TEACHING AIDS: ASSESSMENT OF NEEDS IN PUPIL NURSE TRAINING SCHOOLS

A Survey for
THE HOSPITAL CENTRE
KING EDWARD'S HOSPITAL FUND FOR LONDON
BY
HEINEMANN TRAINING SERVICES LTD.

November 1968

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PREFACE

In recent years considerable advances have taken place in understanding the processes by which people learn and this has led to the development of new techniques of instruction - or, to be more accurate, of learning. These techniques, which have become known as "educational technology", also involve analysing and defining with more precision what people need to learn.

The underlying purpose of this survey is (1) to discover areas of knowledge that cause nurses - especially pupil nurses - particular difficulty: these are defined in the various suggested pilot projects; (2) to indicate how a carefully integrated combination of training techniques, based on a careful analysis of what has to be learned, can help make these difficult areas less daunting to the trainee nurse.

The training systems proposed are not intended as final statements of what should be produced. Some modification and improvements would undoubtedly arise when and if the recommended pilot projects are undertaken, particularly when each problem area is subjected to thorough analysis. The exploration has however been carried far enough to provide a basis for the work recommended, and it has begun to penetrate some relatively unexplored territory in nurses' training.

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Training objectives

An unambiguous description of what the trainee is required to be able to DO at the end of a course of instruction. The statement of training objectives in "behavioural" terms should be a prerequisite of the design of any course. It arises from an analysis of job for which the trainee is to be trained, and of the attitudes, knowledge and skills that the trainee needs to acquire to perform the job.*

Training system

A system designed to meet specific training objectives. It will integrate as many methods of learning and teaching (including aids and devices) as are appropriate to the learner and what is to be learnt.*

Programmed instruction/learning

A form of instruction/teaching in which the following factors are present:-

(a) there is a clear statement of exactly what the trainee is expected to be able to do at the end of the programme;

(b) the material to be learnt which has been itemised and tested is presented serially in identifiable steps;

(c) trainees follow an actual sequence of steps which is determined for them according to their individual needs;

(d) frequent and unambiguous responses are usually required from the trainee throughout the whole sequence;

(e) "feed-back" of information about the correctness or otherwise of responses is usually given to the student before the next step is presented.*

Film loops

Film loops are produced with or without sound, in 8 mm. continuous loops of up to 4 minutes showing time. They can be shown in daylight on

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* These are adaptations of definitions provided in the Ministry of Labour's Glossary of Training Terms.

self-contained units similar to a television set, and can be run over and over again automatically for as long as required. They can be stopped by hand-operated remote control at any time when necessary to emphasise or elaborate a point or to enable questions to be answered as they arise. They are particularly useful for practical training sessions, where their role is to demonstrate a single procedure or skill to be acquired by the trainee. Animated drawings or diagrams are frequently incorporated in loops to give clear visual explanations of what the eye cannot see.

Films

Films, being longer than film loops, are more appropriate for use in appreciation or introductory training, where the training is designed to give a generalised understanding of a subject. Here the aim is not to enable the trainee to acquire skills, but to prepare him for acquiring them.

Slides

Positive photographic transparencies. They can be printed either on a single length of film or individually. Each is projected as a still picture. They can be linked to a sound or printed commentary to present situations for discussion.

SECTION ONE

INTRODUCTION AND SUMMARY

SECTION ONE INTRODUCTION

1. Terms of Reference for the Survey

The agreed terms of reference were to study and analyse the present methods of training state enrolled (i.e. pupil) nurses and to suggest how we could assist tutors by developing relevant training aids. These aids would be designed to meet the precise learning needs of the pupil nurse entry. The survey would take account of existing training aids available.

In view of the wide variety of subjects covered in the training of nurses, it was envisaged that we would identify and investigate only areas of particular learning difficulty, and that our detailed recommendations would be limited to a number of pilot projects in these areas. More general recommendations would be made for possible future projects.

We were given access to two enrolled nurses' training schools at Whittington and New Cross Hospitals.

2. Methods of Carrying Out the Survey

2.1 We began the survey with a discussion with the Principal Tutor at the Whittington Hospital. Mr. Finn outlined for us the syllabus for pupil nurses, the training programmes in operation, the methods of selection and the standard of pupil being recruited. In consultation with Mr. Finn and his colleagues we examined the syllabus closely and with their assistance selected areas which caused learning problems to the pupils.

The next step involved a detailed analysis of a selection of these training problems to identify the skills and knowledge required, so that we could examine precisely the learning difficulties that pupils would encounter.

Training problems identified can be classified into four main groups:-

(a) difficult practical abilities, e.g., taking blood pressure;

(b) difficult basic theory, e.g., knowledge of the nervous system;

(c) ward procedures which cannot be simulated easily in the classroom, e.g., rectal treatments;

(d) training problems relevant to specialist wards and equipment.

The following methods were used to obtain information.
<u>Interviews and discussions</u> with the Matron of Whittington Hospital, principal tutors, tutors, doctors, pupils and students, a physiotherapist, staff at the Royal College of Nursing, the Education Officer to the General Nursing Council.

<u>Observations</u> of pupils and nurses in wards, and class training sessions.

<u>Skills analysis</u> of detailed nursing practices with tutors.

<u>Statistics</u> of the pupil nurse intake.

<u>A questionnaire</u> to investigate the use made of training aids at the Whittington training school.

We would like to record our sincere thanks to the following who gave most co-operatively of their time and experience:-

Miss P.W. Redman, Matron at Whittington Hospital, and her staff.
Mr. B. Finn, Principal Tutor, and his colleagues.
Dr. D. Sharland, Consultant Geriatrician.
Miss K. Jarvis, Principal Tutor at New Cross Hospital.
Miss B.N. Fawkes, Education Officer to the G.N.C.

Miss M.D. Green and Miss E.L. Perry, staff of the Royal College of Nursing.

Miss M.S. Jobson, Assistant Principal of the School of Physiotherapy at King's College Hospital.

We are also grateful to the Matrons of Guys and New Cross Hospitals and the Governors of Guys, New Cross and Whittington Hospitals; and to Miss J.B. Craig for her assistance.

2.2 Our study of the use of training aids in pupil nurse training schools has shown that there is a wide range of aids available and many tutors make extensive use of them. But the study has also shown that:-

(a) there are several important gaps in the range;

(b) the aids tend neither to be integrated with each other nor to form part of coherent systems of training.

With the projects in this report our aim has been to provide (i) well integrated training packages for specific areas of instruction, and (ii) aids which can easily be integrated with existing training methods.

3. Summary of Main Sections and Recommendations

The principal findings and recommendations are summarised in the following paragraphs.

3.1 Training in Basic Nursing Practice

General Findings

There is evidence to suggest that many pupils have difficulty in acquiring some of the basic habits, both mental and physical, which they need for work in the ward. Integrated systems of training making use of a wide variety of aids, carefully controlled by the tutor, can help overcome the difficulties and assist the process of learning.

Recommendations

On the basis of detailed analyses we recommend an integrated training system, making use of a variety of training aids, for each of the following four areas of basic nursing practice:-

- Lifting and moving patients.
- General observation of patients.
- General aseptic practice.
- Taking blood pressure.

To start with, we recommend that "Lifting and moving patients" be given priority as a pilot project for training in basic nursing practice.

Each of the recommended systems of training and relevant training aids are outlined in chart form. A full discussion of our findings and recommendations is presented in Section Two of the report.

LIFTING AND MOVING PATIENTS	Overall Vi	Class Discussions The Mental Habit of Planning Lifts	Ward Experience
Tutors' Handbook containing: - detailed statements of the habits and techniques to be taught; - a suggested plan of training; - notes on the use of each of the aids within the system.	10 minute illustrati importance acquiring habits and techniques lifting in ward.	30 slides illustrating a variety of lifting situations in the ward and patients in a variety of conditions. Discussion on planning of lifts, i.e. on best methods of lifting in each situation illustrated on slide.	6 charts to be hung in ward offices to remind nurses of the correct methods

GENERAL OBSERVATION OF PATIENTS	To enable	upil to observe thoroughly every aspect of d to note any sign which may be important.	
	The	ed Sequence of Observation Exercises *	
	i.e. expe progress condition required.	om	In Ward
Tutors' handbook containing:- - a suggested plan of exercises*, discussions and case studies; - tests; - notes on the use of each aid; - notes on integrating the system with the rest of the pupil training programme.	Programme a Booklet c of signs condition	il klists of lp in ughly. in with normal,* d	Film loops demonstrating thorough observations of patients. Practice in observing patients, using check-lists of questions, and recording the signs observed. Discussions based on film loops and practice sessions.

* This chart is meant to show the s that in the final plan exercises in observing normal people would pre

TRAINING IN BASIC NURSING P

LIFTING AND MOVING PATIENTS	Introduction	
	Overall View	Simple Basic Theory of Body Mechanics
Tutors' Handbook containing: - detailed statements of the habits and techniques to be taught; - a suggested plan of training; - notes on the use of each of the aids within the system.	10 minute film illustrating the importance of acquiring correct habits and techniques for all lifting in the ward.	Short programmed text objective to enable the pupil to recognise and explain correct and incorrect posture in terms of the basic principles of body mechanics.

GENERAL OBSERVATION OF PATIENTS	To enable the pupil to recognise the signs a	
	The Basic Facts i.e. expected signs and progress of patients' conditions and action required.	Case Studies i
Tutors' handbook containing:- - a suggested plan of exercises*, discussions and case studies; - tests; - notes on the use of each aid; - notes on integrating the system with the rest of the pupil training programme.	Programmed instruction and Booklet containing lists of signs of each type of condition	Slides illustrating t signs of commo condition, for classroom exer recognition of

* This chart is meant to show the separate elements of the system, and observing normal people would precede or run parallel in time with e

TRAINING IN BASIC NURSING PRACTICE - OUTLINES OF RECOMMENDED TRAINING SYSTEMS

LIFTING AND MOVING PATIENTS	Introduction		Practical Training Sessions			Class Discussions	Ward Experien
	Overall View	Simple Basic Theory of Body Mechanics	Basic Habits	Special Techniques		The Mental Habit of Planning Lifts	
Tutors' Handbook containing: - detailed statements of the habits and techniques to be taught; - a suggested plan of training; - notes on the use of each of the aids within the system.	10 minute film illustrating the importance of acquiring correct habits and techniques for all lifting in the ward.	Short programmed text objective to enable the pupil to recognise and explain correct and incorrect posture in terms of the basic principles of body mechanics.	2 film loops demonstrating the application of key points of posture to common lifting tasks in the ward (1st loop - very simple 2nd loop - harder)	3 film loops demonstrating - conventional lift - shoulder lift - three-man lift.	1-3 film loops demonstrating one-man lifts.	30 slides illustrating a variety of lifting situations in the ward and patients in a variety of conditions. Discussion on planning of lifts, i.e. on best methods of lifting in each situation illustrated on slide.	6 charts to be hung i ward offices remind nurse the correct methods
			Pupils' practice to be based on film loop demonstrations.				

GENERAL OBSERVATION OF PATIENTS	To enable the pupil to recognise the signs and to decide what action to take			To enable the pupil to observe thoroughly every aspect the patient, and to note any sign which may be importan	
	The Basic Facts	Recognition Exercises *		Carefully Planned Sequence of Observation Exercises *	
	i.e. expected signs and progress of patients' conditions and action required.	Case Studies in Classroom	Case Studies in Ward	In Classroom	In Ward
Tutors' handbook containing:- - a suggested plan of exercises*, discussions and case studies; - tests; - notes on the use of each aid; - notes on integrating the system with the rest of the pupil training programme.	Programmed instruction and Booklet containing lists of signs of each type of condition	Slides illustrating the visible signs of common types of condition, for use in classroom exercises in recognition of signs.	Recording sheets Pupils to record the condition and the signs recognised.	Booklet for pupil containing checklists of questions to help in observing thoroughly. Practice to begin with observation of normal,* healthy people. Pupils to record observations.	Film loops demonstrating thorough observations of patients. Practice in observing patients, using check-lists of questions, and recording the signs observed. Discussions based on film loops and practice sessions.

* This chart is meant to show the separate elements of the system, and NOT the final sequence of planned exercises. It is likely that in the final plan exercises in

GENERAL ASEPTIC PRACTICE	Ba to every ital Process ork	Special Aseptic Techniques
Tutors' handbook containing:- - a suggested plan of discussions and exercises; - test questions for use with each aid; - notes on the use of each aid and on integrating the system with the rest of the pupil training programme.	10 fo ence of exercises pu orrectly common th s in which bad go e has been found pr	Current training methods are considered suitable.

TAKING BLOOD PRESSURE		enable the pupil to combine the use of the ethoscope and of the sphygmomanometer	
		e of sphyg. alone	Combine steth. with sphyg.
Tutors' handbook containing:- - a suggested plan of exercises - notes on the use of each aid.	Fi sq an br Ac pu	pils to practice lpatory method on ch other.	Stethoscopes with two pairs of ear pieces. for individual tuition.

GENERAL ASEPTIC PRACTICE	Basic Principles	Acquiring the mental Class Discussions
Tutors' handbook containing:- - a suggested plan of discussions and exercises; - test questions for use with each aid; - notes on the use of each aid and on integrating the system with the rest of the pupil training programme.	10 minute film for motivational purposes, illustrating the importance of good general aseptic practice.	Slides, film loops an ward procedure, illus Slides and printed ex (to be used in helpin bad practice.) Lists of Key points (All printed examples contained in a bookle Discussions of the il in terms of the basic (bad practices to be after basic principle firmly established.)

TAKING BLOOD PRESSURE	Overall View	Graded seque
Tutors' handbook containing:- - a suggested plan of exercises - notes on the use of each aid.	Film loop of procedure with sound track of stethoscope sounds and animated drawings of blood in brachial artery. Accompanying pamphlet for the pupil to retain.	Tape recordi a graded seq of stethosco sounds(gradu becoming har to distingui

GENERAL ASEPTIC PRACTICE	Basic Principles	Acquiring the mental habit of thoughtfully applying the basic principles to every aspect of nursing in the ward			Special Aseptic Techniques
		Class Discussions	Mental Exercises	Linking the Mental Process to Physical Work	
Tutors' handbook containing:- - a suggested plan of discussions and exercises; - test questions for use with each aid; - notes on the use of each aid and on integrating the system with the rest of the pupil training programme.	10 minute film for motivational purposes, illustrating the importance of good general aseptic practice.	Slides, film loops and printed examples of common ward procedure, illustrating good aseptic practice. Slides and printed examples illustrating bad practice, (to be used in helping the pupil to be alert against bad practice.) Lists of Key points (All printed examples and lists of key points to be contained in a booklet for the pupil to retain.) Discussions of the illustrations in terms of the basic principles (bad practices to be dealt with after basic principles have been firmly established.)	Practice in identifying and explaining the bad practice illustrated.	A planned sequence of exercises in performing correctly common ward activities in which bad aseptic practice has been found to occur.	Current training methods are considered suitable.

TAKING BLOOD PRESSURE	Overall View	Graded sequence of listening exercises, progressing from easy to difficult			To enable the pupil to combine the use of the stethoscope and of the sphygmomanometer	
					Use of sphyg. alone	Combine steth. with sphyg.
Tutors' handbook containing:- - a suggested plan of exercises - notes on the use of each aid.	Film loop of procedure with sound track of stethoscope sounds and animated drawings of blood in brachial artery. Accompanying pamphlet for the pupil to retain.	Tape recording a graded sequence of stethoscope sounds (gradually becoming harder to distinguish)	Tape recording a graded sequence of changes in stethoscope sounds which mark systolic and diastolic pressure (gradually becoming harder to identify)	Amplifier linked to stethoscope. for tutor's demonstrations to the class.	Pupils to practice palpatory method on each other.	Stethoscopes with two pairs of ear pieces. for individual tuition.

3.2 Training in Basic Nursing Theory

General Findings

We identified, with the help of tutors, a number of theoretical topics which pupil nurses find especially difficult.

In view of the wide variety of cultural and educational background of pupils, training in the difficult theoretical topics needs to be very simple and very carefully prepared.

Analysis

We discussed with tutors the particular teaching difficulties encountered and we investigated the available books and programmed texts - many of the latter do not seem to be particularly apt for pupil nurses. We selected 'calculations and measurement in the ward', especially administration of drugs and other nursing techniques as the subject for detailed analysis.

The report outlines (Section Three) the characteristics of programmed instruction which would be suitable for pupil nurses. It also describes the requirements of a system of theoretical training which integrates the use of programmed instruction with planned exercises, tests and individual tuition in class training sessions.

Recommendations

We recommend that integrated training systems, making use of programmed instruction, planned exercises and tests, be devised for each of the following theoretical topics:-

- fluid balance (basic theory);
- blood grouping and transfusion;
- blood conditions and tests;
- calculation and measurement in the ward;
- the endocrine system;
- the nervous system;
- the lymphatic system;
- the use of traction equipment in orthopaedics.

To start with, we recommend that 'calculations and measurement in the ward' be given priority as a pilot project.

The four main problem areas of calculation and measurement in the ward have been identified as:-

(a) measuring and recording the patient's fluid intake and output;

(b) preparing doses from liquid drugs;

(c) preparing doses from solid drugs;

(d) preparing insulin doses.

We recommend that for each of these four topics the following training aids be devised:-

- two short programmed texts (each requiring about 1 hour's learning time for pupil nurses);
- a planned series of practical exercises and tests based on and integrated with the programmed instruction;
- notes for the tutor on the use of the training aids with suggestions on how and when to integrate the training in calculations and measurement with the training in the actual nursing procedures and with the rest of the pupil training programme.

The recommended training objectives for the pilot project are presented in Appendix 5. A full discussion of our findings and recommendations is presented in Section Three of the report.

3.3 Two Further Training Problems

Our discussions with tutors and ward staff have revealed that:-

(a) There are a number of ward procedures which cannot be simulated satisfactorily in the classroom, and for which it is difficult to train the pupil before she is in the ward looking after real patients. A partial solution to

this problem can be found through film or film loop; the latter are, we think, the most suitable medium, provided it is feasible to agree on standard procedures. The film loops should be accompanied by a supporting system which combines them with printed texts and tests, and which integrates them with the rest of the pupil training programme.

(b) There are a number of topics in which pupils experience learning difficulties when they begin to work in the wards. Nurses are becoming involved in using an increasing range of technical equipment. We have listed some of the topics in which they require training, and where self-instructional kits, comprising booklets, charts, checklists and illustrated operating instructions could be developed to assist learning in the wards. These kits would also contain notes on the use of the aids, together with tests that the ward sister and clinical instructor can use to determine whether a pupil needs to make use of the self-instructional aids. The aids would be cross-related, wherever possible, with other training materials and methods either recommended in this report or already in use.

Recommendations

(a) Familiarising Pupils with Ward Procedures

We recommend that for each of the following procedures a film loop should be made, together with a supporting system to enable its use to be integrated fully within the pupil training programme:-

- Rectal treatments
- Tracheotomy tube and sucker procedures
- Paracentesis abdominis
- Underwater seal drainage of the pleural cavity
- Pleural aspiration and biopsy
- Lumbar puncture
- Peritoneal dialysis
- Removing stitches
- Traction

- Emergency routines*
- Catheterisation*
- Intravenous infusions
- Giving injections*

The supporting systems would comprise:-

- an illustrated pamphlet on the procedure, referring to the film loop, for the pupil to retain;
- notes for the tutor on the use of the aids, with suggestions on how and when to integrate this training with the rest of the pupil training programme;
- test questions on key points of the procedure.

To start with, we recommend that the following two procedures be given priority as a pilot project:-

- Intravenous infusion;
- Removing stitches.

(b) Supplementing Clinical Instruction by Self-Instructional Aids

We recommend that a kit of self-instructional aids be devised for each of the following topics:-

- Observation and control of intravenous infusions;
- Peritoneal dialysis equipment;
- Purpose of and observation of heart monitoring machines;
- Operation and use of respirators;
- Types of illnesses and basics of required treatments;
- Types and purposes of diets;
- Types and purposes of drugs;
- The use of traction equipment.

To start with, we recommend that the following be given priority as a pilot project:-

- Heart monitoring machines;
- Respirators.

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*8 mm. film loops already available from Eothen Films Ltd. They were the first pilot project this company made, and Eothen do not feel satisfied with them.

The self-instructional kits to be devised and developed for these topics will comprise:-

- illustrated charts showing in simple terms the function of the equipment;
- illustrated charts showing how to interpret machine signals;
- checklists to help in observing the equipment;
- simply worded and clearly illustrated instructions for operating, controlling or using the equipment;
- test questions to help the ward sister or clinical tutor determine whether or not a pupil needs to make use of the self-instructional aids;
- notes for the ward sister and clinical tutor on the use of the self-instructional kits;

(For each piece of equipment these aids will be cross-related with each other, and, where this applies, with other training materials and methods either recommended or in use already.)

Our findings and recommendations are discussed in Section Four of this report.

An estimate of the cost of producing the various recommended training systems and aids is being submitted separately.

SECTION TWO

TRAINING IN BASIC NURSING PRACTICE

SECTION TWO TRAINING IN BASIC NURSING PRACTICE

1. GENERAL FINDINGS

1. The General Problem

In this section of the report the focus is on the problems of the pupil nurse in acquiring the basic habits and practical abilities needed for her job in the ward. The problem may be in acquiring a physical habit, for instance, the basic key postural habits and the special techniques required for lifting and moving patients. Or she may have difficulty in converting theoretical knowledge into practical behaviour, that is, in acquiring mental habits and methods of approach that will govern and control her physical behaviour in the ward. If the nurse is to act consistently in ways that help to prevent the spread of infection, for instance, she should be habitually thoughtful about what she is doing. The theory of aseptic practice is of little value to her until it is integrated with and modifies her behaviour in the ward.

These training problems apply to students as well as pupils. Both require the same basic habits, abilities and methods of approach, and both, we assume, experience similar kinds of difficulty in practical learning.

2. Identifying the Problems

2.1 We were impressed by the methods of practical instruction at Whittington Hospital in the School of Nursing. Pupils are helped to learn actively by frequent demonstrations, discussions, practice sessions and projects. There is little "chalk and talk" lecturing and much practical class participation. Through this practical training pupils learn a large part of what they require without difficulty.

There are areas, however, in which the current methods are not so successful. According to ward staff:-

(a) There are skills in which it takes many pupils too long to become efficient and reliable.

(b) There are procedures and key points taught initially that tend to give way to less efficient habits when the nurse is exposed to ward pressures.

(c) In certain activities there is wide discrepancy in the level of performance among nurses.

These areas are acknowledged by tutors as presenting problems. In view of the relatively high standards of instruction at Whittington Hospital it is inevitable that the problem areas are common to many, if not most, training schools.

2.2 If an activity is not being performed efficiently the cause may be found in one or both of the following sources:-

(a) The initial training may have failed to establish the correct methods in the first place. If this is true, the nurse is likely to develop her own methods of working on the job, some of which will be inefficient.

(b) The pressures and constraints of the job situation may interfere with, or lead the nurse away from, the correct methods; for example:-

- she may see other nurses performing incorrectly;
- she may be in too much of a hurry to consider how she is working, and consequently begin to pick up bad habits;
- the ward sister may not have time at the appropriate moment to correct her;
- it may be easier to perform incorrectly. Her willingness to "take the trouble" to perform correctly may diminish with time.

These two sources of inefficiency are obviously related. The more securely the correct habits are established during initial training, the less likely it will be that incorrect ones will be adopted in the ward. But thorough initial training alone cannot ensure that

correct habits are permanently maintained. The system employed for thorough and regular "follow-up" training and supervision in the ward has its own indispensable part to play in maintaining operational efficiency.

2.3 The teaching of these practical abilities needs to be expertly designed if the learning problems are to be overcome. Two steps are necessary: analysis of the abilities into learnable elements, and preparation of a sequence of learning experiences or steps leading to the secure acquisition of the abilities. Although many tutors are undoubtedly good at this, the fruits of expertise should be accessible to all. In the areas of special difficulty many tutors could achieve better results if the analysis, and the basic planning of the instruction, were done expertly for them. Although some of this work and the resulting training aids may not be required in the best teaching hospitals, they would be a boon to the less experienced centres.

2.4 A teacher is one kind of specialist; a training analyst is another. It is neither necessary nor common for one person to be both. But there are some teaching problems that call for a joining of forces. With the help of the tutors we have identified these problems.

3. The Specific Problems

3.1 The practical training problems over which, we consider, tutors could benefit from the kind of assistance referred to above, are:-

(a) Posture and techniques for lifting and moving patients

Here the problem for the pupil is the thorough acquisition of a set of physical habits which can be applied consistently to all lifting and moving in the ward, and the maintenance of those habits. The need for a more thorough system for training in and maintaining this skill is shown by the number of nurses who complain of back trouble, by the nursing hours lost through spinal damage, and by the

occasional, but too frequent, harm to patients from being mishandled. The loads which nurses are required to lift must often approach, if not exceed, the maximum safe weight.

(b) Observation of patients

This refers to the development of the pupil's general powers of observation in the ward, and not to the prescribed routines, like "T.P.R." The problem for the pupil is to acquire the ability to:-

- take notice of what she sees;
- take nothing for granted;
- miss nothing that could be important;
- distinguish relevant from irrelevant signs;
- record and report observations correctly;
- have confidence in her observations so that she will take action when she should.

Efficient observation is a flexible but disciplined mental process. Nursing management and medical staff admit that there are discrepancies in observational skill among nurses. This may be partly due to the differing abilities and aptitudes of nurses, but better training should produce a higher and more consistent level of performance.

(c) Aseptic practice

Asepsis is more of a mental discipline than a physical skill, but the problem is similar in some respects to that of posture and lifting training. The pupil has to acquire a set of basic principles that she can apply with habitual thoughtfulness in a large variety of situations. We are not referring to the standard routines used, for instance, in barrier nursing.

(d) Taking blood pressure

This is a small problem in comparison with the previous three, but nonetheless an important one. Some nurses have difficulty in acquiring the techniques and take too long before they can do it reliably.

TRAINING IN BASIC NURSING PRACTICE - GENERAL FINDINGS

3.2 There now follows a full account of our findings on the lifting and moving problem, and of the objectives, methods and potential advantages of the approach we are recommending. This is followed by a briefer discussion of the problems of observation, aseptic practice and taking blood pressure. For each of these topics we outline and recommend an integrated system of training in which the tutor leads the pupil through a controlled sequence of learning experiences, making use of a variety of cross-related training aids.

II. LIFTING AND MOVING PATIENTS

1. Summary of Recommendations

The objectives of the recommended system for lifting training are to enable the pupil to acquire, in gradual stages, key habits and special techniques for all the lifting tasks that she is required to perform in the ward. This includes the lifting and moving not only of patients but also of objects in the ward, e.g., furniture, bedclothes and equipment. All of the recommended aids are cross-related and integrated into a total coherent system. Their full potential value as aids to learning can only be realised if they are used in their appropriate context within the total system. The total system is greater than the sum of its parts. The following training aids are recommended:-

(a) an introductory film, about 10 minutes in length, showing the necessity for acquiring basic postural habits and lifting techniques for work in the ward;

(b) a short, simple, clearly illustrated programmed text, with the objectives that the pupil will be able to:-

  (i) identify correct posture and key points illustrated in drawings and photographs of lifting;

  (ii) discriminate between correct and incorrect illustrated examples of posture in lifting;

  (iii) give the reasons why it is important to learn the correct habits in terms of simple basic body mechanics;

(c) a series of 6 - 8 film loops:-

  (i) a demonstration of the basic key points of posture applied to the lifting and moving of a range of easy, light objects typical of the ward, e.g. bedclothes, light furniture and equipment;

  (ii) a similar demonstration, but with more difficult lifting situations involving heavier objects;

(iii) a demonstration of the conventional two-man lift;

(iv) a demonstration of the shoulder lift;

(v) a demonstration of the three-man lift for lifting the patient horizontally between bed and trolley;

(vi) demonstrations of one-man lifting. It may be beneficial to have two or three film loops devoted to one-man lifting techniques. Since the Chartered Society of Physiotherapy has yet to investigate techniques of one-man lifting, the production of film loops on these should proceed only after standard techniques are agreed.

(d) slides showing "open ended" situations, i.e., presenting a set of circumstances without suggesting a solution. These are to be used to stimulate group discussion on how to adapt the key points and standard lifting techniques to cope with variations in the patient's condition, weight, etc. The objective of this part of the training is to help the pupil to acquire the habit of thoughtful preparation for each lifting situation.

(e) charts to be hung in ward offices to remind the pupil of the basic key points of lifting and to help her to retain what she has learnt;

(f) a booklet for the tutor explaining the system with suggestions about how the system might be used. This will contain statements of the agreed key points and methods of lifting. It will also provide suggestions on the setting up of sequences of practical exercises and discussions based on the key points and techniques demonstrated on film loop and slides.

These recommendations are outlined in greater detail later in this section of the report.

2. The Investigation

2.1 The problem of training nurses to lift and move patients was investigated by:-

(a) attending training sessions on lifting and moving at Whittington Hospital;

(b) discussing the problems with tutors and ward staff;

(c) analysing one of the lifting techniques, in collaboration with a group of tutors at Whittington Hospital;

(d) enquiring into the principles and methods of approach to the problem of the Chartered Society of Physiotherapy and the Central Council for Physical Recreation.

2.2 The approach we are recommending has been discussed in detail with a member of the Lifting Committee of the Chartered Society of Physiotherapy, who is also Deputy Principal of the School of Physiotherapy at King's College Hospital. She suggested that we modify some details, and this we have done. She thought that the recommended system of training could also be useful to those who are training physiotherapists in practical postural and lifting skills.

3. The Findings

3.1 Current Objectives and Methods

This statement of the current objectives and methods of lifting training in nursing schools is not a description of what one tutor did with one particular class. It emerges from all our discussions and observations, and is intended to describe how, in general, pupils and students are helped to acquire efficient lifting techniques.

TRAINING IN BASIC NURSING PRACTICE - LIFTING AND MOVING PATIENTS

3.1.1 The current objectives are:-

(a) to motivate the pupil to acquire the correct techniques for her own and the patients' safety;

(b) to enable the pupil to perform the standard lifts for standard situations; normally just two lifts are taught, both involving two nurses:-
- the conventional lift
- the shoulder lift

A third may be taught involving three nurses:-
- lifting a horizontal patient to or from a trolley.

(c) to enable the pupil to adapt the standard lifts for the individual condition of the patient and to use the right lift at the right time;

(d) to discourage the pupil from attempting to lift or move patients on her own.

3.1.2 The current methods employed to achieve each of the above objectives are as follows:-

(a) Motivation is established by teaching, in simple terms, the basic principles underlying the correct use of the body in lifting, e.g.,
- why it is important to keep a straight spine
- why the thigh muscles should do most of the work

A film* is shown and discussed. The film provides clear demonstrations of the conventional and shoulder lifts and shows plainly how the lifts conform with the basic principles. Some tutors show the film several times to their classes during introductory training.

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* "Lifting in Hospitals", Ministry of Health.

(b) For practical training in the standard lifts, demonstrations of the lifts are provided by:-
- the tutors
- the film
- some tutors use film strips

The practical training rooms are arranged to allow the maximum of individual practice by pupils. Pupils practice lifting each other, under the close supervision of the tutors. They are also encouraged to practise unsupervised outside formal class time.

(c) The third objective - to enable the pupil to use the lifting technique best suited to the individual condition of the patient - can obviously be achieved only partially outside the ward. The tutors stress the importance of adapting to the patients' needs. Some practice is given in lifting class members who are simulating common complaints, e.g. arm injury, thoracic complaints or unconsciousness. But this important development of the nurses' skill must be acquired mainly from experience in the ward.

(d) The classes are frequently told that they should not lift patients on their own.

(e) Clinical tutors and ward sisters provide individual tuition in the ward, and revision or refresher sessions are held in the school.

3.2 Weaknesses in current training

This general approach to practical training works well with most basic nursing practice, but for lifting training it has two fundamental weaknesses admitted by the tutors themselves:-
- it tries to teach too much at once, with the result that many pupils do not acquire the techniques as securely as they should;

- it avoids dealing directly with the problem of establishing sound basic postural habits. The result is that the pupils are not sufficiently immune to the bad habits which result in muscular strain and spinal trouble.

There is a third serious weakness:-

- it avoids the problem of equipping the nurse for lifting on her own. Most of the nursing management to whom we have spoken have acknowledged that there are some situations in the ward in which the nurse is bound to lift or move a patient on her own - in urgent situations or emergencies when there is no second nurse immediately available. Since every nurse must lift on her own from time to time, and since it is at these times that both she and the patient are particularly at risk, it is a serious omission to avoid dealing with the problem in training.

3.2.1 Too much taught at once

Our investigator joined a class which was being taught the conventional lift for the first time. The difficulties which he and the majority of the class experienced in combining in practice all the key points led him to ask a group of tutors to help analyse the lift.

The analysis (Appendix 1.) is not complete. It represents only the first step towards the production of an agreed statement of what should be taught.

The following points arise from this exercise:-

(a) The lift combines a number of basic habits, skills or "knacks". It would be logical to allow the pupil to acquire each of the basic knacks thoroughly before requiring her to combine them.

(b) Although tutors include most of the key points in their instruction, it is unusual to find two tutors who stress identical points. There were lengthy discussions among the tutors over details of our analysis. It is one thing for

tutors to be good at lifting; it is another for them to have analysed their own skill accurately; and it is yet another for their analyses to agree. An agreed analysis of lifting is needed.

3.2.2 The absence of basic postural training

There are two reasons why nurses should be trained more systematically in basic postural habits before they are taught to perform special lifting techniques:-

(a) It would make the acquisition of the techniques much easier. (This point is covered above.)

(b) It would equip nurses more safely for the many varied lifting and moving situations which they meet in the ward. Variations in size, weight, shape, condition and attitude of patients, call for great adaptability on the part of the nurse, but this leads many nurses to forgo the basic principles, and that is when the damage occurs. The more securely the basic principles have been acquired the less likely they are to be lost.

It is obviously desirable to discourage nurses from lifting or moving patients on their own. But, as already stated, they still do sometimes have to lift on their own, and it seems they always will. According to some ward staff, it is here that most of the damage occurs. It is here that the nurse is least equipped. Training in basic postural habits would help to equip nurses for this contingency.

4. The Requirements of a System for Lifting Training

It has been suggested already that the solution to these practical training problems should be sought through "systematic planning of the learning process based on thorough analysis of the habits and skills to be learnt". Our initial analysis of the problem has enabled us to outline a system that will help tutors to give more effective lifting training. We now list the requirements of this system.

TRAINING IN BASIC NURSING PRACTICE - LIFTING AND MOVING PATIENTS

4.1 The pupil's needs

The pupil needs five stages of training for lifting:-

(a) She must be introduced to the topic of lifting in the ward and the reasons why correct habits must be acquired. This will include some simple, basic theory of body mechanics.

She should acquire:-

(b) basic key postural habits needed for lifting not only patients but also articles of furniture, equipment, etc;

(c) special two-man lifting techniques;

(d) special one-man lifting techniques;

(e) the ability to adapt her techniques to the varied conditions which she meets in the ward.

Male pupils, of course, require the same habits and techniques even though their physique is stronger.

4.2 The tutor's needs

The tutor needs to be able to:-

(a) refer to an agreed statement of the key points which need to be taught;

(b) lead pupils through a controlled sequence of learning experiences to the secure acquisition of the skill;

(c) provide, at each stage of the training, frequent expert demonstrations of exactly what is being taught;

(d) allow the maximum pupil practice at each stage, and spend the maximum amount of time on individual coaching;

(e) provide frequent retraining to maintain basic habits once the pupil has started working in the ward.

5. Recommendations

We present here an outline description of a coherent system of training designed to meet the needs listed above. Our first step in drawing up the outline was to define the training objectives for each stage of the system; that is, to make a detailed statement of the physical and mental habits and abilities that the pupil is to acquire in each stage. This draft statement of recommended objectives is presented in Appendix 2.

The first phase of the work to produce the system will be to make a thorough analysis of all the required habits and techniques. The final statement of training objectives for each stage is contingent upon this analysis.

5.1 The role of each type of training aid in the system

According to the Assistant Principal of the School of Physiotherapy at King's College Hospital, there is a need for a new, up-to-date film on lifting in hospitals. The film "Lifting in Hospitals" is widely used at present for demonstrational purposes but it is not really suitable for our present purpose. The film proposed as an integrated part of this training system would give a brief introduction to the whole field of lifting covered by the system, and would stimulate the pupils' enthusiasm for learning. It should be produced with this specific role in view.

The basic theory of body mechanics lends itself to programmed instruction. The aim is not just to give the pupil an appreciation of the basic theory, but to help her to think soundly and consistently about lifting. The advantage of programmed instruction for this purpose is that the required thought patterns can be firmly established by calling for and controlling the learner's active participation.

Film loops are recommended for the role of demonstrating key habits and correct techniques of lifting for the following reasons:-

- they can be designed to emphasise and demonstrate very clearly all the important key points. By the technique of eliminating local background ('delocalisation') they can both concentrate the viewer's attention without distraction on the key points and also be applied to a wide variety of lifting situations;
- they are short and memorable;
- they will present an unvarying high standard of performance for the pupil to imitate. The quality of demonstration will not be dependent on the exigencies of the moment or the varied ability of tutors to demonstrate;
- they are easy to operate; a frame can be halted by instructor or pupil in order to emphasise a particular point; they can be shown repeatedly as often as required; they lend themselves to use in practice sessions;
- they can be used by the pupils themselves for revision and self-instruction;
- they will save the tutor's time and allow her to spend more time on individual coaching.

Slides, i.e. photographs, of lifting situations in the ward are recommended in order to stimulate discussion. They are to be used to present "local" conditions which require adaptation and flexibility in the use of the standard correct habits and techniques.

When she is working in the ward the pupil should be reminded of the key habits and standard techniques she has learnt. For this purpose we recommend charts to be hung in ward offices. These will consist of stills and diagrams taken from the film loops and the programmed texts.

TRAINING IN BASIC NURSING PRACTICE - LIFTING AND MOVING PATIENTS

5.2 The recommended system for lifting training

Training Aids	Description of Training
STAGE ONE - WHY CORRECT HABITS ARE IMPORTANT	
A film, about 10 minutes in length, showing the necessity for acquiring correct postural habits and lifting techniques for work in the ward.	Introduction to the topic of lifting in the ward. The purpose of the film is to give the pupil an overall view of what she is to learn, and to help to stimulate her enthusiasm for learning it.
A short, simple, clearly illustrated programmed text aimed at enabling the pupil to:- - identify and discriminate between correct and incorrect posture; - explain in terms of simple basic body mechanics why it is important to learn correct habits.	A foundation of simple theory. The purpose is to help the pupil to begin to think soundly and consistently about lifting.
STAGE TWO - BASIC POSTURE FOR LIFTING	
Step One	
A film loop demonstrating basic key points of posture applied to simple lifting and moving tasks typical of the ward, e.g. moving bedclothes, light furniture and equipment.	Practice is to be provided for the pupils by setting up an "obstacle course" of simple lifting and moving tasks like those demonstrated on the film loop. Practice, demonstration, group discussion, individual tuition, and more practice should continue until each pupil has acquired the basic habits securely and consistently. Estimated minimum training time, 2 - 3 half-hour sessions.
Step Two	
A film loop similar to the first but applying the basic habits to more difficult and heavier lifting tasks.	As above, but extending the basic habits to more difficult and heavier tasks. Estimated minimum time, 2 - 3 half-hour sessions.

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Training Aids	Description of Training
STAGE THREE	- TWO AND THREE-MAN LIFTS
Conventional Lift	
A film loop demonstrating the conventional lift,	Demonstration, practice, group discussion, individual tuition, to continue until each pupil has demonstrated that she can perform the lift confidently and correctly. Estimated minimum time, 2 - 3 half-hour sessions. It is important that pupils are given as much practice as it is possible to arrange, It may be necessary to give the pupil practice in the component parts of the lift before tackling the lift as a whole. But the basic postural habits which have been learnt should make it easier for pupils to learn the lift as a whole,
Shoulder Lift	
A film loop demonstrating the shoulder lift.	As above. Estimated minimum time, 2 - 3 half-hour sessions, plus as much further practice as possible.
Three-Man Lift	
A film loop demonstrating the three-man lift for lifting the patient horizontally between bed and trolley.	As above. Estimated minimum time, 1 half-hour session,

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Training Aids	Description of Training
<u>STAGE FOUR - ONE-MAN LIFTS</u>	
<u>Note</u>: Standard techniques for one-man lifting have not yet been agreed by the Chartered Society of Physiotherapy. This Stage of the system should await development until the problem has been fully investigated and standard methods agreed.	
Film loop (or loops) demonstrating one-man lifting techniques.	As for Stage Three.
<u>STAGE FIVE - ADAPTING THE TECHNIQUES TO THE PATIENT'S CONDITION</u>	
<u>Group Discussions</u>	
Slides showing lifting situations in the ward involving patients with a variety of conditions, positions, weights, etc.	The aim of this stage is to train the pupil to acquire the habit of thoughtful preparation for each lifting situation, i.e to think about all the factors that need to be considered, both for the patient's and for her own safety, when planning the lift. The method is by discussion of particular cases. These may be both taken from the pupil's own experience and based on the slides. The discussions are aimed to answer the questions, "How should this patient be lifted?" and "What factors should be taken into account in planning the lift?"
<u>Follow-up Training</u>	
Charts to be hung in ward offices to remind the pupil of the basic key points of lifting and to help her to retain what she has learnt.	Individual tuition in the ward as required. Periodically throughout her two years of training the pupil should receive refresher training, using the film loops, and practising under supervision. We cannot assess at present how much time should be devoted to this stage of training. The most effective plan, we think, would be to cover the stage in short sessions spread over several weeks or months.

A Handbook on the system

Tutors will require a booklet containing:-

- detailed statements of agreed lifting methods and key points of posture;
- a suggested plan of training;
- full notes explaining the system, and the purpose and recommended uses of all the training aids.

6. Questions Arising from the Recommendations

6.1 The role of the tutor in the proposed system of training

The normal role of the tutor in practical training is to:-

- establish and maintain the class motivation;
- demonstrate;
- stimulate discussion and questions;
- provide as much individual practice as possible;
- coach individual pupils as they practise;
- encourage pupils to practise not only inside but also outside formal class sessions;
- coach individual pupils on the job in the ward.

Far from usurping the tutor from this role, the system we propose should enable her to play it with greater confidence and better results. The film loops are not substitutes for, but supplement, the tutor's demonstrations. The success of the system depends on the skills of the tutor both as a practical nurse and as a practical instructor.

We are supporting Richard Goodman's* plea for integrated training systems rather than for isolated training aids. There is no threat to human individuality or creativity implicit in the growing technology of education.

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*Late Head of Dept., of Computing and Cybernetics - Brighton College of Technology in the forward to the Hospital Centre's programmed text, "The Mechanism of Respiration and Closed Drainage of the Pleural Cavity".

On the contrary:-

> "It's objective is to achieve an efficient and rational division of labour, subject to human control, between people and the Support Systems they evolve, to amplify human creativity, not to replace it."*

6.2 The role of the system in the development of nursing training

The role of the system would not only be to improve lifting training. It should also be a valuable teaching experience for many of the tutors who use it. It was this role which was particularly noted by the two Royal College of Nursing staff members to whom we spoke.

The two features of the system which should be of general value to many tutors are:-

(a) ensuring that the learner has mastered one step before proceeding to the next, and ensuring that there is frequent "feedback", both to teacher and learner, about whether what is being taught is being learned. The system for lifting training defines the level of performance required of pupils by the end of each step. The tutor will be encouraged to test the learning thoroughly before introducing the next step.

(b) the use of a range of training aids as integral parts of an overall plan or system of training.

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*See footnote, page 31.

III. OBSERVATION OF PATIENTS

1. The Investigation

The problem of training nurses to observe in the ward was investigated by:-

(a) attending training sessions on observation at Whittington Hospital;

(b) discussing the question with tutors, ward staff and a doctor;

(c) studying the nurses' text books, in particular:-
M.C. Anderson "Basic Nursing Techniques"
(a programmed text);
J. Forrest "Practical Nursing and Anatomy for
Pupil Nurses";
B.B. Kozier and B.W. Du Gaz "Fundamentals of Patient Care".

We are not referring here to the prescribed observation routines, like "T.P.R.", but to the development of the pupil's general observational ability.

2. Findings

2.1 The problems of observation training

Observational ability enters into almost every task that the nurse has to do. It is a high level perceptual skill and is not easy to acquire. It involves:-

(a) an ability to sense signs and indications from individual patients in a variety of conditions;

(b) perception of the meaning of these signs and their interpretation;

(c) a decision on personal action or reporting on the basis of an analysis of the signs.

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It is a difficult training task to train a nurse to be habitually alert and thorough in observation in the ward. There is an understandable tendency to assign a large part of the learning required to experience, and there is some doubt as to whether the process of observation can be taught at all.

2.2 Current training methods

In spite of the difficulty of defining the problem there is a variety of training taking place which is obviously of great value:-

(a) classroom teaching of the basic facts, i.e. the expected signs and symptoms of patient conditions which the nurse is likely to meet in the ward, and the required action on the part of the nurse;

(b) lectures from doctors on illnesses, signs and action required;

(c) textbooks with chapters which classify signs and symptoms;

(d) some tutors set up observational exercises in the classroom to reveal to the pupils that they are not very observant and to encourage them to try hard at developing their powers of observation;

(e) visits to the ward with tutors, and bedside case studies;

(f) bedside tuition from ward sisters;

(g) on-the-job experience in the wards.

The general strategy being used can be summarised as follows:-

> It feeds the pupil with the knowledge she needs in order to observe patients. It shows the pupil some of the signs and symptoms which she is likely to meet in the ward. It encourages her to be alert and thorough. It provides some valuable tuition at the bedside. It leaves the rest to experience.

2.3 Weakness in the current training

Although this general strategy covers much of the required basic training, it does not aim specifically to help the pupil to develop thoroughness in observation. Some nurses do become alert, thorough and reliable. Some do not. This may be partly due to the differing abilities and aptitudes of nurses, but we contend that the training could be structured to include this objective, and that, if it was, a higher and more consistent level of performance would result.

The present training tends to be scattered and incoherent. It lacks unity of purpose. Although there is much in it that is reliable, it is not integrated with the aim of enabling the pupil to increase, step by step, her powers of observation.

Since there are many individual differences between patients, and no two situations in which the nurse finds herself are exactly alike, some tutors and ward sisters claim that it is not desirable to train the pupil in defined methods of observation. We agree that nurses need to be flexible and adaptable in their methods, and that it would be a mistake to train them in rigid observation routines (apart, of course, from standard observations like "T.P.R."), but it should be possible to provide some guide lines and systematic practice in basic training that will enable the nurse to become more "skilled" at observing than she can be if left to develop this ability on her own.

Experience in the ward must always play a major part in the learning of this kind of ability. But if the pupil is helped in the beginning to be thorough and methodical her work in the ward will itself be a more valuable learning experience.

2.4 Towards a solution

There are two steps to be taken if a solution to this problem is to be developed:-

(a) analysis of the problem, i.e., difinition of what the good observer does that makes her a good observer, and of what she needs to have learned in order to do it. A clear definition of what needs to be learned, i.e., of the training objectives, obten itself suggests the training methods required;

(b) organisation of a coherent system of training based on the training objectives that arise from analysis of the problem.

In the two sections (3, and 4.) which follow, we suggest the lines along which it should be possible to take these two steps. In section 3. we have begun to analyse the training problem. In section 4. we suggest an outline for a coherent system of observation training arising out of the analysis, which integrates and develops the nursing training methods, some of which are already in use.

The system has been outlined in general terms because the development of a final and specific solution is outside the scope of this survey.

3. Analysis of the problem

We have begun the task of defining:-

(a) the mental processes involved in observation;

(b) what the pupil needs to learn if she is to improve in her performance of these mental processes.

The purpose of this initial investigation was to enable us to explore the problem and outline a possible system for training the pupil in observation. To devise specific training aids we would need to observe and record what is seen, heard, etc. by a number of experienced nurses at work in the wards, and use questionnaires to find out the thought processes by which they make their decisions.

This analytical work would undoubtedly lead to modifications and improvements in the system that we have outlined on pages 39 - 41.

What the nurse should do when observing a patient, and what training she needs

3.1 Perceive all perceptible signs of the patient's condition

When the nurse observes a patient she needs to be sufficiently thorough to be sure that she will not overlook any perceptible sign or symptom that might be important.

In order to observe thoroughly she must learn to make full use of her senses of sight, hearing, touch, smell, and of questions to the patient, in scrutinising every aspect of the patient that might reveal an important sign.

Some examples are provided here of the kinds of questions the nurse must ask herself about the patient:-

The patient's eyes. Is the patient revealing:-

- loss of sight
- blurred sight
- photo phobia
- lacrimation
- swollen or bloodshot eyes
- drooped or paralysed eyelids
- jaundiced whites of eyes
- dilation or constriction of pupils
- inequality of pupil size?

The patient's skin.

- Is it normal pink, pale, cyanotic, jaundiced or flushed?
- Is it dry, oily or moist?
- Is it warm or cool?
- Are there rashes? If so, where, how big, what colour, do they irritate?
- Is there inflammation? If so, where, how big, etc?
- Is there any skin injury? Bruise, abrasion, laceration, incision, ulcer, pressure sore?

The patient's facial expression and behaviour.

Is the patient happy, sad, afraid, anxious, alert, interested, apathetic, restless, hyper-active, calm, excited, agitated, approaching collapse, in pain?

If the patient is suffering pain:-

Where is it?

Is it aching, sharp, dull, shooting, cramping, burning, colicky?

How long has it lasted?

How bad is it?

What, if anything, relieves it?

How did it start?

3.2 Decide what action to take, and take whatever action is necessary

When the nurse observes a patient, she needs to be able to decide, for each sign:-

- whether it is a normal sign of a healthy person;
- whether it is normal for a patient of this type, in this condition and having this treatment;
- whether any change has occurred since the patient was last observed;
- whether it is important and calls for action on the part of the nurse;
- what action, if any, is required - reporting, recording, or other action.

To make these decisions she must learn to:-

(a) identify or recognise:-

Signs common to all or most people

- the signs of normal good health common to all or most people;

- the signs and syndromes that for all or most people indicate illness and injury;
- common signs calling for urgent or quick action;
- signs that must be reported and recorded.

Signs particular to wards, conditions and treatments

- the signs and syndromes expected of all or most patients in particular wards, in particular conditions of illness and injury and having particular treatments;
- abnormal signs or signs of change from expected conditions;
- signs calling for urgent or quick action;
- signs that must be reported and recorded.

Signs particular to individual patients

- the signs that vary from patient to patient and can only be interpreted in the light of the patient's individual characteristics, condition and treatment.

(b) assimilate all the relevant information about each patient's history of health, characteristics, condition and treatment, from the patient's records, the ward sister and the patient himself;

(c) report and record observations clearly and concisely;

(d) carry out each type of emergency routine and other forms of action when these are required for the patient's condition.

4. Outline of Recommended System of Training

4.1 General description of system

The system would be a series of controlled learning experiences constructed to enable the pupil to acquire, in gradual stages, the

ability to:-

- recognise the common signs and symptoms of illnesses and conditions that she is likely to meet in the wards;
- observe the patient methodically and thoroughly and miss no perceptible sign or symptom that may be important;
- decide whether the patient's condition calls for action, and, if so, what action on the part of the nurse;
- report and record her observations.

Note This system includes the training of pupils in deciding what form of action to take, but we have not included practical training in performing the emergency routines and other forms of action. Observation is obviously an activity which relates to almost everything which the nurse has to do. The training sessions and exercises outlined below should therefore be integrated with the total pupil training programme.

4.2 The System

Elements of the system	Training methods	Appropriate training aids
Basic training in recognition of the signs of and action required for illnesses and conditions:- (a) which are common in all or most wards; (b) which are common to patients in special wards, with particular diseases, conditions and treatments.	A prescribed series of talks, discussions and tests in the classroom on the basic facts (i.e. the expected signs and progress of each type of patient condition and the action required on the part of the nurse). Case studies in the classroom, with exercises and tests in observing the visual material presented. Planned case studies in the wards with exercises and tests in recording the observed signs of each type of illness and condition, and the action required.	Short programmed texts for teaching the basic facts could be useful. Booklet containing lists of the common signs and symptoms of each type of patient condition. Slides showing the visible signs of each disease and condition. Sheets on which pupils can record the name of the illness or condition, the signs observed and the action which should be taken.

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Elements of the system	Training methods	Appropriate training aids
Basic training in observing thoroughly.	A prescribed series of observation demonstrations, practice case study exercises and discussions, aimed at building up the pupil's ability in gradual stages until she is able to scrutinise thoroughly every aspect of the person or patient being observed, and note every sign that may be important. Some of this practice would be in the classroom using healthy people, and slides and film of patients, as subjects. Most of the practice exercises would be done in the ward.	For each exercise:- - a checklist of questions to guide the pupil in thorough observation of the aspect of the patient which is being dealt with in the exercise (the lists of questions can be printed in a booklet); - an observation recording sheet to enable the pupil to practise recording what she observes. Demonstrations of thorough observation on film loop with sound track.

Notes

(a) The structured exercises in observing would be integrated with and run parallel in time to the basic training in recognition of signs of illnesses and conditions.

(b) The use of the lists of questions and recording sheets is intended to teach the pupil to be thorough, not rigid. Some of the signs which the nurse observes have the same meaning for all or most patients. Other signs can only be interpreted in the light of the patient's individual history, characteristics, condition and treatment. The questions can be designed to help the nurse to take account of these individual factors when she is observing the patient. Once they have succeeded in making her ask herself all the relevant questions about patients the nurse can dispense with these training aids.

(c) A tutor's handbook would be provided, containing:-

- planned sequences of case studies, discussions and exercises;
- tests;
- notes on the use of each of the aids within the system;
- notes on integrating the system with the rest of the pupil training programme.

IV. ASEPTIC PRACTICE

1. The Investigation

The problem of training pupils in the prevention and control of the spread of infection was investigated by:-

(a) discussions with tutors and ward staff;

(b) studying nurses' text books:-

J. Forrest "Practical Nursing and Anatomy for Pupil Nurses";

B.B. Kozier and B.W. Du Gaz "Fundamentals of Patient Care";

M. Seedor "Introduction to Asepsis" (a programmed text).

2. Findings

2.1 The pupil needs two distinct kinds of training to equip her for her role in the prevention of bacteriological invasion:-

(a) She has to acquire a set of basic, general principles of medical and surgical asepsis that she can apply consistently and safely in her work in the ward. She should be continuously aware of how infection can spread, and act consistently in ways that will help to control it.

(b) She also requires to be trained in a number of standard techniques, e.g. hand washing, barrier nursing and use of gloves, masks and gowns, preparation and use of sterile equipment, preparation and conduct of surgical dressings, terminal disinfection.

The special techniques are, we believe, taught thoroughly and well at present. They lend themselves to practical demonstrations both by the

tutor and on film (a number of visual aids are already available), and to practical exercises and tests for the pupil.

2.2 The problem for training lies in helping the pupil to acquire the basic habits of thought and action which arise out of the general principles of asepsis. It is one problem, and a relatively simple one, to teach the facts about micro-organisms, how they spread, how they enter the body, how the body reacts, etc.. It is a more difficult problem to turn this knowledge into practical behaviour.

The general principles and basic facts are being taught. The pupil is expected to -- and to varying degrees does -- learn to apply them in practice under the supervision of ward staff and clinical tutors. The problem that interests us is how the pupil can be helped more systematically to make the transition from knowledge in the head to behaviour in the ward.

2.3 Examples illustrating the training problem

Some typical examples of the kinds of inconsistency which do sometimes occur in the ward will illustrate the problem.

A nurse has been trained in the procedure for washing her hands and putting on a mask. Having followed the procedure correctly, she talks, coughs, and raises her hand to touch the front of her mask. She does not immediately wash her hands again. Either she has assumed erroneously that the mask is a 100% proof barrier against infection, or she has been thoughtless. If her action had been accompanied by careful thought she would either have avoided the mistake or have corrected it by re-washing her hands. It is a training problem to build careful thought into the nurses' behaviour.

A nurse who may be thoughtful and alert in her own aseptic practice gives a bed pan to a patient, but neglects also to give him a bowl of water and soap.

When stripping beds a nurse drapes the linen over a chair or holds it to her body instead of transferring it directly from the bed into a container.

A nurse follows the correct routine for performing a dressing, but does it at the time of day when beds are being made and the concentration of organisms in the atmosphere is at its highest.

3. Recommendations

We recommend, in outline only, a system of training that could be developed to enable the pupil to acquire habits of thoughtfulness. This training is not intended to supplant current training, but to supplement it in the one area where we consider it is weak.

3.1 Recommended training objectives

Each pupil will be able to:-

(a) state how the basic principles of asepsis are to be applied to each type of situation in which she is likely to find herself in the ward;

(b) demonstrate that she can apply the basic principles in a variety of test situations typical of the ward;

(c) identify mistakes and inconsistencies in her own and other people's practice, state in what way the practice is wrong, and how it can be avoided or corrected.

3.2 Recommended training aids

In order to achieve these objectives we recommend that a thorough study be made of aseptic practice in a number of hospitals, in order to identify

nursing situations and activities in which mistakes and inconsistencies most frequently occur. The purpose of the study would be to collect a large number of cases, examples and illustrations of both good and bad practice.

On the basis of this material we recommend that the following training aids be devised:-

(a) a 10 minute film designed to motivate the pupil to adopt hygienic practice. By skilful use of enlargements of bacteria, and emphasis on how infection can spread, the film would make a powerful impression on the viewer in preparation for the training exercises and discussions which follow;

(b) film loops, slides and a booklet of examples illustrating good aseptic practice in the common nursing activities in which bad practice sometimes occurs. The booklet would also contain key points for discussion and observation, and test questions;

(c) slides and printed examples showing the types of mistakes and inconsistencies which have been found to occur*. These would be cross-related with the film loops, slides and printed examples of good practice, specified in (b) above. They would be used in exercises and discussions on the application of the basic principles of aseptic practice to practical ward activities. The pupil would record the mistakes she observes in the slides and printed examples;

(d) a booklet for the tutor with a suggested sequence of discussions, exercises and tests in observing and identifying good and bad* practices. This would also contain test questions for use with each aid, and notes on the use of the aids and on the integration of the system with the rest of the pupil training programme.

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* Although it is not normally a sound technique to expose the learner to bad practices in training, in this case it will be valuable to do so. Observation exercises and discussions on bad practices, based on sound training in the good practices, can be a very powerful method of instilling habits of thoughtful and critical mental alertness. The pupil is not being taught bad practices. She is being taught to be critical whenever she encounters bad practices.

3.3 Recommended training methods

(a) Current training methods for teaching the basic theory of aseptic practice should remain, supplemented by the 10 minute film.

(b) A planned series of group discussions, observation exercises and tests on the good and bad practices illustrated on film loop, slides, and by printed examples. The correct application of the basic principles will be taught thoroughly first, followed by training in avoidance of mistakes and inconsistencies.

This part of the training is aimed at helping the pupils to acquire the habit of thinking about their normal everyday tasks in terms of the basic principles. It also aims to make them mentally alert for mistakes and inconsistencies.

(c) A series of practical exercises in performing the activities in which mistakes and inconsistencies have been found to occur. To help her to conform with the basic principles of asepsis the pupil can be guided by the lists of key points.

This part of the training is aimed at bridging the gap between knowledge in the head and behaviour in the ward.

The system of training outlined should be combined with the current methods for training in the basic facts and in the special techniques, to form an integrated system covering the whole topic of asepsis.

V. TAKING BLOOD PRESSURE

1. The Problem

It has been almost unanimously agreed by the tutors, ward staff, and doctors to whom we have spoken that many nurses experience difficulty in learning to take blood pressure. Those who have difficulties dc eventually, after much experience, acquire the knack. But if a method of training could be designed to overcome the learning difficulties, many nurses would be helped to reach a reliable standard of performance in a much shorter time than it is taking at present.

The main difficulty, we were told, lies in the use of the stethoscope. Nurses in the early stages find it hard to distinguish between the various sounds which the instrument amplifies.

2. Analysis of the Problem

In order to learn more precisely and at first hand what the difficulties were, we made an analysis of the total procedure, with the help of two tutors at the Whittington Hospital. The analysis of the procedure for measuring blood pressure is presented in Appendix 3. It needs, we think, to be revised and checked with a number of tutors, senior ward staff and doctors before it can be claimed to be a generally acceptable statement of the essential steps and key points.

The analysis revealed two types of learning difficulty:-

(a) Identifying and discriminating between sounds

This difficulty can be defined more precisely:-

- (i) identifying the weak, regular tapping sound of the pulse;
- (ii) distinguishing between the tapping sound and other muffled noises;
- (iii) identifying the points at which the tapping sound starts and disappears.

(b) Combining the eyes, ears and two hands in one controlled and sensitive operation

There is some difficulty experienced in the early stages in combining the following activities:-

(i) listening intently through the stethoscope;

(ii) watching the manometer closely;

(iii) operating the pressure slowly and steadily with the left hand;

(iv) holding the bell of the stethoscope absolutely still on the brachial artery with the right hand.

This statement of the training problem arises from a relatively brief study of the procedure. As the first step in constructing an effective system of training aids and exercises it will be necessary to make a more thorough study of the problems.

This definition of the learning problems supplies the training objectives and also points to the kinds of training aids and methods needed to attain them.

3. Recommendations

3.1 List of recommended training aids

(a) a film loop showing procedure for measuring blood pressure with the stethoscope. The sound track would give the stethoscope sounds which are heard at each step.

The film loop will also show animated drawings of blood passing through the brachial artery at each stage of the procedure. This will give the pupil a clear idea of what she is listening to, and consequently help her in identifying and discriminating between the sounds.

(b) a sound tape on which are recorded the individual sounds heard on the stethoscope - progressing from easily identifiable sounds to others which are hard to identify;

(c) another tape (or part two of the same tape) on which are recorded the sound changes heard on the stethoscope - progressing from easy to difficult;

(d) an amplifier for relaying the sounds on the stethoscope to the class while blood pressure is being measured;

(e) stethoscopes with two pairs of ear pieces to enable tutors to give individual attention to each pupil.

(f) a hand book for the tutor with notes on the use of the aids, a plan of the practical exercises, and suggested tests of pupil performance.

3.2 Recommended training system

Training Objectives	Training Methods and Aids
Each pupil will be able to identify and discriminate between the following sounds recorded on tape:- - the regular tapping sound of beat just below systolic pressure; - the loud knocking sound heard in middle range between systolic and diastolic pressure; - the sound of beat just above diastolic pressure; - the muffled sound heard through stethoscope before air pressure is applied; - the sounds caused by movement of the stethoscope bell.	1. An introduction to the range of sounds through a film loop with sound recording, and animation. The film loop shows the procedure, step by step, with key points emphasised. The sound track gives the sounds heard through the stethoscope as each step appears on the screen. A pamphlet would be provided with the film loop, for the pupil to retain. 2. A series of graded exercises in identifying and discriminating between the sounds on a tape:- Exercise 1. The tape begins with a sequence of sounds in random order which are easy to identify. Pupils note the type of sound to which they are listening. When all pupils are able to identify each sound correctly they proceed to the next exercise. Exercise 2. Similar to Exercise 1, but with sounds which are harder to discriminate and identify. Exercise 3. Similar but more difficult. Note The production of a tape which helps pupils over their learning difficulties will involve experimenting with pupils in order to find:- (a) the most suitable jump in difficulty between one exercise and the next; (b) the number of exercises required; (c) the most suitable length for each exercise.

TRAINING IN BASIC NURSING PRACTICE - TAKING BLOOD PRESSURE

3.2 Recommended training system

Training Objectives	Training Methods and Aids
Each pupil will be able to identify the changes in sound which mark systolic and diastolic pressure.	1. A series of graded exercises in identifying sound changes on tape. The only difference between these exercises and the previous series is that while the previous series is concerned with identifying and discriminating between sounds, this series is concerned with identifying the point at which one sound changes into another. 2. It would also be useful for the tutor to be able to connect a stethoscope to an amplifier. The class would then be able both to see what she was doing and hear what she was hearing as she demonstrated the measurement of blood pressure.
Each pupil will be able to use the sphygmomanometer bulb and valve to control pressure slowly and steadily.	Pupils should, under supervision, practice using the sphygmomanometer without the stethoscope, obtaining rough measurements of each other's systolic pressure by feeling the radial pulse.
Each pupil will be able to combine the use of the stethoscope and the sphygmomanometer.	Stethoscopes with two pairs of ear pieces should be used to enable tutors to give individual coaching to each pupil as required.

SECTION THREE

TRAINING IN BASIC NURSING THEORY

SECTION THREE TRAINING IN BASIC NURSING THEORY

I. GENERAL FINDINGS

1. Introduction

Theory and practice, for the pupil nurse, go hand in hand. She needs to be well informed in order to do her job, but the knowledge which she needs is not pure knowledge. It is knowledge which permeates and governs her behaviour in the ward. The real objective of teaching her knowledge is not so that she can answer test questions on paper, but that she acquires habits of thinking and doing in the ward.

Most of the topics in the syllabus are, we think, being taught thoroughly and in a practical way. But there are a large number of subjects in which the pupil requires some basic theoretical knowledge. The tutors are skilled teachers with a wide range of teaching techniques. We have therefore confined our attention to topics which tutors have themselves identified as teaching problems.

2. The Investigation

We investigated the theoretical training of pupil nurses by:-

(a) attending classes at Whittington Hospital;
(b) discussing every topic in the syllabus with tutors in order to identify those topics which they consider to present training problems;
(c) investigating a range of programmed texts already available on nursing topics in order to judge whether they were suitable for pupils;
(d) selecting one topic for a pilot project.

TRAINING IN BASIC NURSING THEORY - GENERAL FINDINGS

3. Problem Topics in Theoretical Training

3.1 The following topics, according to the tutors, tend to be a source of particular confusion and learning difficulty to many pupils:-

- fluid balance (basic theory);
- blood grouping and transfusion;
- blood conditions and tests;
- calculation and measurement as used, for instance, in the administration of insulin;
- the endocrine system;
- the nervous system;
- the lymphatic system;
- the use of traction equipment in orthopaedics.

3.2 Before preparing training systems that will help to overcome the difficulties of pupils in these topics it will be necessary to make a thorough analysis of the use the pupil is expected to make of each area of theory in her actual ward practice. Since the time available for training pupils and also the capacity of most pupils for assimulating theory are limited, they should be taught only what helps them to do their job.

It is not easy to decide just how much theoretical information to teach. Pupils obviously need to be given reasons for doing what they have to do. This helps them to do it more reliably than if they are simply following a set of unexplained routines. But there is considerable variation of opinion amongst tutors about the depth to which pupils should be taken in theoretical training. To take the nervous system as an example, one tutor has claimed that the level of basic information required by pupils is, roughly, as follows:-

(a) the name and location of the main parts of the system:-
i.e., the brain
the spinal cord
the nerve fibres branching to every organ of the body;

(b) the functions of each main part of the system:-

i.e., the brain sends messages to and receives them from every part of the body through the nerve fibres, most of which pass through the spinal column.

To include much more than this in basic training would, she claims, confuse many pupils, and in any case they do not need much more than this for the practice of nursing care.

Other tutors include much more anatomical and physiological detail in the basic training. In one of the pupils' standard text books, "Practical Nursing and Anatomy for Pupil Nurses", by Jane Forrest, a four page description of the nervous system includes the names of about 40 components of the system, many in latin. In the six pages which immediately follow, on the nursing care required for common diseases of the nervous system, only 8 components of the nervous system are mentioned:-

brain, cerebrum, spinal cord, nervous tissue,
cerebro-spinal fluid, the ventricle of the brain,
meninges, sciatic nerve.

In the treatment of meningitis the nurse is particularly concerned with feeding the patient, treating pressure areas, and maintaining quiet and darkness. She probably has to assist the doctor in performing a lumbar puncture, by preparing both the trolley and the patient. It is useful for her to learn that:-

- meningitis is inflamation of the meninges, i.e., the protective membranes covering the brain and the spinal cord;

- the layer of fluid within the meninges protects, nourishes and cleanses the tissues of the brain and the spinal cord;

- the purpose of the lumbar puncture is to diagnose the cause of the inflammation, estimate and relieve the pressure of fluid on the brain, introduce anaesthetics and other drugs.

But does she need to be taught the names and descriptions of each of the three membranes which constitute the meninges?

The pupil needs enough detailed information to be able to play her role in helping the doctor and looking after the patient. She also needs to be satisfied that she "understands" what she is doing. But it is questionable whether any further anatomical details and technical terms help her to understand or do her job any better. What is important is that she should have a firm grasp of the essentials. A definition of what is essential can only arise out of an analysis of what she has to do in the ward. A thorough and detailed analysis of the enrolled nurse's job should therefore be the first step in designing training materials to help her over her learning difficulties.

4. The Literacy and Learning Ability of Pupils

4.1 The average level of intake of pupil nurses in terms of educational qualifications is, of course, much lower than that of students. Pupils are not required to have passed 'O' level G.C.E., whereas students are required to have at least 2 'O' level passes. Most students have already studied basic anatomy and physiology at school, whereas for most pupils these subjects are new. On the rare occasions when they have the opportunity of becoming state registered nurses, the brightest of the pupils, we are told, have difficulties in keeping up with students in training.

About 50% of the pupil intake at Whittington Hospital, for example, are West Indians, about 20% are Irish, about 15% are English, and the remainder are of widely scattered origin. This broad spectrum of cultural backgrounds poses inevitable difficulties to the tutor in providing a level of training which is suitable for all pupils. No pupil is recruited who is not fluent at written and spoken English, but the level of literacy is nevertheless widely varied.

4.2 According to tutors, pupils find it much more difficult to learn from the written word than students. But little written material has been produced especially for them. It is to be expected that the average pupil will have difficulty in reading a book which is written for students. The length of the book, the number of new words which she meets, the speed at which the book moves from topic to topic, and the sheer mass of words, are bound to deter her.

Simple well-illustrated forms of programmed instruction have been found to work successfully in teaching people of a much lower level of literacy and intelligence than pupil nurses. The problem is to match the form of the programme to the needs of the learner.

An example of the kind of text which can be designed to appeal to pupils is provided by the pamphlet, "Here's a career that needs both men and women", produced for Guy's Hospital Enrolled Nurses' Training School to attract pupil entrants. It is not a programmed text but is designed specifically for prospective pupils. It is attractively produced, short, with few, compelling words, and most of the information is presented pictorially. Programmed texts produced in this kind of pattern could, we believe, have a strong appeal to a large proportion of pupils, particularly once they discover that the programmes can help them to understand difficult topics. The effectiveness of these programmes would be further enhanced by integrating them with planned exercises, tests and individual tuition.

5. Review of Programmed Instruction Currently Available on Nursing Topics

Our review of some of the programmed instruction available currently on nursing topics was made in order to try to find material suitable for pupil nurses. The list of texts we have seen is presented in Appendix 4. Our comments are generally unfavourable, but this is mainly because we are considering the material from the point of view of its usefulness for pupils and not students.

TRAINING IN BASIC NURSING THEORY - GENERAL FINDINGS

From the point of view of pupils these programmes have the following weaknesses:-

(a) They tend to be too long and the subject matter goes too deep for the pupil. When the pupil picks up a programme she should have confidence that she will be able to complete it in a reasonably short time, say ½ - 1 hour.

(b) There tend to be too many words and too much information presented on each page. For pupils, we believe, it is particularly desirable to keep the number of words to a minimum, and to lay each page out in a way which is attractive to the eye.

(c) They tend not to make enough use of visual illustrations. The lower the level of literacy of the reader, the more important it is to combine verbal and visual information.

(d) One of the main principles of programmed instruction is that the reader learns actively by being made to respond at each step. In these programmes there is a tendency for the responses and consequently the learning to be too theoretical, too verbal, too far removed from the kinds of responses which the pupil has to make in the ward. For instance, a programme which trains the reader to recite lists of signs and symptoms of diseases is of limited value as observation training. It is by no means certain that being able to give the correct verbal answers helps in actually observing the signs and symptoms. If the programme trained the reader in identifying actual signs and symptoms illustrated in drawings and photographs it would be getting closer to meeting the real training need. This is particularly true for pupils, who, by definition, are less capable of making the transition from verbal knowledge to practical behaviour.

TRAINING IN BASIC NURSING THEORY - GENERAL FINDINGS

6 The Requirements of a System of Theoretical Training

Unlimited individual tuition would be the ideal, but obviously impractical, solution to theoretical learning difficulties. It is, however, possible to equip the tutor with a system of class teaching which has some of the main features of individual tuition.

Individual tuition enables the tutor to identify accurately the learning problems and needs of each pupil, and to provide the required individual learning experiences. It is the continuous process of questions to and responses from the pupil which enables the tutor to be sensitive to each pupil's problems and needs. The larger the class, the more difficult it is for the tutor to remain in touch with the learning process of each individual. The problem is aggravated by the diversity of educational backgrounds among pupil nurses.

Tutors could be assisted in the teaching of difficult theoretical topics by a system that enabled them to:-

(a) ensure that every pupil learned the basic theory at her own pace and thoroughly;

(b) keep every member of the class occupied with profitable learning experiences;

(c) devote most of their time to individual tuition.

The basic theoretical training can be achieved through the medium of programmed instruction. This can also provide the basis for effective exercises and tests. The tutor would then be freed from the necessity of devoting most of her time to normal class teaching, and would be able to circulate among her pupils giving each the individual attention required. Simple, short programmes, attractively produced, well illustrated, with few words, and carefully integrated with practical exercises, tests, and individual tuition, could be very helpful in overcoming pupil nurses' difficulties with theoretical subjects. According to tutors, many student nurses could also benefit from such training in the early stages

II. RECOMMENDED PILOT PROJECT

1. Aims of Pilot Project

Many students as well as pupils experience confusion over the simple calculations and measurement that are required in the ward. Tutors readily admit that they have difficulty in overcoming the confusion. It is of critical importance for the safety of patients that the nurse does not make mistakes.

An illustration of the kind of mistake that can occur will serve to underline the importance of this training problem:-

> The standard dose of dixogin, a heart retarding drug, is 0.25mgm.
>
> Occasionally 0.5mgm is prescribed.
>
> It is dangerous to exceed the prescribed dose.
>
> For young people or people especially sensitive to the drug, the dose is 0.125mgm.
>
> A nurse, when asked to give 0.125mgm, gave 1.25mgm.
>
> Confusion about the relative value of digits above and below the decimal point is common.

We are recommending that the topic of calculations and measurement in the ward should be chosen for a pilot project. The aim will be both to provide tutors with a valuable set of aids for overcoming their teaching problems in this topic, and also to develop and establish a form of programmed instruction with its supporting system which is suitable for and appeals to pupil nurses.

TRAINING IN BASIC NURSING THEORY - RECOMMENDED PILOT PROJECT

2. General Description of the Recommended Training System

With the help of tutors we have identified four problem areas of calculating and measuring in the ward. For each of these areas we are recommending short programmed texts with planned exercises, tests and tutor guidance notes. The pupil learning time in each of these areas will be between 1½ and 2½ hours. The active participation of the pupil in the training will be linked as closely as possible to the activities of the nurse in the ward. For example, the programme on measuring insulin dosages will require insulin bottles and syringes. The pupil will not only solve problems on paper, but will measure doses as she will be required to do in the ward. The system will be designed to train and test her not just to do the arithmetic involved in measuring insulin doses, but to measure insulin doses.

The system deals only with the calculating and measuring aspect of the nurse's job. It must therefore be integrated with the total pupil training programme. When, for instance, the study day arrives in which diabetes is to be dealt with, the tutor will make use of the recommended aids together with methods in current use for teaching the topic of diabetes. Notes will be provided for the tutor on how and when to integrate the training in calculation and measurement with the rest of the pupil training programme.

3. Analysis of the Calculating and Measuring Activities of the Enrolled Nurse

The first step in designing the programmes must be to make a thorough analysis of:-

(a) what calculating and measuring the enrolled nurse has to do in the ward;

(b) common difficulties experienced by pupils in learning to perform these activities

This analysis will provide the practical training objectives for each of the programmed texts, practical exercises and tests, and it will reveal the learning problems which require particularly careful and thorough programming strategy. It will be necessary to check the analysis with a large number of tutors and ward staff in several hospitals, to ensure that the system gives adequate attention to all of the common problems experienced by pupils in calculation and measurement.

4. Review of Arithmetic Programmes Already Available for Nurses

We have already mentioned general reasons why existing programmes are not suitable for pupil nurses. As far as the arithmetic programmes are concerned these strictures certainly apply: they tend to have the dimensions of a complete textbook covering the whole field of mathematics for the ward. They are therefore too long for the pupil. They focus on training the student to solve mathematical problems on paper rather than to perform ward activities which involve mathematical reasoning. In appearance they must be daunting to pupils, since each page tends to be filled with the maximum possible number of exercises and examples. There are very few illustrations. The apothecaries' system is disappearing from use. Tutors do not, as far as we can gather, attempt to use them for the training of pupils. The field is, we believe, open for a different kind of programme to be developed along the lines which we have described.

5. Recommendations

The four main problem areas of calculation and measurement in the ward have been identified as:-

(a) measuring and recording the patient's fluid intake and output;
(b) preparing doses from liquid drugs;
(c) preparing doses from solid drugs;
(d) preparing insulin doses.

TRAINING IN BASIC NURSING THEORY - RECOMMENDED PILOT PROJECT

We recommend that for each of these four topics the following training aids be devised:-

- two short programmed texts;
- a planned series of practical exercises and tests based on and integrated with the programmed instruction;
- notes for the tutor on the use of the training aids, with suggestions on how and when to integrate the training in calculations and measurement with the rest of the pupil training programme.

The recommended training objectives for each topic are presented in Appendix 5.

SECTION FOUR

TWO FURTHER PROBLEM AREAS

SECTION FOUR TWO FURTHER PROBLEM AREAS

1. Introduction

The survey has highlighted two further general problems:-

(a) The pupil (and the student) should be familiarised with a wide range of ward procedures before she is expected to perform them or to help someone else to perform them in a real life situation, e.g. catheterisation, underwater seal drainage of the pleural cavity, lumbar puncture. A training problem is presented when:-

  (i) the ward situation cannot be simulated satisfactorily in the classroom, and there is no means of giving the pupil full practical training until she is actually working in the ward. This can, of course, be alarming for the pupil. The implications for the patient depend on the thoroughness with which the pupil is supervised in the initial stages of her work in the ward;

  (ii) it is difficult to arrange for the whole class to see the procedure being carried out in the ward. The class may get in the way, or the patient may be embarrassed, or the procedure may be performed only rarely or irregularly.

Most of the tutors we met have identified this as one of their major problems. When a procedure cannot be simulated fully in the classroom and cannot be demonstrated to a class in the ward, some other way is needed of familiarising the pupil with the procedure before setting her to work in the ward. We cannot see any complete solution to this problem, short of a vast increase in the number of tutors available to give individual "bedside" tuition. Nevertheless film or film loop showing each of the procedures is an obvious partial solution.

(b) The time available for formal training of pupils is limited. All the available time is required to satisfy the basic training needs. Consequently there are some topics that must be left for the pupil to learn informally in the ward. The number of clinical tutors available for individual "bedside" instruction falls far short of what is required to satisfy all the training needs of individual pupils in the wards. However much time a ward sister devotes to training, it is not her primary function. The problem therefore is to find a way of helping the pupil to learn in the ward without requiring more time from tutors and ward sisters. There are certain specific areas, such as the observation and handling of the increasing range of specialised instruments and equipment, where it would be both feasible and valuable to develop training aids that enable the nurse to instruct herself.

2. Familiarising Pupils with Ward Procedures

2.1 The kind of training aid required

A major problem in producing films or film loops for general use in hospitals is the variation in procedures from hospital to hospital. Tutors may be unwilling to show their classes a film of a procedure which does not conform completely with their own hospital's accepted methods. The size of this problem must vary from procedure to procedure and it will need to be investigated carefully for each one. On the other hand, once the procedure has been agreed with a large number of hospitals and has been, so to speak, stabilised on film, it will help to add momentum to the gradual process of standardisation.

The differences arising from lack of standardisation suggest that it might be better to equip tutors in each hospital with video-tape equipment, but it should be borne in mind that the value to be obtained from any equipment depends entirely on the quality of the teaching material which it displays. In general, the value of a film as a teaching aid

depends on the degree of craftsmanship with which it is made. The professional film maker has a range of techniques for making the film memorable, for highlighting essential key points, i.e. showing very clearly exactly what the viewer needs to see, for eliminating visual distractions, and for creating an appearance of "realism", that are not at the disposal of the tutor. If the problem of standardisation is not insuperable, it will in general be more valuable for tutors to show professionally made film than to record the procedures themselves. The film-making technique of "delocalisation", i.e., eradicating the background which ties the procedure to a particular ward, will help to make the film suitable for general use and also to concentrate the viewers' attention on the procedure itself.

2.2 Procedures for which film loops are required

With the help of tutors we identified the following procedures for which it would be beneficial to provide film loops:-

- rectal treatments;
- catheterisation[*];
- tracheotomy tube and sucker procedures;
- tapping of fluid in distended abdomen (paracentesis abdominis);
- underwater seal drainage of pleural cavity;
- pleural aspiration and biopsy;
- lumbar puncture;
- peritoneal dialysis;
- intravenous infusions, including blood transfusion;
- giving injections[*];
- removing stitches;
- traction;
- emergency procedures for haemorrhage, shock, sudden unconsciousness, cardiac arrest[*], post-operative distress, e.g. cessation of breathing while unconscious[*].

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[*] 8 mm. film loops already available from Eothen Films Ltd. They were the first pilot films this company made, and Eothen do not feel satisfied with them.

2.3 Recommendations

We recommend that for each of the above procedures a film loop should be made, together with a supporting system of training which would comprise:-

- an illustrated pamphlet on the procedure, referring to the film loop, for the pupil to retain;
- notes for the tutor on the use of the aids, with suggestions on how and when to integrate this training with the rest of the pupil training programme;
- test questions on the key points of the procedure.

To start with, we recommend that the following two procedures be given priority as a pilot project:-

- intravenous infusion;
- removing stitches.

3. Supplementing Clinical Instruction by Self-Instructional Aids

3.1 The need for and value of self-instruction

In the time available to them tutors cannot teach with complete finality everything which the pupil needs to learn for her work in the ward. Nor is it desirable that they should try, because most pupils would not retain all that they were taught. There are some topics which it is preferable to leave until the pupil is assigned to the ward. She can then learn from tuition by the clinical tutor and the ward staff, and from experience. How well and rapidly she learns once she is in the ward depends on:-

(a) her own curiosity, readiness to ask questions, and ability to assimilate the answers;

(b) the amount of time tutors and ward staff can spend tutoring her.

Some of the onus of identifying personal training needs is inevitably placed on the pupil. Ward staff tend to welcome the pupil who comes

to them with questions. They also tend to complain about the pupil who appears to lack curiosity. If the pupil is really interested in her job, they feel, she should continually be seeking to learn more about it.

Steps could be taken, we believe, to help the pupil who may realise vaguely that she has an area of confusion but who does not know what type of information she needs to clear up the confusion or what questions to ask. There are several areas in which the pupil could be helped to learn by self-instructional training aids, for instance in the observation of and use of special ward equipment. Diagrams, charts, checklists and programmed instruction pamphlets could enable the pupil to ask and answer key questions about the equipment. Tutors and ward staff could refer pupils to the self-instructional material for basic information and follow it up by answering any remaining uncertainties and queries. The pupil would be helped in the process of learning for herself. Tutors and ward staff, without having great demands made on their time, would be more certain that the pupil had assimilated what she needed to learn.

The ward staff with whom we have discussed this problem have reacted favourably to the idea of selecting key topics in the ward and providing self-instructional aids for them.

3.2 Types of self-instructional training aids which could be developed

Some of these topics are closely related to observation training. For example, in observing say a heart monitoring machine or a respirator, the nurse should observe both the patient and the apparatus continuously so as to make sure that nothing is going wrong and, if necessary, take prompt and corrective action.

We suggest that a check list of the questions to be asked in observation, coupled with a chart showing the function of the apparatus,

and a clearly worded, well illustrated set of instructions for taking the appropriate action, would go a long way to meet the need.

The nurse has to learn to operate an increasing number of instruments as technology advances. Instrument makers' operating instructions are often difficult to follow. It would, we believe, be valuable to develop a method of presenting illustrated and simply worded operating instructions to be used on the job by nurses, along with charts showing the function of the instruments. Possibly the production of these aids could be undertaken in conjunction with the manufacturers.

The nurse has to remember a large amount of detail about the treatments required for different types of patient condition. It would be valuable for ward staff and clinical tutors to be able to hand to the pupil cards with basic outlines of treatment listed for each type of condition. These could be divided into general treatment routines and special treatments, e.g.

Gall Bladder Removal

Pre-operative Routine

Basic Treatment	Special Treatment
- settle patient into ward - tests to confirm diagnosis - physiotherapy - routine blood tests etc.	- fat free diet - vitamin K

Post-operative Routine

Basic Treatment	Special Treatment
- full care while unconscious etc.	- two special types of drainage tube - perhaps blood transfusion

We are recommending the development of self-instructional kits for the ward. These would comprise sets of charts, checklists, cards, operating instructions for apparatus, and, perhaps, simple programmed instruction booklets, covering a range of equipment and topics. Where possible the self-instructional aids would be cross-related with the teaching methods and aids recommended elsewhere in the report. For example, a programmed text, a film loop and a set of operating instructions on traction would all contain common illustrative material and be accompanied by a set of notes with suggestions on how to integrate their use.

The self-instructional kit could be located in the ward sister's office and used, as required, either by the ward sister or by the clinical tutor. Notes would be provided explaining each of the aids, and suggesting methods of testing the pupil to determine whether or not she requires the self-instructional aids.

3.3 Some topics for self-instruction

With the help of tutors and ward staff we have identified the following topics for which it would be of value to produce self-instructional material:-

- types of illness and basics of required treatments;
- types and purposes of diets;
- types and purposes of drugs;
- the observation and control of intravenous infusions;
- peritoneal dialysis equipment;
- purpose of and observation of heart monitoring machines;
- operation and use of respirators;
- use of traction equipment.

3.4 Recommendations

We recommend that a kit of self-instructional aids be devised and assembled to supplement clinical instruction in each of the above topics.

TWO FURTHER PROBLEM AREAS

To start with, we recommend that the following be given priority as a pilot project:-

- heart monitoring machines;
- respirators.

The self-instructional kits to be devised and developed for these topics will comprise:-

- illustrated charts showing in simple terms the function of the equipment;
- illustrated charts showing how to interpret machine signals;
- checklists to help in observing the equipment and the patients;
- simply worded and clearly illustrated instructions for operating, controlling or using the equipment;

(for each piece of equipment these aids will be cross-related with each other, and, where this applies, with other training materials and methods either recommended or in use already);

- test questions to help the ward sister or clinical tutor to determine whether or not a pupil needs to make use of the self-instructional aids;
- notes for the ward sister and clinical tutor on the use of the self-instructional kit.

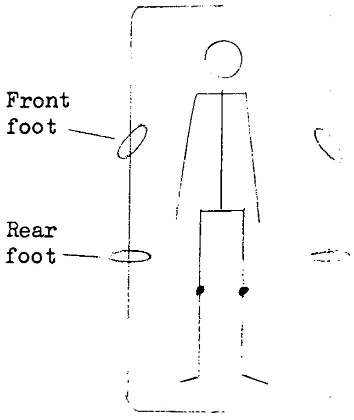
APPENDICES

APPENDIX 1

FIRST DRAFT OF ANALYSIS OF CONVENTIONAL LIFT

Lifting the patient from a reclining to a sitting position

NOTE: This analysis is not complete. Further analysis will be needed to check that the key points are correct, and to determine what emphasis should be given to each point in training.

MAIN STAGES TO BE LEARNT	KEY POINTS	EXPLANATION AND COMMENT
Stance to be taken by nurses before lifting.	Nurses should be exactly opposite each other. Rear foot of each nurse:- - at least 18" behind front foot; - level with patient's chest; - pointing in direction of lift. Front foot of each nurse:- - level with patient's thigh; - under edge of bed; - roughly 90° to edge of bed. Both knees pressed firmly against edge of bed. Chin in.	It is important to take up the correct stance in relation to:- - each other - the bed - the patient. 
Hand grip.	There are three main types of grip:- - double wrist grip; - hand shaking grip; - fingers clenched grip. (The methods and uses of each grip have not yet been analysed.)	This depends on the relative sizes of nurses' arms and hands.

APPENDIX 1, (CONTD.)

MAIN STAGES TO BE LEARNT	KEY POINTS	EXPLANATION AND COMMENT
Position of shoulders, arms and hands for lifting.	Rear shoulder of both nurses should be touching and lightly supporting patient's shoulder. Rear hand of both nurses:- - firm grip; - as low down patient's back as possible. Rear arm of both nurses should be gently supporting patient's back. Front hand of both nurses:- - firm grip; - as high under patient's thighs as possible. Weight of both nurses should be poised mainly over front foot.	The two nurses should be locked firmly but gently as one unit with patient, anchored by knees against bed. Nurses' bodies should be as close to patient as possible.
Position into which patient should be moved for lifting.	Patient should be helped into the following position:- - sitting; - knees bent; - arms crossed on chest; - head forward, chin on chest; - relaxed.	Nurses should tell the patient what to do to take up the required position, clearly, firmly, and in a relaxed manner.

APPENDIX 1. (CONTD.)

MAIN STAGES TO BE LEARNT	KEY POINTS	EXPLANATION AND COMMENT
The lifting movement	Take the strain on the thigh muscles. Do NOT take the strain on arms or back. Lift just high enough to prevent friction of patient's skin on bed linen. Sway or swivel towards rear, transferring weight mainly from front feet to rear feet.	Perfect balance should be maintained throughout the lift. This is ensured by making sure that the nurses' feet are wide enough apart. The total movement of both nurses should be smooth and synchronised with each other.
The total lifting procedure.	Place patient as far back into pillows as possible. - Inform the patient what is going to happen. - Help patient into sitting position. - Arrange pillows for sitting position. - Help the patient into the correct position for the lift. - Take up correct stance and position for lift. - Lift.	

APPENDIX 2

RECOMMENDED OBJECTIVES OF TRAINING SYSTEM FOR LIFTING AND MOVING PATIENTS

This statement of training objectives is subject to revision in the light of the detailed analysis of lifting methods which must precede the production of the training aids.

The final aim of lifting training is to achieve a higher standard of skilful movement, i.e. efficient performance, with the least possible expenditure of energy, and with the minimum risk of sudden or cumulative strain to the nurse or of discomfort or harm to the patient.

To achieve this overall objective we are recommending the following objectives for each stage of the training:-

STAGE ONE - WHY CORRECT HABITS ARE IMPORTANT

Each pupil should, on completion of this stage, be able to:-

(a) give the reasons why it is important to learn the correct habits in terms of basic body mechanics;

(b) identify correct posture and key points illustrated in drawings and photographs;

(c) discriminate between illustrated examples of correct and incorrect posture in lifting.

STAGE TWO - BASIC POSTURE FOR LIFTING

Each pupil should, on completion of this stage, be able to demonstrate that specified key habits have been acquired with sufficient firmness to be applied confidently and consistently in common types of ward situation requiring lifting or moving patients, furniture or equipment.

The key habits are:-

- efficient use of foot and body position for balance, swing and follow-through

- secure hold
- arms as close to the body as possible
- straight back - use of thigh muscles rather than small back muscles
- chin in
- efficient use of body weight
- relaxation and flexibility - use of as little muscular effort as possible (this is a general point which applies to each of the others).

STAGE THREE - TWO AND THREE-MAN LIFTS

Each pupil should, on completion of this stage, be able to use the required special lifting techniques for moving patients:-

- up and down the bed
- on and off a bed pan
- from bed to chair and from chair to bed.

The required special techniques are:-

- the "conventional lift" (two nurses)
- the "shoulder lift" (two nurses)

Each pupil should also be able to lift a patient between bed and trolley by means of the three-man lift.

STAGE FOUR - ONE-MAN LIFTS

Each pupil should, on completion of this stage, be able to use special one-man lifting techniques when she cannot avoid lifting a patient on her own. More specific objectives for this stage should not be drawn up until the question of one-man lifting has been thoroughly investigated by the Chartered Society of Physiotherapy.

APPENDIX 2. (CONTD.)

STAGE FIVE - ADAPTING THE TECHNIQUES TO THE PATIENT'S CONDITION

Each pupil should, on completion of this stage, be able to:-

(a) use the appropriate lifting technique for patients who
  - have arm injuries
  - have thoracic injuries
  - need to be watched while being lifted
  - are unconscious
  - (other conditions yet to be specified);

(b) make appropriate adjustments in technique for the following variable factors:-
  - illness or injury of patient
  - whether patient has had a stroke affecting muscle power
  - weight of patient
  - mental state of patient
  - relative height of nurses
  - height of bed
  - (other factors yet to be specified);

(c) hold fast, in all adaptations of lifting techniques, to the key basic habits;

(d) plan each lifting task with habitual thoughtfulness;

(e) get the patient to do as much of the work in the lift as possible.

NOTE

The objectives for Stage Two have been drawn from publications of the Central Council for Physical Recreation, the Industrial Society and the Chartered Society of Physiotherapy.

The objectives for Stages One, Three and Five are based on the objectives of the current pupil training.

We are grateful for help and comments on these objectives from the Assistant Principal of the School of Physiotherapy at King's College Hospital.

APPENDIX 3

MEASUREMENT OF BLOOD PRESSURE - INITIAL ANALYSIS OF THE PROCEDURE

STAGE	METHOD	KEY POINTS
Prepare patient and sphygmomanometer.	Sit. Patient sits or lies on back. Patient's arm palm upwards. Wrap cuff round upper arm, leaving about one inch between cuff and elbow. It is preferable to use patient's left arm (?) If using mercury manometer, place it where patient cannot see mercury rising. Connect manometer to cuff.	Check no restriction round arm. Check cuff not twisted. (If cuff over patient's sleeve, check no creases in sleeve).
Obtain initial estimated measure of systolic pressure by feeling radial pulse. (See note following this analysis).	Take bulb in right hand and tighten valve. Place fingers of left hand on radial pulse. Pump up pressure until pulse disappears. Open valve to release pressure. Note manometer reading at which pulse begins to be felt.	Watch manometer. Allow mercury level (or aneroid needle) to fall slowly and steadily.
Measure systolic pressure using stethoscope.	Put on stethoscope. (This may need to be done earlier in the procedure). Place bell of stethoscope with left hand on brachial pulse just above bend of elbow.	Ear pieces must be firmly plugged into ear to exclude external sound. Do not touch rubber tube of stethoscope with hands or clothing. If unsure of location of brachial pulse, locate with fingers of left hand.

APPENDIX 3 (CONTD.)

STAGE	METHOD	KEY POINTS
Measure systolic pressure using stethoscope (contd.)		Bell of stethoscope should be placed lightly on pulse.
	Pump up pressure to about initial reading.	Watch manometer. Hold bell of stethoscope still to avoid extraneous sound.
	Continue to increase pressure until all sound disappears.	
	Release pressure.	Allow mercury level to fall slowly and steadily. Listen for faint tapping sound.
	Note manometer reading at which first beat is heard.	
Measure diastolic pressure using stethoscope.	Release pressure.	Slowly and steadily. Watch manometer. Distinguish between regular sound of beat and continuous muffled sound. Hold bell of stethoscope still.
	Note manometer reading at which beat disappears.	
Conclude the observation.	Release all pressure. Detach manometer from cuff. Remove cuff, fold and replace in box. Record readings.	

NOTE

Stage Two, "Obtaining initial estimated measure of systolic pressure by feeling radial pulse", needs further analysis to see how much of it is necessary and practicable with the comfort of the patient in mind. Many nurses and doctors do not use radial pulse at all. In establishing an agreed method for training one of the main principles should be to minimise the amount of pumping up and down of pressure, for the sake of the patient's comfort.

APPENDIX 4

PROGRAMMED TEXTS SURVEYED

Basic Nursing Techniques, by M.C. Anderson (Saunders 1968)

Basic Concepts of Anatomy and Physiology, by C.P. Anthony (Mosley 1966)

Basic Concepts of Anatomy and Physiology, by W.P. Dean and others (Lippincott 1966)

Text Aid for Basic Physiology and Anatomy, by R.H. Miller and N.B. Taylor (Putnam 1965)

Fluid and Electrolyte Balance, by M.L. Dickens (Davis 1967)

The Mechanism of Respiration and Closed Drainage of the Pleural Cavity, edited by R. Goodman (E.U.P. 1966)

The Hypodermic Injection, by E.A. Kreuger (Columbia Univ., 1966)

Arithmetic for Nurses, by M.B. Ferster (Springer 1961)

Mathematics for Nursing Sciences, by S.I. Lipsey (Wiley 1965)

Self Study Guide to Mathematics Used in Nursing, by G.G. Price (Putnam 1963)

Programmed Instruction in Arithmetic, Dosages and Solutions, by D.F. Saxton and J.F. Walter (Mosby 1966)

Programmed Mathematics, by M.E. Weaver and V.J. Koehler (Lippincott 1966)

Aids to Diagnosis, by M.M. Seedor (Columbia Univ., 1964)

Therapy with Oxygen and Other Gases, by M.M. Seedor (Columbia Univ., 1966)

Medical Terminology, by G.L. Smith and P.E. Davis (Wiley 1963)

APPENDIX 5

RECOMMENDED OBJECTIVES OF TRAINING SYSTEM FOR CALCULATIONS AND MEASUREMENT IN THE WARD

These objectives are subject to revision following a detailed analysis of the use which enrolled nurses are required to make of arithmetic in the ward, and of their common arithmetical difficulties.

TEXT ONE Measuring and recording fluid input and output

The pupil will be able to:-

(i) estimate and write the approximate capacity of common domestic measures in terms of metric units; e.g. drop, teaspoonful, breakfastcupful (this will help the pupil to learn to "think in" metric units);

(ii) ascertain and write in metric units the approximate capacity of standard liquid containers, e.g., cups, feeders, jugs;

(iii) use accurately the standard measuring jug for measuring liquids in metric units;

(iv) do simple addition and subtraction in metric terms;

(v) complete the fluid balance chart correctly.

TEXT TWO Preparing doses from solid drugs

The pupil will be able to:-

APPENDIX 5
(CONTD.)

(i) convert and write simple equivalents within the metric system, e.g., 750 mg. = 0.75 G. = $\frac{3}{4}$ G.;

(ii) express percentages as fractions;

(iii) calculate and prepare required doses in solution using tablets of known strength,

e.g., make 140 mg. drug injection using 200 mg. stock tablets (amount for injection should be between 0.2 and 1 ml.);

(iv) calculate and prepare required doses using medicine where the solid drug is expressed as a percentage or ratio, e.g. How much 3% medicine is needed to give a dose of 300 mg. drug?

Prepare a dose of $\frac{1}{8}$ G. drug from 1/10 medicine.

(v) read and interpret doctors' dose specifications.

TEXT THREE Preparing doses from liquid drugs

The pupil will be able to:-

(i) convert and write simple equivalents within the metric system;

(ii) write percentages as fractions;

(iii) calculate and prepare doses from stock medicines where the liquid drug is expressed as a ratio or a percentage,

e.g., How much 20% medicine is needed to give a dose of 0.5 ml. drug?

Give a dose of 1.5 ml. drug using 1/20 medicine stock;

(iv) calculate and prepare doses from stock medicines where the strength is expressed as the weight or volume of drug

dissolved in a certain volume of fluid,
e.g., From a solution labelled "5 mg./1 ml. chlorine"
give the patient 25 mg. chlorine;

(v) read and interpret doctors' dose specifications.

TEXT FOUR Preparing insulin injections

The pupil will be able to:-

(i) state the number of insulin units to 1 insulin syringe division for each standard strength of insulin,
i.e., for 'U20', 1 syringe division = 1 insulin unit
for 'U40', 1 syringe division = 2 insulin units
for 'U80', 1 syringe division = 4 insulin units;

(ii) given the insulin strength to be used, calculate and draw up the required dose,
e.g., Draw up 24 units of insulin using 'U40' insulin;

(iii) without being given the insulin strength to be used, select the appropriate strength, calculate and draw up the required dose.

Note

Usedinsulin bottles filled with water will serve adequately for practical work.