Line Cutter
M. Tensile Tester
N. Hydraulic Arbor Press
V. Welding Equipment
   A. Brazing Torch
   B. Arc-Air Torch
   C. TIG Torch
   D. MIG Gun
   E. MIG Spool Gun
   F. Carbon Arc Torch
   G. Electrode Welder
   H. Spot Welder
   I. Submerged Arc Welder
   J. Theory of Electricity
      1. AC-DC
      2. Volts
      3. Amperage
      4. Ohms
      5. Slope
      6. Phase
      7. Hi-frequency

VI. Weldament Filler Material
   A. Silver Solder
   B. Bronzes
   C. Gas Steel Filler
   D. Cast Iron Filler
   E. Stainless Steels for TIG
   F. Aluminum for TIG
   G. Magnesium for TIG
H. Nickel for TIG
I. Arc Welding Stick Electrodes
J. MIG Wires
K. Hard Surfacing Wires
L. Powdered Metals for Metallizing

VII. Compressed Gases
A. Oxygen
B. Acetylene
C. MAPP
D. Propane
E. Natural Gas
F. Argon
G. CO₂
H. Hydrogen
I. Nitrogen
J. Combination Gases

VIII. Frame Construction
A. Buildings
B. Cars and Trucks
C. Trailers
D. Boats
E. Machinery

IX. Heat Treatment
A. Bending
B. Stress Relieving
C. Hardening
D. Annealing
E. Tempering
F. Forging

X. Testing

A. Nondestructive testing
   1. Magnaflux
   2. Ultrasonic
   3. X-Ray
   4. Spray Penetrant

B. Destructive
   1. Guided Bend
   2. Tensile Test

Comprehensive programming of this intensity will require up-to-date equipment and extensive supplies. Most of the existing equipment will be utilized with additional equipment required.
CHAPTER VIII

TESTING AND CERTIFICATION CENTER

Being a fully comprehensive facility it could become a training and testing center for southwestern Michigan. Fees for certification testing are normally $100.00 per person, which more than pays for time and materials. Testing centers in Michigan are located at various educational and industrial facilities. (See Appendix G.) Industry in southwestern Michigan could utilize a competent testing center certified by the American Welding Society.

Many persons from Barry, Kent, Ionia and Kalamazoo counties have inquired about AWS Certification procedures. Hastings Adult Education has offered comprehensive welding for nine years, but has never offered American Welding Society nor American Society of Mechanical Engineers Certification. Testing and certification could be accomplished in the proposed facility that would benefit industry as well as the aspiring weldor. Materials such as pipe specimens, stainless steel, aluminum and magnesium coupons and special alloys would be provided by those industries desiring certification service. In addition, expertise in new areas of welding technology could be provided the school in the form of guest lectures and demonstrations by personnel from industry.
A comprehensive program of this type would be an ideal place for student teachers training to be vocational welding instructors. Industrial representation, extensive up to date equipment, related instruction, abundant material and a complete course of study would make it an ideal training situation.
CHAPTER IX

GRADE 13

Many young people graduate from high school at age 17. Of these approximately 40% do not join the military or go to college but are intent upon joining the work force. Industry does not hire people under age 18, so consequently these youngsters are placed in an uncertain situation somewhere between High School graduation and employment. For those who desire to enter industrial occupations perhaps an extra summer of preparation would be beneficial. Specifically, a vocational program in an area of study which would include related courses such as mathematics, and a co-op position in their prospective place of employment. Matriculation could be developed which would provide community college credit for the course work. Grade 13 would be a coordinated program of four distinct areas: 1) Vocational training; 2) Related academics; 3) Co-op training; and 4) Community College involvement. This experience gives the prospective employers and employees an opportunity to determine the relative merits of each other. Paying minimum wages as stipulated in state co-op guidelines the employer will not have as much money invested in the individual while having the opportunity to evaluate their potential for service to the industry. Hopefully, full employment would occur with encouragement toward an apprentice program and
further community college exposure. Complete cooperation between the high school, community college, and industrial employer must be developed and maintained to ensure continuity in the individual's experience.

Many areas of vocational training would fit into this coordinated programming framework. In addition to Machine Shop and Welding, Auto Mechanics, Vo-Agriculture, Business Education, Building Trades, Electricity, and Nurses Aides Programs could be developed in the Hastings Community. Two major points exist which make Grade 13 unique and valuable to the participant: 1) Community College credit which would encourage completion of a one or two year program and 2) Filling the void of the "unemployable months" with very worthwhile experience that the youngsters could not obtain by themselves. In other words take the public school involvement with kids a step further and guide them from Kindergarten to their first employment after graduation. Additional costs to school districts for instruction could be offset by added cost funding from the state. Lab fees for materials would be paid by the student in addition to materials obtained from industry.

Academic courses such as algebra, geometry, physical science, business machines, agri-chemistry, auto-electronics and drafting could be taught at the high school by regular staff or personnel from the community college. Course content would be a collaboration of high school, community
college and business and industry personnel. Education would have a new meaning, a very practical, learn it - do it now approach. Seventeen year olds need this help to bridge the gap in their lives, but eighteen year old graduates would benefit from such a cooperative program which could open doors of employment for them too. High School curriculums designed for college bound students do not allow for student exposure in areas of vocational education. A prospective engineer would do well to have a vocational metalworking or drafting class before entering college.
CHAPTER X

VOCATIONAL AUTO MECHANICS

Primarily the thrust of this report has been in the area of developing vocational metal-working programs, but a very similar situation exists in the area of vocational auto mechanics. Need has been established by the advisory committee working with the existing program to expand the present three stall facility. (See Appendix H.) Presently, one section of vocational auto is being offered which serves sixteen students. State guidelines require 180-200 square feet per student, at the present enrollment this means 3200 square feet. The present facility comprises 1800 square feet. Also, several students are turned away each year due to the space limitations which restricts the size of enrollment. Figures have indicated that a demand exists for two (2) three hour blocks of instruction. Certainly a shared time program could be arranged with the other school districts in Barry County which would increase numbers and therefore, three (3) two hour blocks would be established.

Certification of automobile mechanics has become state law and a shortage of qualified mechanics exists. Much of the same rationale discussed concerning vocational metal-working could be equally applied to the present vocational auto mechanics situation. Increasing from three to a maximum of sixteen stalls housed in a 4,264 square feet facility
would allow the existing shop to be used for power mechanics and small engine repair. (See Appendix F.) The latter being a very popular course in day as well as night school.
CHAPTER XI

SUMMARY

Educational institutions are established because needs exist. As time moves on our environment, society, and needs change. Quite often it is difficult to keep pace because needs aren't always easy to identify. Many are however, and they glare at us with an obvious demand to be met. People being people don't always agree, and needs and wants are often confused. Our monetary society demands that we prioritize our needs and wants because there isn't enough capital to do everything.

Faculties as well as communities are often broken into factions centered around a common gripe about the way the public school budget pie is cut up. Many are those who believe athletics receive much more than they should. Others scream about a "too-fancy" band which practices out of school far too much. There are even those who say; "Too much history, science, and physical education and not enough teaching them what they really need."

Obviously, curriculum planning is a multi-faceted, interwoven, and complicated task. Education must offer as much for the dollar as is possible with the least amount of personal crusading. From the philosophy of the school board, needs assessments need to be made which apply directly to the school district in which they are to be applied.
After needs are determined objectives need to be developed which in turn shape curriculum. It is the curriculum which is most often altered, revised, updated and otherwise manipulated. Curriculums determine facilities and physical plan specifications.

It is from the needs of Barry County as I see them that I present this paper and the specifications found within.
APPENDIXES

A–J
APPENDIX A

JOINING THE CALHOUN INTERMEDIATE SCHOOL DISTRICT

The following gives a brief look at the Calhoun Intermediate School District as a whole and the Vocational advantages in specific.

A. Services provided:
   1. Vocational Education
   2. Additional Special Education Services
   3. Cooperative Purchasing
   4. Instructional Materials
   5. Special Consultant Services
   6. Computer Services
   7. Cooperative Education

B. Vocational Program Offerings at the Calhoun Area Center:

   - Account Clerk
   - Agriculture Mech.
   - Air Cond. & Refrig.
   - Auto Body
   - Auto Mechanics
   - Bldg. Maintenance
   - Carpentry
   - Child Care
   - Commercial Art
   - Cosmetology

   - Food Service
   - Graphic Reproduction
   - Industrial Machines
   - Industrial Truck Mechanics
   - Institutional & Domestic Services
   - Horticulture
   - Male Attendant
   - Medical Office Practice
   - Nurses Aide
   - Office Practice

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Data Processing    Small Engines
Drafting           Visual Communications
Electricity        Welding
Electronics         Plumbing
Floor Coverings

C. Quota of students ------ 150

D. Course length --- 3 hours for 3 credits --- Some
1 year and some for 2 years --- Students would
enroll in 2 classes at Hastings either morning or
afternoon.

E. Schedule of Classes ------- 8:30-11:30
                                           12:15- 3:15
                                           3:30- 6:30

F. Placement following graduation - 95% of students
finishing Calhoun courses have been placed on jobs
by the Center's Placement Office. 67% in related
areas.

G. Millage comparison

<table>
<thead>
<tr>
<th>Barry</th>
<th>Calhoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>.13 Allocated</td>
<td>.26</td>
</tr>
<tr>
<td>.00 Debt Retirement</td>
<td>.00</td>
</tr>
<tr>
<td>1.25 Special Education</td>
<td>1.50</td>
</tr>
<tr>
<td>.00 Vocational Ed.</td>
<td>1.50</td>
</tr>
<tr>
<td>1.38 TOTALS</td>
<td>3.26</td>
</tr>
</tbody>
</table>

Difference 1.88

Note: This program would not include direct involvement
with Kellogg Community College. Affiliating with
the college would be additional millage.
Feb. 26, 1979

To: Administrative Board
   Members,
   Manpower Planning Council
   Youth Planning Council
   BBSJ Staff

Subject: THE CETA LAW (A Look At The Changes)

The text of the correspondence consists of six single spaced pages. Interested parties should consult the BBSJ Consortium.
<table>
<thead>
<tr>
<th>MACHINE</th>
<th>FLOOR SPACE</th>
<th>MACH WT.</th>
<th>MACH #</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN MOTOR</td>
<td>DATE MFD</td>
<td>WKPIECE</td>
<td>ASSET #</td>
</tr>
<tr>
<td>HP</td>
<td>DEPARTMENT:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMPS</td>
<td>LOCATION:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHASE VOLTS</td>
<td>DATE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP</td>
<td>R.P.M. RANGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMPS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHASE VOLTS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SWING**

**DIST. BTWN. CENTERS**

**HOLE THROUGH SPINDLE**

**SPINDLE SIZE & TYPE**

**TABLE SIZE**

**TABLE SIZE**

**AXIS TRAVEL IN INCHES:**

<table>
<thead>
<tr>
<th>A:</th>
<th>U:</th>
</tr>
</thead>
<tbody>
<tr>
<td>B:</td>
<td>V:</td>
</tr>
<tr>
<td>C:</td>
<td>W:</td>
</tr>
<tr>
<td>P:</td>
<td>X:</td>
</tr>
<tr>
<td>Q:</td>
<td>Y:</td>
</tr>
<tr>
<td>R:</td>
<td>Z:</td>
</tr>
</tbody>
</table>

**KVA DATA**

**KW =**

**DUTY HOURS/DAY =**

**KW HOURS/DAY =**

**COMMENTS:**
OBSERVATION AND RECOMMENDATION DATA

EMPLOYEE:  James W. Sutherland
ENGINEER CONSULTED:  Dick Baerman       DATE:  3-8-79

PROCESS INVOLVED:

Flame cutting plate stock; handling plate stock
by burner operator full length of foundry bay.

MACHINES:  Overhead crane and flame cutter.

DEFICIENCY OBSERVED:

Large material is brought through east end of bay
and transported to the burn table area.  Danger to person-
nel is increased and time is lost, including space conflict,
by this process.  Occasionally clamps used on plate slip
and pieces fall against finished machine parts etc.

RECOMMENDATIONS:

Move burner table west towards bar stock cutoff.  Set
up dock at west overhead door with beam crane equipped
with magnet and hook.  Handle material inside with roller
dollies in flat position.  Equip burner operator with over-
head crane with hand controls (pendant).  Area around west
door outside could be used for plate storage.
The following list represents the major vocational education programs offered at the secondary level in Michigan. They have been ranked below in descending order projected number of job openings in 1978 with the assistance of the Michigan Employment Security Commission. MESC's research and statistics division working with the U.S. Department of Labor's Bureau of Labor Statistics has prepared a 1970 census-based report entitled Michigan Occupational Outlook, 1980. This report provided the basis for the ranking listed below.

NOTE: Of the 35 occupations included in the rankings I have indicated only the metalworking and auto mechanic trades.

<table>
<thead>
<tr>
<th>RANK</th>
<th>PROGRAM CODE</th>
<th>PROGRAM NAME</th>
<th>ESTIMATED RANGE OF ANNUAL JOB OPENINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>14.0104</td>
<td>Mach. Operators</td>
<td>2,000-6,000</td>
</tr>
<tr>
<td>8</td>
<td>17.2306</td>
<td>Welding &amp; Cutting</td>
<td>1,000-2,000</td>
</tr>
<tr>
<td>9</td>
<td>17.2302</td>
<td>Machine Shop</td>
<td>1,000-2,000</td>
</tr>
<tr>
<td>9</td>
<td>17.2307</td>
<td>Tool and Die</td>
<td>1,000-2,000</td>
</tr>
<tr>
<td>11</td>
<td>17.0302</td>
<td>Auto Mechanics</td>
<td>1,000-2,000</td>
</tr>
<tr>
<td>11</td>
<td>17.0303</td>
<td>Auto Specialization</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

* Discussion with advisory committee indicated that the estimated range of job openings is very conservative.
BARRY COUNTY METALWORKING TRADES EMPLOYMENT DATA

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>MACHINE TRADES</th>
<th>WELDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. W. Bliss</td>
<td>380</td>
<td>12</td>
</tr>
<tr>
<td>Hastings Manufacturing</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Tyden-Viking Corp.</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Flex Fab Inc.</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Middleville Manuf.</td>
<td>105</td>
<td>2</td>
</tr>
<tr>
<td>Bradford White Inc.</td>
<td>28</td>
<td>60</td>
</tr>
<tr>
<td>Lescoa</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Hastings Aluminum Products</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Ketchum Machine Co.</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Munn Manuf.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Dimond Machinery Co.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Delton Production Products</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Plummer Bros.</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Standard Stamping Co.</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Ingall Machine Products</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Keeler Brass Co.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lake Odessa Canning Co.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Lake Odessa Machine Products</td>
<td>59</td>
<td>5</td>
</tr>
<tr>
<td>Fairett Inc.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Michigan Magnetics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Lykins Bros. Welding &amp; Machine Shop</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
PROPOSED VOCATIONAL ADDITION

Present Industrial Arts Laboratories

Voc. Auto Mechanics

Voc. Welding

Parking

Scale: 1" = 40'

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## EXISTING WELDING EQUIPMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxy-Acetylene Torch Kit</td>
<td>175.00</td>
</tr>
<tr>
<td>Oxy-MAPP Torch Kit</td>
<td>225.00</td>
</tr>
<tr>
<td>Flame Cutter and Table</td>
<td>1,300.00</td>
</tr>
<tr>
<td>MIG Welder</td>
<td>2,500.00</td>
</tr>
<tr>
<td>TIG Welder</td>
<td>2,200.00</td>
</tr>
<tr>
<td>AC-DC Welder (4)</td>
<td>425.00 ea</td>
</tr>
<tr>
<td>Carbon Arc Torch</td>
<td>80.00</td>
</tr>
<tr>
<td>Arc-Air Torch</td>
<td>110.00</td>
</tr>
<tr>
<td>Hand Torch Cart</td>
<td>60.00</td>
</tr>
<tr>
<td>4'x6'x 3/4&quot; Steel Welding Table</td>
<td>275.00</td>
</tr>
<tr>
<td>3'x 5' welding table</td>
<td>180.00</td>
</tr>
<tr>
<td>9&quot; Disc Grinder</td>
<td>150.00</td>
</tr>
<tr>
<td>4&quot; Disc Grinder (2)</td>
<td>90.00 ea</td>
</tr>
<tr>
<td>12&quot; Pedastal Grinder</td>
<td>450.00</td>
</tr>
<tr>
<td>Welding Helmets &amp; Gas Goggles</td>
<td>160.00</td>
</tr>
</tbody>
</table>

* Misc. hand tools and gloves also.
<table>
<thead>
<tr>
<th>PROPOSED EQUIPMENT</th>
<th>$ VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ton overhead crane</td>
<td>Bliss</td>
</tr>
<tr>
<td>5' x 5' acorn table</td>
<td>1,200.</td>
</tr>
<tr>
<td>oxy-acet. manifold, 8 station</td>
<td>1,600.</td>
</tr>
<tr>
<td>4' x 8' flame cutter, elec. eye</td>
<td>3,400.</td>
</tr>
<tr>
<td>MIG welders (3)</td>
<td>7,500.</td>
</tr>
<tr>
<td>TIG welders (2)</td>
<td>4,500.</td>
</tr>
<tr>
<td>AC-DC arc welders (2)</td>
<td>840.</td>
</tr>
<tr>
<td>hyd. tube bender</td>
<td>2,800.</td>
</tr>
<tr>
<td>hyd. arbor press 75 T</td>
<td>3,900.</td>
</tr>
<tr>
<td>power shear 1/2&quot; x 48&quot; cap.</td>
<td>4,600.</td>
</tr>
<tr>
<td>power forming rolls</td>
<td>6,200.</td>
</tr>
<tr>
<td>ironworker, 1 1/2&quot; hole in 1/4&quot; plate</td>
<td>5,400</td>
</tr>
<tr>
<td>9&quot; disc grinder (6)</td>
<td>930.</td>
</tr>
<tr>
<td>4&quot; disc grinder (2)</td>
<td>300.</td>
</tr>
<tr>
<td>mag. base drill</td>
<td>790.</td>
</tr>
<tr>
<td>positioning table</td>
<td>1,100.</td>
</tr>
<tr>
<td>sand blaster</td>
<td>600.</td>
</tr>
<tr>
<td>steel racks</td>
<td>500.</td>
</tr>
<tr>
<td>1/2&quot; H.D. elec. drill (2)</td>
<td>200.</td>
</tr>
<tr>
<td>Pullmax 7 ga. cap.</td>
<td>5,485.</td>
</tr>
<tr>
<td>welding booths (8)</td>
<td>2,060.</td>
</tr>
<tr>
<td>filler storage</td>
<td>400.</td>
</tr>
<tr>
<td>hand tools</td>
<td>800.</td>
</tr>
<tr>
<td>4' radial drill</td>
<td>Bliss</td>
</tr>
</tbody>
</table>
engine lathe, 16 - 18" swing Bliss 1,800.
mattalizing gun kit 1,800.
vise grip clamps (24) 190.
c-clamps (24) 390.
power hack saw 9"x 9" 1,600.
hor, band saw 10"x 16" 2,060.
Marvel vert. cutoff saw 3,500.
pipe beveling torches no. 1 & no. 2 850.
steel saw horses (8) 80.
water table 4"x 8' 400.
"Bug-0" line burner 760.
belt sander 2½" x 60" 835.
14" pedestal grinder 1,770.
14" wire wheel 875.
electrode oven 120.
submerged arc welder 1,800.
arc welding tables (6) 930.
Smith hand torch (3) 228.
Tuf Tony torch (2) 356.
Smith welding torches (8) 732.
SRH 333 DC 300 amp welder 600.

* NOTE: Average annual equipment cost for a quality laboratoy for welding and cutting as reported in Administrative Guide for Vocational Technical Education is $25,940.00.
APPENDIX G

TESTING FACILITIES IN MICHIGAN

1. Delta College
   Dow Welding Center
   Midland, Michigan

2. Ferris State College
   Welding Technology Center
   Big Rapids, Michigan

3. Zuidema Associates
   Kenneth M. Sweers, P.E.
   Grand Rapids Corporate Center
   3512 Roger B. Chaffee Blvd., SE
   Grand Rapids, MI 49051

   11301 Schaefer
   Mr. Rainey
   Detroit, MI 48227
APPENDIX H

MINUTES FOR VOCATIONAL AUTO MECHANICS

March 7, 1979

Members attending meeting: Frank Fuhr, owner and manager of Todd Automotive Parts & Paints; Dick Deming, owner-operator of Deming Auto Collision Service; Duane Glasgow, automotive specialist; John Scott, High School Counselor; Gordon Fuhr, Hastings Manuf. Oil Lab; and Steve Balderson, vocational auto mechanics instructor.

The meeting began at 7:00 p.m. and was held in room E-103 of Hastings High School. Introductions were made, Steve Balderson explained the purpose of the vocational program and advisory committee. Each member was given a four page explanation of all committee duties and functions.

We proceeded with two major areas of concern:

1. School--industry relationship
2. Current employment situation

Initially we discussed the many changes that are presently taking place and how they effect both teaching and business. We also discussed how it has become very expensive to keep pace with equipment changes because many become obsolete in less than a year.

The second relates to the first in that employment is in a demand, at present, for good "certified" mechanics. In the Barry County area there was mention of five employers who needed good mechanics immediately. Of greatest concern was the need for a person who could trouble shoot and
diagnose problems and be dependable.

Frank Fuhr commented on how Michigan is changing its certification program. This program will be more comprehensive than the national test and regardless, if you have passed the national test or not, you still must pass the Michigan test to be employed as a mechanic in Michigan.

It was also mentioned by Frank Fuhr that in the near future the State would assist in regulation co-op placement for automotive students so that there would be one trainee apprentice for every three certified mechanics in a service garage.

Next, we toured all the shop areas: Woods & Plastics, Drafting, Machine Metals and Welding, Electronics and the Auto Shop. Everyone commented on the organization and the neatness of the shop areas.

Throughout all of the labs as we toured, Duane Glasgow pointed out different problems and things he had either altered or redeveloped in order for that area to function better. This was done particularly in the wood shop, metals area and electronics.

While in the auto shop, I explained the plans for the addition of a vocational Welding and Auto Shop to be added to the existing building. Everyone agreed to the reasoning and wanted to help in any way they could. We then returned to E-103 and continued to discuss the details of the new facility and the necessary equipment.
We concluded by talking about any future considerations to service more students in our vocational areas and to better prepare them for job entry level after high school. All areas would be improved if the program were expanded.

The meeting adjourned at 10:15 p.m.

Respectfully submitted,

Steve Balderson
APPENDIX I

REFERENCES

E. W. Bliss Company
1004 E. State St.
Hastings, MI 49058

Lake Odessa Canning Co.
1315 Sherman
Lake Odessa, MI 48849

Bradford White Corp.
Lafayette St.
Middleville, MI 49333

Lake Odessa Machine Products
1201 4th Avenue
Lake Odessa, MI 48849

Delton Engineering
Grove St.
Delton, MI 49046

Lakewood Public Schools
824 3rd Avenue
Lake Odessa, MI 48849

Delton Kellogg Schools
Grove St.
Delton, MI 49046

Lescoa
900 E. Main
Middleville, MI 49333

Dimond Machinery
1645 N. Middleville Rd.
Hastings, MI 49058

Michigan Magnetics INC.
203 West 3rd
Vermontville, MI 49096

Hastings Area Schools
232 W. Grand
Hastings, MI 49058

Maple Valley Schools
11090 Nashville Highway
Nashville, MI 49073

Hastings Aluminum Products
429 S. Michigan
Hastings, MI 49058

Middleville Manufacturing
39 E. State St.
Middleville, MI 49333

Hastings Manufacturing
325 N. Hanover
Hastings, MI 49058

Munn Manufacturing Co.
143 W. Division
Freeport, MI 49325

Ingall Machine Products
Goddard Road
Lade Odessa, MI 48849

Pairett INC.
E. State St.
Hastings, MI 49058

Keeler Brass Company
1315 Hancock
Lake Odessa, MI 48849

Plummer Bros.
1150 129th Street
Wayland, MI

Ketchum Machine Company
219 E. Oak
Freeport, MI 49325

Standard Stamping Co.
1008 Reed St.
Nashville, MI 49073

67
Thornapple Kellogg Schools
3885 Bender
Middleville, MI 49333

Flex Fab INC.
1843 Gun Lake Rd.
Hastings, MI 49058

Tyden Viking Corporation
210 N. Industrial Park
Hastings, MI 49058

Lykins Bros. Welding & Machine
Main Street
Woodland, MI 48897
APPENDIX J

LOG

11-21-78 (4 hrs.)
Met with Manufacturing Engineering Department, met Harold Van Nocker - Maintenance Supervisor, toured shop thoroughly and met personnel. Looked over records of machinery in Plant Engineers Office.

11-22-78 (3½ hrs.)
Interviewed employees in various areas. Obtained 1968 plant layout and sectioned it off. Developed systematic method of covering plant. Determined where corrections need to be made.

11-24-78 (4½ hrs.)

11-24-78 (3 hrs.)
Review machine data and checked out machinery in Bay C.

11-28-78 (5 hrs.)
Verify machinery in Bay C. Discuss specific problems with workers and supervisors.

11-30-78 (4½ hrs.)
Verify machinery in Bays C & D and the tool room. Discuss machine maintenance with repairman.

12-5-78 (2 hrs.)
Finished D Bay and inspection of flame cut and welding. Discussed possibilities for improvement with maintenance supervisor and cutter operator.

12-6-78 (2 hrs.)
Checked first aid and auxiliary rooms attached to Bay C. Discussed communication problems with night superintendent. Talked over ideas concerning changes in flame cut area.

12-8-78 (3 hrs.)
Conference with Foreign Buyers Consultant concerning needs in his department. Compile list of machine builders phone numbers to establish correspondance.
12-21-78 (2hrs.)
Reviewed manufacturer's card file and recorded addresses & phone numbers to obtain scale templates.

12-22-78 (1 hr.)
Conference with Dick Baerman to determine scale for layout.

12-28-78 (5 hrs.)
Design and develop machine data form for gathering energy data and process information. Study: *Time and Motion Study* by Niebel.

1-15-79 (2hrs.)
Xerox copies of machine data form. Check out 2 lathes for number verification.

1-22-79 (3 hrs.)
Review machinery data records and discuss formulation with forman.

1-24-79 (2½ hrs.)
Fill in my copies of machinery data.

1-28-79 (3 hrs.)
Check motor data for any changes.

2-1-79 (3 hrs.)
Inspect plant for material scrap and waste. Discussed problem with materials supervisor.

2-2-79 (2½ hrs.)
Write machinery descriptions.

2-8-79 (2 hrs.)
Write machine descriptions.

2-9-79 (4 hrs.)
Write machine descriptions.

2-12-79 (4½ hrs.)
Write machine descriptions.

2-13-79 (2 hrs.)
Write machine descriptions.

2-14-79 (3 hrs.)
Write machine descriptions.

2-15-79 (3½ hrs.)
Write machine descriptions.
2-17-79 (4 1/2 hrs.)
Write machine descriptions.

2-18-79 (5 hrs.)
Write machine descriptions.

2-19-79 (2 hrs.)
Write machine descriptions.

2-20-79 (3 1/2 hrs.)
Conference with Dick about method for obtaining data. Inspected machines in shop for missing data.

2-21-79 (3 1/2 hrs.)
Checked out descriptions of machine location.

2-22-79 (5 1/2 hrs.)
Recheck prints and write machine specs.

2-23-79 (4 hrs.)
Validate data against machines.

2-26-79 (4 1/2 hrs.)
Write rough draft of experience and talk to G. Isham.

2-27-79 (2 hrs.)
Toured Bliss with my student teacher and traced down discontinued machinery.

2-28-79 (3 hrs.)
Finished machine specs for A, B, and C Bays.

3-6-79 (5 1/2 hrs.)
Worked on machinery specs and discussed problems in stock cutoff and inventory.

3-7-79 (4 hrs.)
Finished writing machinery specifications. Discussed problems in tool and cutter grind with operators.

3-8-79 (4 1/2 hrs.)
Correlated information. Developed plans of action and organized information.

3-9-79 (1 hr.)
Discussed current status of project with Industrial Engineering and Time and Motion study.

3-13-79 (3 1/2 hrs.)
Worked on drawing.
3-14-79 (3$rac{1}{2}$ hrs.)
   Worked on 1/4 scale plant layout.

3-15-79 (3 hrs.)
   Worked on drawing

3-16-79 (2$rac{1}{2}$ hrs.)
   Worked on drawing

3-18-79 (2 hrs.)
   Worked on drawing

From 3-19-79 I have been continually working on the plant layout. Tentative completion date of entire project is May 1, 1979.