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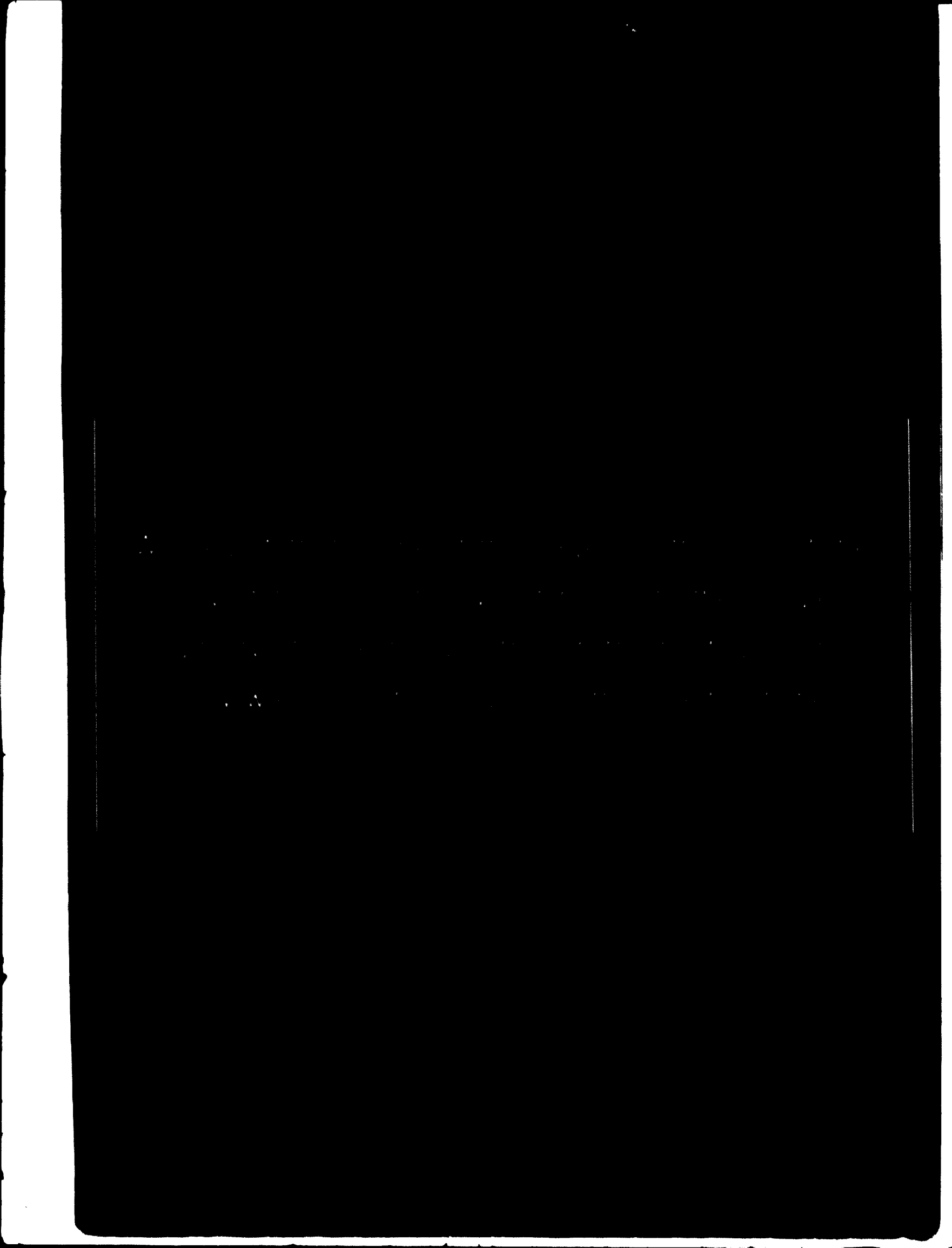
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EDUCATION AND TRAINING IN THE PACKAGING INDUSTRY ✓

by

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THE NEED FOR LIFETIME LEARNING

Today, in the age of Technology, we live not only in a Society of achievement, a consumer society and a leisure society, but also in a learning society.

Lifelong learning has become almost essential for existence in our time. In comparison with pre-industrial time, there are now much more rapid changes in our total living environment, not just in our working environment.

Adaptation to the contemporary circumstances of life and its ecological conditions, adaptation to the requirements of our work and technical progress in the working environment, and the mastering of new tasks with which we are faced at all stages of life, make it an almost unavoidable challenge to learn new things and revise the knowledge we have already acquired.

THE MESSAGE

Very many new developments in the packaging technology of machines systems, and materials have come up during the last few years. Most of it is new technology which did not even exist 25 years ago.

During that time packaging has grown rapidly to establish itself as a major industry and as a major component of many industries. New technology can be exciting; so exciting that there is a danger that, at worst, new machines can be little more than sophisticated toys--each new toy outdoing the last, providing status symbols for companies who like to think of themselves as being progressive. There have been companies, no longer in existence, who were for a brief time in the forefront of technology but who failed to exploit that technology to achieve business objectives.

The message I bear the duty of delivering today may not be a new one. It is simply that: "Investment in technology can be of little value if it is not matched by investment in Manpower".

Firstly, this implies the good selection of a team of people capable of achieving company objectives.

Secondly, it means providing them with the education and training they need to carry out their jobs successfully whether they are managers, technicians, salesmen or operatives.

Despite the title of this paper, it is no attempt to put forward solutions to the education & training problems of our packaging industry.

This paper is only an attempt to set the place of education and training in the packaging panorama. It is only an attempt to feel how urgent is the need of the Arab Countries for packaging educated and trained personnel.

These in turn will bear the responsibility of arising the package awareness in other sectors of the society.

Training & Education in general; motives, methods and systems have been thoroughly investigated in many areas, However for packaging, there is still a long way to go and there is still a lot to be done.

EDUCATION & TRAINING - A DEFINITION

Education & Training could have different objectives. Education is aimed at fullest possible development of the individual. Training is aimed at improving the profitability of the industry. Training is necessarily concerned with industrial techniques which already exist. That part of education which is related to science and technology is concerned with the ability to understand industrial techniques which may not yet exist.

The difficulty is always to establish the right balance of education & training at any given level.

In a world of rapidly changing technology, it would be dangerous particularly at technology level, to sacrifice education for training. The problem of identifying new technological processes and potential markets is one which cries out for professionals educated over a wide field, rather than trained in a narrow one.

THE PACK & COMPANY'S PROFITABILITY

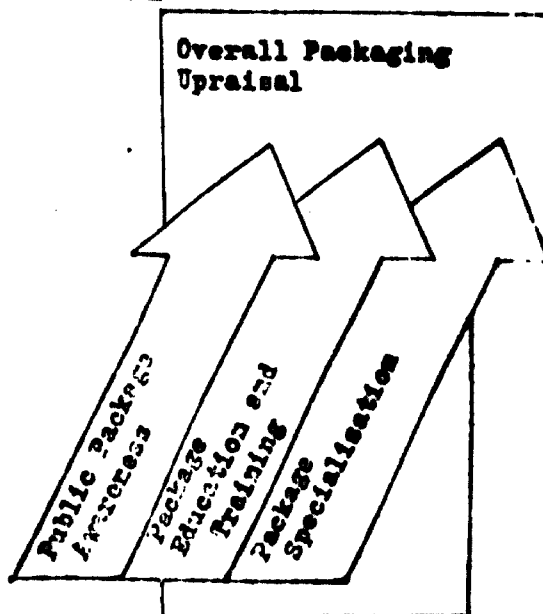
Think of a pak. On the surface it represents the work of a design team and perhaps an advertising agency. Beneath the surface, however packs from the humble matchbox to the ubiquitous tin can, are the tangible result of massive investment on the part of companies whose goods they carry. Packaging costs can play a major role in deciding a company's production outlay.

The reasons behind expenditure on packs should be obvious. The pack is the company's ambassador to the public. The image which it creates in the mind of the buyer is the image of the product itself. The wrong sort of pack can cost a company lost sales and falling market share. And the wrong sort of pack development strategy can also increase costs as a result of inefficient pack production.

Given that packaging, and the way it is dealt with by management can produce ripples and waves in the company's profit figures, there seems to be big scope for the education of the many managers in charge.

Packaging is a complex and difficult operation and needs the co-operation and integration of a large number of management functions for its success. Cooperation and integration depend for its existence on communication and knowledge. And communication efficiency and dissemination of information depend in their turn on education.

LEVELS OF PACKAGE KNOWLEDGE



The levels of knowledge in a field like packaging, one would expect to find in a society, could be arbitrarily classified as:

- 1- Package Awareness.
- 2- Package Education & Training.
- 3- Package Specialisation.

In industrialised (developed) nations the three levels exist simultaneously, whereas in developing countries this might not be the case.

If we consider one of the industrialised societies, it is not difficult to realise that it acquires:

- 1- A high degree of package awareness amongst the public.
- 2- A high degree of package awareness amongst the various sectors (User companies, Producer Companies, Educational Institutes, Environment concerned bodies etc).

That is why the importance of packaging is well recognised.

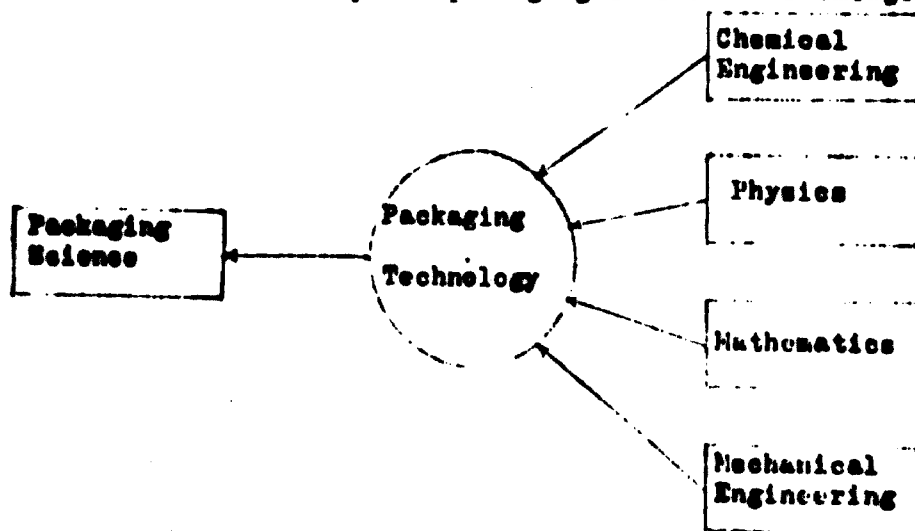
In most developing countries the realisation of such packaging awareness is present to a far lesser degree. Accordingly the packaging industry in developing countries is still unsatisfactory in terms of both quality and quantity and it is hence considered that a large proportion of goods produced are lost because of this.

DO WE HAVE A PACKAGING SCIENCE ?

There is beginning to come into existence a body of knowledge related to packaging that might be considered the foundation for a technology which will someday take its place with the older established sciences.

Food technology, Nuclear Engineering, Chemical Engineering ,

Industrial Engineering & Mechanical Engineering are all devoting a larger share of their efforts to packaging oriented problems. Out of which will eventually come up a unifying system for applying the fragmentary operations of each of these disciplines to the total problem of delivering goods to the point of use with the maximum efficiency. A packaging science will emerge.



Most of the progress in packaging in the past has been by trial and error methods. There is a great need for a more reliable basis for decisions, and this can come only from research in sufficient depth to give a solid foundation to the techniques required.

MULTIDISCIPLINARY NATURE OF PACKAGING

Packaging has a multidisciplinary nature. It is an art and science. It is materials and equipment, it is protection, promotion, law, logistics, manufacturing and materials handling; all rolled in one. It is many things to many people and a very difficult concept to describe and define.

Certain disciplines are basic to almost any branch of packaging.

The education of a technologist should include these fundamentals: Mechanical Engineering, Chemistry, Physics, Mathematics and Economics. These are applicable in some degree to every packaging problem. Optional subjects that might be included are: Marketing, Art, Graphics, Industrial Engineering, Printing Technology, Psychology, Law and Bacteriology.

An educational program must be a good balance among these divergent subjects in order to anticipate the demands of different manufacturing, marketing and research conditions.

PART TWO

THE ROLE OF PACKAGING CENTRES (REGIONAL & NATIONAL) IN THE EDUCATION & TRAINING PROGRAMS

For the manufacturer, the converter and the user alike, efficient and cost-effective packaging demands " Know-How " .

That is why for every establishment, packaging education and training needs should in fact occupy an important place and demand an early action.

Now the question arises, in regard of the classification given earlier, what would a national packaging centre do ? education or training ? . The straightforward answer is a bit of both .

Taking a leading role in the education process and training of personnel in the field should be given top priority amongst the tasks of National Packaging Centres.

Ideally the National Centre would be expected to provide information and data services, assists in the companies consultancy problems. It also provides library facilities; training ; documentation; abstracting; marketing; economic and statistical services.

The Regional Centre would be expected to provide besides all above, Research, Development & Project work for its members (in all Arab Countries), also testing and laboratory facilities.

PROBLEM AREAS

However, the road to that achievement in developing countries is not always silky, it seems to be hard and long.

There will be many problems and difficulties. The major of these will be:

- 1- The low level of general education in packaging technology and design, hence the low level of package appreciation.
- 2- The limited flow of information on packaging within the national market and between the national and the international markets.
- 3- The very limited number of packaging and design consulting and advisory bodies.
- 4- The limited financial resources in some cases.

What can be done ?

Despite the problems outlined, there is a lot which could be done, let us first see what is supposed to be taught and studied.

WHAT TO STUDY

To help realize what subjects are to be taught and to what extent? it is essential to know two things:

- 1- The elements and functions of a package.
- 2- The elements in the total cost of a package.

Very briefly let us wander into some of the above elements.

Hand in hand with a broad knowledge of materials and forms of packaging, must go an intimate knowledge of the processes used in the manufacturing & assembling of packages.

MATERIALS

A thorough understanding of the methods of making paper and paperboard will help in understanding their properties and in using them to the best advantage.

The same can be said of metal, glass and plastics and the serious technologist will learn all he can about these industries.

PROCESSING TECHNIQUES

Various techniques used in packaging depend on many areas of science & technology. To name a few of these techniques, there are Filling, Wrapping, Sealing and Bundling of various types. Processing & Sterilising are used for some foods & for surgical items.

Cleaning and Corrosion prevention are important in military packaging, and the prevention of mold & insect infestation also has its place in packaging.

Sometimes the work of the packaging specialist involves Material Handling, Warehousing and Carloading.

MACHINERY

Some consideration of equipment is an important part of any packaging program.

The best place to get first hand information about equipment is at the trade shows and expositions. The next best source is the periodicals and directories that are published regularly in the packaging field.

Packaging Centres equipment for package making and testing could be used, as part of training courses, for demonstration purposes.

COSTS

Any study of packaging inevitably gets into a consideration of costs. It is essential to have a good understanding of the various elements that enter into the over-all cost of a package. Each specific type of package has a beginning, a time of active use and an end, it must justify its life by contributing the maximum of value in relation to its cost.

Costs are incurred from the very conception of a package, and continue till the final liquidation of last inventories, while

value is received only during the "active use" period.

PRINTING

Packaging and, by definition, printing assists both graphically and functionally, within the cost parameters fixed by the marketing policy, to promote and ensure the safe delivery of the product in a sound condition to the ultimate consumer.

It is important to adopt or at least consider the concept of a total package design-physical shape fully integrated with graphics. A package must satisfy many people if it is to be successful and sell the product.

Consistently higher standards are demanded in terms of performance and decoration. This calls for close cooperation and discussion between manufacturers and users of printed packaging materials. The performance of the print when the purchaser of packaged material erects, fills, seals, packs, stores, transports, and markets the products, cannot be considered to be successful until the ultimate user disposes of the empty package. In fact, it may be argued that it goes beyond this to the destruction, recycling or re-use of the package. The following are examples of important functional properties:

Rub Resistance - Product Resistance - Low temperature Resistance - Heat Resistance - Light fastness - Moisture gas and flavour barriers - Non-Toxicity - Slip-Limits on chemical residues.

LEGAL CONSIDERATIONS

The packaging developer or coordinator has an obligation to see that the legal requirements are met. There are many laws and regulations concerning packaging and it is a constant problem to know the applicable laws and to keep abreast of the changes that are made so frequently.

TESTING & EVALUATION

One of the important lessons to be learned in packaging development is the need for an adequate testing program.

The measure of professionalism in this work might well be the thoroughness and adequacy of the test methods that are used. It cannot be overemphasized that a new or revised package should be checked under actual conditions of manufacture, storage, shipment, and use.

To obtain the best results and make the best use of packaging and packaging materials testing methods, it is essential to understand their limitations and the purposes for which they may legitimately be employed. It must always be remembered that the proof of any package lies in its performance, in the field for which it was designed, over a relatively long period of time-only in this way can a package or packaging material be evaluated.

SPECIFICATIONS

The language of packaging reaches its purest form in the specifications that are used to document a completed design. This is the means of communicating, in precise terms with purchasing, manufacturing, quality control, and all the other departments that are directly involved in the execution of the designer's intentions. It increases efficiency in all areas, helps to avoid errors and should keep costs to a minimum if the specifications are prepared properly.

PURCHASING

When the components of a package are purchased it is essential that as much information be given to the vendor as possible.

A clear understanding at the very beginning may prevent costly errors and delays in delivery.

It is the National Packaging Centre's duty to establish & verify national and international packaging standards, specially for local forms of packaging materials and packaging which may exist, using local Raw Materials, and which may not be covered by international standard.

THE MANY FORMS OF KNOWLEDGE TRANSFER

The following are examples without any particular order of priority:

- Conferences
- Full Time courses, resident (conducted by a group of instructors).
- Part Time courses, non resident (Conducted by a group of instructors).
(Full & Part time Courses are either short, medium or long range programs).
- " One " Evening Talk (Conducted by an expert).
- Seminars.
- Workshops.
- Competitions.
- Visits to Packaging Establishments (Users, producers ... etc).
- Exhibitions (International & National).
- Library (Periodicals & Text books).
- Abstract Service.
- Advertising Media (Newspapers/periodicals/TV/Radio/Cinema.
- Project Work

- Study Groups.
- Trade Journals.

WHO IS TO TEACH

In packaging education there is a need for competent instructors. Where are they to be found? are they to come from Academic Teacher's colleges or from industry itself?

At one end, there is the pure academic instructor (a theorist rather). This type of instructor has had no exposure to actual shop experience, has never held a full-time job in a commercial packaging establishment in which the objective had been to reduce costs and to squeeze some sort of profit from each job, besides having to meet deadlines and still have a quality job.

As well educated and trained as the college graduate may be, there is something valuable lacking; the lessons learned through experience.

On the other hand, there is the instructor from industry who have had the benefits of systematic background, but also does have a grasp of the actualities of the shop practice; lessons learned through experience.

In actual fact the programs to be organized by the packaging centres may have to make use of both types of instructors, the pure academic and the industrialists.

However before these instructors start, their knowledge need to be brushed, unified and a common language between them need to be created. This should be a priority task of the regional centre. To run a few training courses for the trainers themselves assisted in this by Unido experts and facilities.

INDUSTRY TO LEND AN EDUCATIONAL HAND

Obtaining instructors from industry is not the only thing industry can offer. As was previously indicated packaging is now a fast moving, modern and technically sophisticated industry.

This brings two facts to light;

- 1- If the industry is to continue and grow, it must attract more talent to perform the diversified jobs to be done.
- 2- There are outside industry very little schools available which can provide some sort of training.

The packaging centres, will be, this way, the leading bodies for education & training. That is where industry can help by providing the facility of up to date equipment and supplies; by keeping instructors informed on latest developments and techniques, and by co-operating fully with schools, colleges and organisations seeking up dated information and advice on the state of the art. In certain cases financial assistance could also be considered. It is considered the duty of the industry leaders together with the National Packaging Centre as an independent body to try to influence the syllabuses of some branches in some levels of academic education in their respective countries to be directed towards packaging.

It is indeed disappointing in Egypt for example not to find a trace of packaging teaching in the colleges where there should have been at least a mention of it (as in the colleges for Engineering Applied Art and Science).

A guide example is illustrated briefly in Appendix No I; giving a summary of current academic education of packaging and printing in the United Kingdom. The benefits of the Sandwich courses are indicated.

WHERE TO START ?

In the context of our discussion there are too many things National and Regional Centres can do. However it is not the intention here to list all the duties.

Instead however it is suggested to list in this paper only a few activities which seem logical to start with or at least to give them some concern in the centres plan of action for next year.

1- In my opinion the basic necessity which enables the centre to achieve its purpose efficiently is the establishment of a good library acquiring mainly all text books and periodicals published in different languages in the field of packaging and its related disciplines.

Besides, a collection of published and unpublished bibliographies (for example those prepared by PIRA and by ITC) would also be very useful. This bibliographies must be ammended contineously.

Providing a nice library service would always be one of the attractions which can make from the centre place a likable meeting point for the packaging managers.

2- The best up to-date information on packaging are the trade shows and the periodicals on the various aspects of packaging. There are international annual exposition for materials of packaging as well as seperate shows for machinery and equipment. Not only the ones that are devoted exclusively to packaging should be attended; there is much to learn at the pulp and paper exhibitions, as well as at the plaqtics, Chemical Engineering, Design Engineering, Printing and other related shows.

Sponsoring exhibitions or collaborating with other bodies in organising packaging and related fields, exhibitions is of specific importance in developing countries, as it significantly helps to transfer the technology and knowledge to a much wider spectrum of people.

- 3- The Packaging Centre should be the leader in the field of packaging education and training, standard-setting and qualification; should offer a widening range of courses designed to provide knowledges which can be of real value in a working situation. Such courses should indeed cover both:
- a- "Base" and "In-depth" levels.
 - a- "Base" Studies : In Packaging Principles and Practice.
 - b- "In-depth" Studies: related to specific products such as foods, pharmaceuticals, chemicals and to specialised areas such as packaging machinery, Flexible packaging and Printing.

The importance of visual aids, slides, films, samples ...etc, must also be emphasised.

Although some examples of courses and syllabuses are given as annexes to this paper, however there is no ready-made educational material that could be used without modification to meet the specific needs of developing countries.

It is necessary to keep both content and method under constant review. A conscious effort should be made to keep education and training schemes in line with a changing industrial scene

It is to be remembered that a learning program is not intended to make packaging experts of its audience nor is it designed to improve the capabilities of the marketing and packaging experts who come into contact with it.

Through discussion the trainees can relate the situation of his own firm and its products to the case histories given in the course as well as using the strategy of communication and collaboration on packaging problems, outlined in the course, to provide a constant reminder of the right way to tackle the problem. The lasting result of such discussion should be the automatic use of new found packaging awareness in the managers future decision making.

- 4- By increasing their membership; by attracting and convincing more and more members, packaging centres can keep alive. Personal contacts, and also inviting non-members & company representatives to the centre's meetings and talks are two useful means in this concern.

However, it might be a good time for some national centres to think of having branches in other large cities and not to depend solely on the central services in the country's Capital.

The branches can help in promoting the advancement of the science and art of packaging, at least by running "evening meetings" as main activity, where experts can talk and discuss with audience.

It is therefore essential that a high standard of papers should be maintained and that the subjects discussed should cover as many areas of importance to the packaging centre's future

development as possible.

Branchees can only really come alive if they are actively supported by members.

5- Out of the activities mentioned above, there will emerge a new number of interested & capable people.

It will be the duty of the centre to increase their knowledge and increase their capabilities by organising study groups on the following for example:

- The standardisation of materials, packages, specifications
.... etc.
- The collection and classification of data & statistics.
- The compilation of a Packaging Glossary and an Arabic Trade Dictionary.

6- For the Regional Packaging Centre, there must be a priority job for next year. That is to organise and run few training courses for the instructors themselves from all Arab Countries.
To Unify their terminology.
To Exchange experiences.
To Create a common language between them.

Finally, I think it is time for our national centres to start directing their activities aiming at one target. Just one; that is to raise the "Packaging Awareness" amongst both the public and the managers in various sectors.

Let the theme for next year be "TOWARDS A BETTER PACKAGING AWARENESS".

APPENDIX I

ACADEMIC PRINTING & PACKAGING EDUCATION
IN THE UNITED KINGDOM

Until 1960 printing colleges in the United Kingdom (as in most other industrialized nations) were largely concerned with the education and training of craftsmen in the various specialised production processes. As the industry moved from venerated craft towards modern technology there was a growing recognition of the need for a proportion of more scientifically trained young people to meet future needs in the management of technology. Part-time courses providing a technician education were first introduced at Watford, UK in 1960. These courses made a broader approach to production processes and paid greater attention to underlying scientific principles.

More advanced courses in printing technology were subsequently introduced in 1962 and 1965. These were organised on "Sandwich" or "Co-operative" basis with periods (normally six months) of college education alternating with similar periods of training in industry. The three years sandwich course with options in printing technology or packaging technology leads to the award of a Higher National Diploma (HND). Four year sandwich courses lead to the award of BSc Honours Degrees in Printing Technology or Packaging Technology. Watford is the only centre in the United Kingdom offering courses in printing and packaging technology at degree level.

Although organizationally they are much more difficult to run; sandwich courses offer many advantages over full time courses particularly for young people entering higher education straight from school at the age of 16.

The periods of training in industry have a maturing effect on students enabling them to derive more benefit from second and subsequent college periods. Initial broad experience of production processes followed by a series of projects in which steadily increasing demands are made on the student, mean that on graduating the products of the sandwich courses already have a good working knowledge of their industry and company, and are ready to do an effective job without the initial training normally given to a university graduate. A large proportion of technical graduates move into management positions sooner or later and at this stage part-time courses in management studies have proved their value.

The degree and diploma courses in printing and packaging each includes an element of business studies, underlining the point made earlier that technology is of little value in itself unless it can be directed towards business objectives. Other full-time courses are available in which the mixture of technical and business studies are weighted towards a business education with opportunity to specialise in advertising, marketing or printing. The trend in planning these advanced courses is towards more student choice in building an individual programme of study providing a particular balance of technical, business and design studies. To facilitate this flexibility, technical and business education in the United Kingdom is moving towards a unit or modular system, within which students and sponsoring companies can select a programme of study units to meet individual needs. Mention should be made of the important role played by the professional associations- the Institute of Printing and the Institute

of Packaging - in establishing standards for advanced education in these two fields. Both Institutes set their own examinations and they work closely with those colleges running courses for students seeking graduate membership of the two Institutes. The Institutes are also active in arranging meetings and conferences to promote the development of the technologies of Printing and Packaging.

As One might expect, packaging education is at an earlier stage of development than printing education, until now most packaging courses in the UK have been run on a part-time usually evening basis. During the last few years the Institute of Packaging has successfully introduced correspondence courses preparing students for its own examinations. A great deal of valuable work is done through short residential conferences.

The recent introduction of the degree course in Packaging Technology at the Watford College of Technology, UK, has been another important step forward in the development of advanced education in this field.

Students come to the Watford College from all over the world to study on printing and packaging courses. Arab Countries have also been well represented.

APPENDIX II

MAIN HEADINGS OF A PACKAGING SYLLABUS
EXTRACTED FROM THE I.O.P.UK PROGRAMME

Section I INTRODUCTION TO PACKAGING

Historical background to packaging
Definitions of packaging and packing
Influence of and relation to other operations
Packaging as part of the production process

Section II THE NECESSITY FOR PACKAGING

The assessment and characteristics of commodities (products)
The hazards of distribution

Section III PRINCIPLES OF PROTECTION

Against mechanical damage
Against climatic damage
Against damage or loss from other environmental influences

Section IV PACKAGING MATERIALS

Wood
Pulp, Paper, Paperboard and Hardboard
Plastics, Rubbers and other polymers
Glass
Metals
Waxes
Bituminous materials
Textiles
Ceramics

Section V TYPES OF PACKAGING

Unit Packaging
Transport Packaging
Miscellaneous

Section VI ACCESSORIES FOR PACKAGING

Cushioning systems
Reinforcement methods
Adhesives and the principles of adhesion
Paper, Plastics and Fibre sealing tapes
Seals, Caps and other opening and closing devices

Section VII PACKAGING AND PRODUCTION PROCESSES OF PACKED GOODS

Packaging—the inevitable element of production processes
Mechanisation of packing process
Packaging Engineering

Section VIII MATERIALS HANDLING, MOVEMENT AND STORAGE

Principles
Materials and movement
Analysis of materials handling problems
Methods and equipment
Letters
Selection of equipment

Section IX PACKAGE TESTING AND DEVELOPMENT

The purpose of tests
General methods of testing complete transport packages
Equipment for and methods of testing packages, containers & materials
Package development

Section X SPECIFICATIONS AND QUALITY MEASUREMENT FOR CONTROL

Defining packaging performance
The user-supplier relationship
Definitions
quality control
Use of quality measurement

Section XI TRANSPORT AND INSURANCE

Methods of transport
Transport practices
Transport regulations
Insurance

Section XII RATIONALISATION AND STANDARDISATION

Rationalisation in the field of packaging
Standardisation in the field of packaging
International standards

Section XIII LEGAL REQUIREMENTS

Administrative requirements
Requirements concerning crimes against the public good faith
Legal protection of package design

Section XIV MARKING, IDENTIFICATION AND LABELLING

Identification
Marking for shipping
Labels and labelling

Section XV PACKAGE DESIGN

Graphics

Functional design

Relation of design to the ability of the package to be handled on semi- or fully automatic packaging lines

Economics of design

Section XVI ECONOMICS OF PACKAGING

Principles

Relation of package&packaging material costs to the national economy

Planning of package&packaging material requirements

Package renovation

Principles and methods of buying returnable packages

Principles of packaging economy in various media for unit containers

Economics of shipping containers

Packaging costs as part of overall production cost

Costing methods

Optimization trends and methods in packaging

Budgetary control and methods in packaging

Statistical data

Section XVII APPLIED PACKAGING

Modern methods of packaging specific products

Packaging of food

Packaging of pharmaceuticals

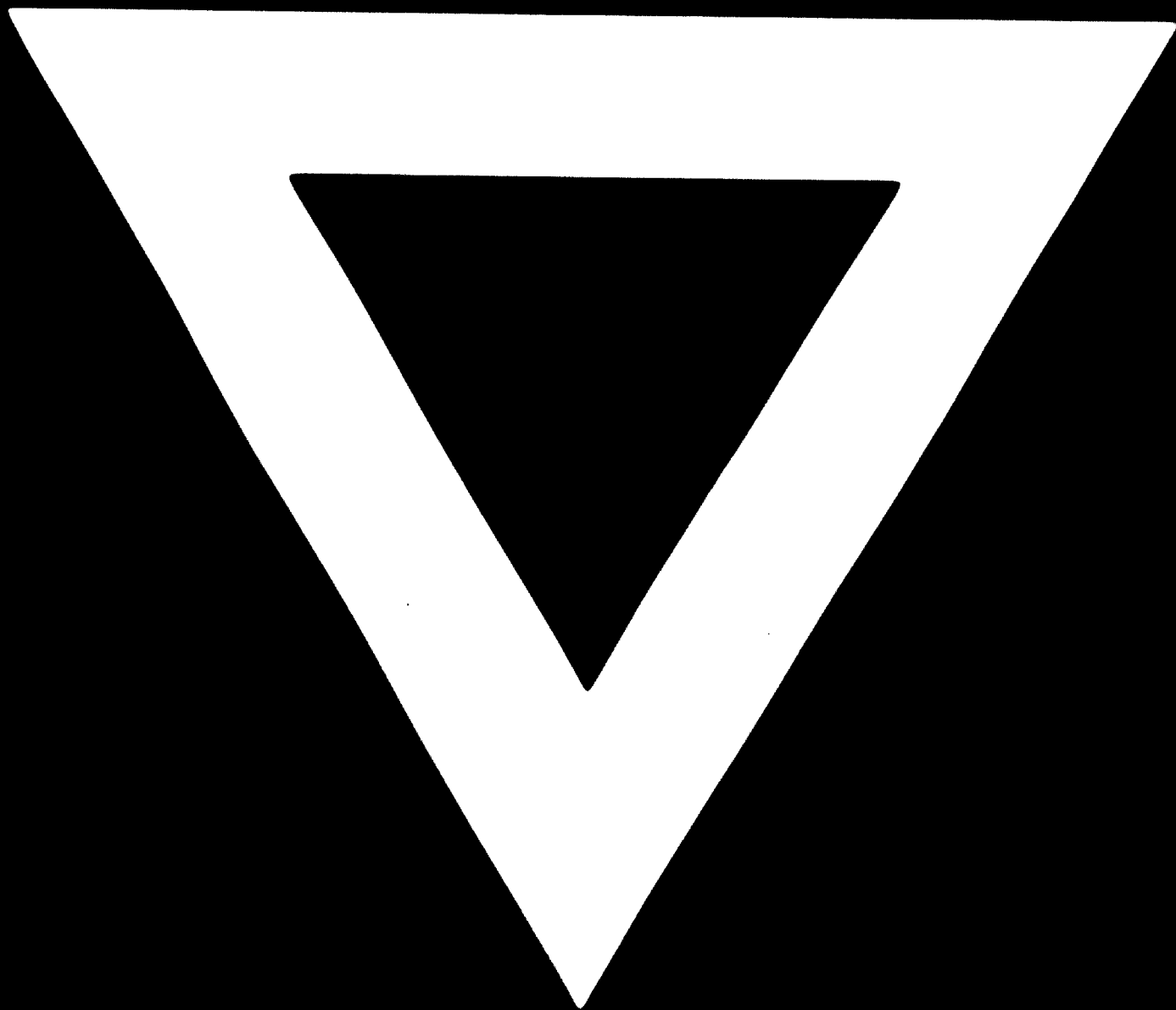
Packaging of chemicals

Packaging of engineering equipment, appliances and machinery

The approach to packaging problems



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