THE EVOLUTION OF EDUCATIONAL HANDWORK IN THE U.S.A.

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THE system of educational handwork now in vogue in the American secondary school is known as Industrial Arts. It has evolved from older systems originating in Europe and is felt to be better suited to the needs of a youngster growing up in a highly technological world. As the Transvaal Education Department is reshaping its own programme on similar if less ambitious lines, an analysis of the new approach and its underlying philosophy becomes a matter of more than passing interest.

At the outset of this brief survey, however, I propose to outline early developments in this field, both in England and on the Continent, before discussing the nature and extent of the American break-away.

Most teachers in our secondary schools, irrespective of their specialised fields, have some knowledge of the subject which, here in the Transvaal, has been variously known as Wood and Metalwork, Handwork and Manual Training. It was patterned on the English system and in its earlier days was administered and taught by men whose training had been received there. The British influence has therefore been strong even though out teaching personnel is today entirely indigenous.

Prior to the Industrial Revolution it was generally accepted, at least by the ruling classes, that the education of the masses should not extend beyond the requirements of their occupations. More knowledge would bring discontent, leading to revolt against privilege. In the ideal state the greater proportion of the citizenry should remain poor and ignorant, the better to serve the needs of their masters.

The Church crusaded for schooling, however, having as its objective a wider reading of the Bible. Parental opposition was formidable. Children were in every sense "the gift of God" in that their meagre earnings helped to maintain the household. Eventually a compromise was arrived at. The school would provide remunerative activity while at the same time instructing the child in the art of reading. Thus the "Schools of Industry" came into being, paralleling the Ragged School Movement and paving the way towards free and compulsory education for all.

Technical Schools

Britain's struggles to achieve industrial supremacy during the 19th century led to the establishment of technical schools, which in their turn had considerable influence on the introduction of a system of educational handwork.

Earliest developments in this latter direction took the form of needlework for girls, introduced some time prior to 1850. Two decades later or so cookery entered the field, followed almost immediately by drawing, compulsory for boys and optional for girls.

Woodwork was tardy in breaking through to the elementary school, though it had already gained a foothold in some of the public schools, notably Bedford Grammar and Uppingham. It was not until 1885 that classes were started at the Beethoven Street School, Chelsea, the proximity of which to Parliament resulted in considerable attention being focused on its pioneering efforts.

Public funds were, however, still not available, notwithstanding the recognition already given to both needlework and cookery. To break the deadlock the London School Board appealed to the wealthier Guilds for financial assistance. This was immediately forthcoming, and in the late eighties, under the direction of a committee drawn from both the School Board and the City and Guilds Institute, several manual training centres (so called because of their location relative to the group of schools each served) were finally established.

The success of the experiment was clear from the start. Authority finally capitulated and in 1890 manual training took its place in the curriculum of the elementary school.

"Sloyd"

Paralleling these events in Britain was the development in Scandinavia of a system of domestic

handicrafts known as "sloyd" (the Swedish term is slöjd). In its earliest phases this was practised around the hearth during the long evenings of the Northern winter. Mothers and daughters occupied themselves with spinning, weaving, sewing and knitting while their menfolk, with simple tools, fashioned rakes, yokes and other useful equipment for farm and home. In course of time their products found a ready market, many villages became famous for some particular craft.

With the introduction of power and the growth of organised industry the availability of a more stylish, factory-produced article brought a decline in sloyd. The process was aided by increased activity in the lumber trade, drawing the menfolk to logging during the winter months. The resultant breaking up of the traditional home-life of the peasant and its degenerative consequences alarmed the authorities. In an endeavour to stem the tide sloyd schools were set up towards the middle of the 19th century throughout Sweden and Norway. Initially their sole purpose was to revive and preserve indigenous handicrafts. The pupils were paid for their work. The basis of these schools was thus economic rather than pedagogic.

To Uno Cygnaeus, director of popular education in Finland during the 1860's, goes the credit for first exploiting sloyd in that country's elementary school system, on principles laid down by Pestalozzi and Froebel. He postulated that handwork should be part and parcel of a comprehensive elementary schooling and taught by the class teacher rather than the specialist — an ideal which is still accepted by seldom attainable in present teacher training schemes. Finland thus has the distinction of being the first nation to make handwork compulsory in the elementary school. The boys learned woodwork and the girls needlework, instruction extending over several hours a week.

Meanwhile in Sweden in the 'seventies there was established at Nääs near Gothenburg a sloyd school destined to exercise great influence on educational handwork throughout the civilised world. In its infancy it followed the accepted pattern of the time. Under the direction of Otto Salomon young men were taught carpentry, turning, black-smithing, basket-making and leatherwork, with an admixture of drawing, mechanics, mathematics and physics. Maidens learned weaving, sewing and cookery. Seven hours of the day were devoted to the practical subjects and three to the more academic. The course lasted two years with one vacation of two weeks.

The nation-wide demand for sloyd teachers in the schools of Sweden, however, soon brought changes at Nääs. Salomon decided "to turn intelligent artisans into school-masters". Influenced by the theories of Cygnaeus he developed sloyd along pedagogic lines. His scheme provided for the making of useful objects in wood (considered to be the ideal medium) in a sequence of carefully graded tool processes, which at the same time provided a constant stimulus to the interest and enterprise of the child. Enrichment of education was the cardinal principle.

Salomon's school undertook the training of teachers in the techniques involved. Vacation courses were also offered and during the summer months attracted teachers from all over the world (it is on record that five South Africans made the pilgrimage). In a comparatively short time his theories were being applied in most civilised countries.

A third system to influence the Americans was that worked out by Della Vos during the late 'sixties for the training of engineering apprentices at the Imperial Technical Institute in Moscow. Systematic progression was maintained through a series of tool exercises proceeding from the simple to the complex. Although this training was starkly vocational it was based on pedagogical principles which still find general acceptance in modern schools.

The Russian method was demonstrated at the Centennial Exposition held in Philadelphia in 1876 and this event is generally accepted as having triggered off developments in the New World — an odd quirk of fate indeed.

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Industrial Arts

The American industrial arts system must be seen against its background — the revolutionary industrial developments of recent years. The electric generator has grown from the primitive dynamo to the great alternator. Television, radio, the motor car and the aeroplane are all 20th century phenomena. Steel in its hundreds of forms has taken over from iron, and plastics and other new constructional materials from timber.

In the U.S.A. it is estimated that the technological progress of the last 25 years at least equals that of the previous 100. There are today more than 50,000 distinct spheres of employ-

ment, nearly 60% of which did not exist a half-century ago. The two largest fields are aviation and motor transport with electronics a close third.

Factors influencing employment at the present time include

(1) automation and other recent developments which tend to eliminate the skilled machinist;

(2) reduction of the working week to 35 hours, with a prospect of further curtailment;

(3) the almost universal availability of cheap electric power (whereas a century ago 85% of all work done was manual, the figure today is less than 1%);

(4) increasing foreign competition, reinforced by a lower wage structure in the countries concerned;

(5) a constant movement by industry from its traditional strongholds into new areas, particularly the agricultural South, with consequent creation of ghost towns;

(6) an increasing demand for repair and maintenance personnel (as distinct from artisans) in the fields of radio, television, refrigeration, heating, office appliances, motor cars, etc.;

(7) curtailment of the apprenticeship system except in such fields as tool and die making.

The effect of these trends is to compel the worker to train for new occupations, quite often at a fairly advanced age. He knows also that he must regularly enrol in night classes to keep abreast of technological changes. Industrial arts and vocational educators accept as part of their responsibility the training of the labour force in new spheres.

In the world of education first steps were taken in 1880 when Dr. Calvin Woodward, a professor of applied mathematics, established a manual training school at Washington University. In this he taught his students the use of tools in the construction of apparatus needed for their experiments.

By the turn of the century a number of school workshops had been established for the teaching of woodwork and mechanical drawing.

In 1904 the term "manual training" was dropped in favour of "manual arts". Some ten years later the name "industrial arts" was first used and the programme of activities began to broaden coincident with the development and diversification of industry. These early advances were contributed to by Dewey, Bonser, Richards and other American educationists, and mark the beginning of the real break-away from the manual training system.

With the raising of the school-leaving age, too, the need arose for a programme of greater interest and challenge than that provided by woodwork alone. By the middle 'twenties, therefore, many schools were offering instruction in a range of subjects which included, in addition to woodwork and drawing, general metalwork, art metalwork, leatherwork, electricity and crafts. The name given to this diversified programme was "general shop."

By 1930 auto mechanics and graphic arts (letterpress printing) had been added. Some schools also offered a home mechanics course, it being felt that the pupil should be familiarised with the materials and processes of construction of the modern home.

With the broadening of the programme less work was performed with hand tools and more with machines. About the same time, too, an increasing emphasis began to be placed by employers on the school's responsibility for developing such qualities as honesty, self-reliance and resourcefulness rather than manual skill. These two factors appear to have had a very decided effect in influencing industrial arts away from older systems in which skill of hand is paramount. (Significantly, Dr. Ray Karnes, Professor of Industrial Education at the University of Illinois, in a recent setting out of desirable objectives, comments: " 'Skill' will no longer be a dirty word in industrial arts.")

The present official viewpoint is adequately if somewhat verbosely set out by the Board of Education of New York City, which describes industrial arts in the high school as "a curriculum area in general education, which seeks to develop knowledge, understanding and appreciation of our industrial civilisation through interesting individual and group manipulative experiences with a variety of materials, supplemented by readings, research and discussion.

"Through these experiences good craftmanship and intelligent consumership are developed and democratic and effective citizenship is fostered. The programme provides for the development of muscular co-ordination, manual and machine

skills, consumer education, leisure time activities, and integration with other subjects through active learning and doing situations. It also provides learnings in related cultural, industrial, technical and vocational areas of value in trades, occupations and professions, and to consumers.

"Industrial arts directly benefits the pupil who will gain his livelihood in industry. It indirectly benefits the pupil who lives in an industrial society, giving that fuller understanding of the environment so essential to well adjusted living.

"It applies the basic principles learned in chemistry, physics, geography and mathematics to real-life activity, making academic subjects more meaningful to the student.

"It develops desirable attitudes and habits, creates opportunities for leadership and co-operation, giving all its participants a chance to share and work together in typical real-life situations."

Impressions

My impression, based on visits to a number of schools in the States of New York and Connecticut, is that the American teacher is succeeding in his main objective of aiding the child to understand the predominantly technological world in which he finds himself and of which he will later become a full citizen. The simple processes of the school workshop are being effectively patterned on the more complex processes of industry, even to the extent of mass production and the setting up of pupil personnel organisations which include, for example, a shop superintendent, tool foreman, materials foreman, etc. This identification with industry is in fact real and consistent to a degree which by our standards takes it right into the field of vocational training (which of course it is not), modern industrial methods and organisation being duplicated as far as this is practicable in the educational institution.

Considerable attention is devoted to the role of the worker and his remunerative prospects in all spheres, as well as the problems of the consumer in the selection, use and maintenance of the industrial product.

Much importance is attached to individual and group planning and the solution by the pupil of problems which interest him. Pupils are trained at a fairly early stage to work semi-independently, making good use of instructional material found in the workshop library or provided by the teacher. There may consequently be wide diversification in the class programme. While a series of projects may be undertaken at the bench this is not *per se* regarded as industrial arts. Moreover, manipulative work is not considered essential at every stage and part of the programme may take the form of experimental work in science, electronics, etc. In the lower classes the exploratory aspect predominates, with excursions into the fields of woodwork, metalwork, textiles, ceramics, printing, electricity and transportation.

Several factors contribute materially to such success as the scheme has achieved. Firstly, there is in this course (and I believe in others as well) no terminal examination. The school administrator is consequently free to adopt a programme of his own devising, having due regard to the special skills and aptitudes of his teaching staff, and the needs of the community. The latter, of course, under a system of direct taxation for educational needs, exerts considerable influence in this direction.

Then the size of classes is limited. In New York, for example, the State Department of Education lays down a maximum of 24 pupils. Workshops must provide at least 75 sq.ft. of floor space per pupil. In the more well-to-do areas this figure may rise to 125 sq.ft.

Whether the Americans are entirely happy with their system is a moot point. There is evidence of some doubt as to whether the present superficial coverage of a very wide content area has not been overdone in the prevailing enthusiasm for exploratory experiences. A faint nostalgic longing for the ordered progress of a well-planned manual training course is sometimes discernible. In the light of this it will be interesting to watch future developments in this country. There seems no reason why, profiting by the errors of the past, we should not succeed in hammering out an approach which incorporates the best in both systems and meets with the technological and aesthetic needs of our youth in abundant measure.

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