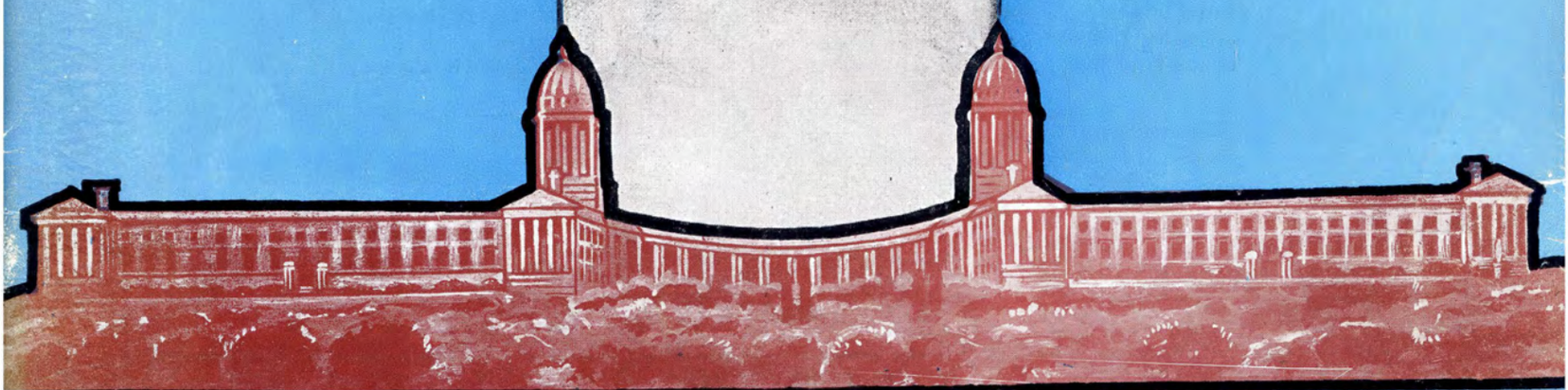
Vol. IX. No. 51. FEBRUARY : 1948.

PUBLIC WORKS OF SOUTH AFRICA



Price per Copy : 1/6
Subscription : 15/- per annum.

Registered at the General Post Office as a Newspaper.

PUBLIC WORKS OF SOUTH AFRICA

PROPRIETORS: PUBLIC SERVICES PUBLICITY (PROPRIETARY) LIMITED
EDITORIAL OFFICES: 45, PRUDENTIAL HOUSE, PRETORIUS STREET, PRETORIA
PUBLICITY DEPARTMENT: FIRST FLOOR, 92, MAIN STREET, JOHANNESBURG
LONDON ADDRESS: RYTON PUBLICITY SERVICES, 92, FLEET STREET, LONDON E.C.4.

EDITOR
ERIK TODD

PUBLIC WORKS OF SOUTH AFRICA, which is published monthly, is intended to keep the public up-to-date in regard to the engineering and building projects of the Central Government and the Provincial and Municipal Governments of South Africa

VOLUME IX • NUMBER FIFTY-ONE • FEBRUARY 1948

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HOSPITALS

REPORT OF THE CAPE HOSPITALS COMMISSION 1946-1947

TO THE HONOURABLE J. G. CARINUS

ADMINISTRATOR OF THE PROVINCE OF THE CAPE OF GOOD HOPE

(Note : Chapters I to XI of this Report appeared in the December and January numbers).

CHAPTER XII.

COMMENTS AND RECOMMENDATIONS.

SECTION 1.

This section deals with Control and Administration of Hospitals, and a summary of the recommendations contained therein, is :

(1) That the Hospitals Ordinance, 1946, be brought into operation at the earliest possible date.

(2) That the position of hospital administrator (superintendent) should be recognised as one of great responsibility and importance and that great care should be exercised in the selection of persons to fill posts of this type.

(3) That steps be taken to inagurate courses of instruction in hospital administration in Universities in this country.

(4) That only officers with the best qualifications and with long experience should be appointed to senior administrative posts in the Hospital Service.

(5) That administrative officers in the Hospital Service should be given an opportunity to improve their knowledge and should receive a varied practical experience by being moved to hospitals of different sizes and to the Hospital Department.

SECTION 2.

This section deals with Staffing of Hospitals, and a summary of the recommendations contained therein is :

(1) That extensions or improvements to hospital services should be considered from the angle of the provision of sufficient numbers of adequately trained personnel supplied with adequate accommodation and equipment to enable them to function effectively.

(2) That before embarking upon a scheme for the extension of hospital services, steps should be taken to ensure :—

(a) that adequately trained staff will be available at each stage of the programme to carry out the hospital services when new hospital buildings buildings have been erected and equipped ;

(b) that the right proportion of each group of specialised individuals will be trained, so that they will, together, constitute a team to provide the hospital service ;

(c) that every hospital is planned so as to provide adequate accommodation for each group of its specialised staff so that each section can cope with the work required from it by the other sections ;

(d) that each section is properly and adequately equipped to perform its functions.

(3) That the Hospital Department should establish and maintain records in regard to the numbers of staff available for the various services at any time.

(4) That the Hospital Department should investigate future staff requirements by consulting its own records and by obtaining information from hospital statistical departments in other countries.

(5) That as large a number of staff as possible should be trained with the existing facilities.

(6) That assistant nurses (practical nurses) should work under the supervision of qualified nurses (registered nurses) and should perform the simple nursing tasks and the household duties in the wards.

(7) That maids and labourers should be employed for the more menial duties of cleaning and polishing.

(8) That greater use be made of practical nurses in hospitals in this country, particularly the non-Europeans whose scholastic attainments are frequently insufficient to allow them to undertake the course of training prescribed for general nursing.

(9) That courses in theoretical and practical instruction should be prescribed to fit practical nurses for their duties and that less involved courses of training should be introduced for practical nurses.

(10) That practical nurses should be registered as a separate class of nurse.

(11) That hospital authorities should allow nurses more freedom so as to dispel the dissatisfaction which is at present frequently brought to their notice.

(12) That greater use should be made of the services of hospital social workers in this Province.

(13) That the hospital social worker should not duplicate the services provided by the authorities responsible for social welfare.

(14) That the responsible public authorities assisted by voluntary agencies should provide adequate social welfare services.

(15) That the hospital social worker should maintain the closest contact with the social workers in the field.

(16) That physiotherapists and occupation therapists are necessary in hospital practice, particularly in respect of rehabilitative services.

(17) That it is imperative that good clinical records should be kept in every hospital.

(18) That photographic departments should be provided in central hospitals.

(19) That hospital services in this country should make greater use of the services of trained dietitians and their asssistants, leaving the nursing staff free to attend to their nursing duties.

SECTION 3.

This section deals with the Training of Staff, and a summary of the recommendations contained therein, is:

(1) That there should be co-operation between hospitals and universities for the training of staff.

(2) That adequate numbers of young doctors should be trained in the various medical specialties.

(3) That doctors should be transferred between hospitals of various sizes and should attend regular staff conferences, both in their own hospitals and with the staff of different hospitals to enable them to keep up-to-date in their subjects.

(4) That in the training of nurses both the theoretical and practical aspects should be equally stressed.

(5) That a scheme should be adopted whereby adequate numbers of nurses may be trained.

(6) That courses of training be instituted as soon as possible by the universities and hospitals in association whereby the supply of adequately trained auxiliary personnel such as radiographers, dietitians, dispensers, hospital social workers, laboratory technicians, physiotherapists, etc., will be available in sufficient numbers for every stage of the hospital development scheme.

SECTION 4.

This section deals with the Placing of Hospitals and a summary of the recommendations contained therein is:

(1) That the Hospital Department should collect and maintain accurate records concerning the number of adequately trained staff available for the various services.

(2) That the hospital development scheme should be expedited.

(3) That the ratios of beds per population agreed to by the Executive Committee should not be altered at this stage, but that in any individual case the ratio should be subject to increase or decrease to suit the local needs of the area.

(4) That adequate statistics should be maintained by the Administration in regard to the use made of available facilities, particularly in the Native areas, so as to determine from time to time whether the ratios require to be amended.

(5) That the most important aim in the planning of a hospital development scheme should be to ensure that full medical and nursing facilities will be, as far as possible, equally available to all citizens of the community.

(6) That the advice of a specialist or of a group of specialists should at all times be reasonably available to any patient.

(7) That the schemes in vogue in the Scandinavian countries should be applied to the needs of this Province.

(8) That where possible a university training hospital should form the focal point around which are placed central specialist hospitals with which are associated several surrounding district hospitals and outlying feeder hospitals and health centres.

(9) That in other areas large central hospitals providing all specialist services which, to a large extent, will fulfill similar functions as do the university hospitals, should be placed at strategic points throughout the Province with disctrict and feeder hospitals situated in various parts of the area served by the central hospital.

(10) That arrangements should be made for all full-time medical staff serving in non-training hospitals, to attend refersher courses at university training hospitals at regular intervals.

(11) That any of the specialists attached to the central hospital, as well as those attached to district hospitals should be available for consultation to any of the other hospitals within the group and if suitable arrangements can be concluded with the Central Government, to the health centres in the area as well.

(12) That there should be no precise determination at this stage where hospitals should be placed in future.

(13) That the first steps in the hospital development scheme should be the training of adequate numbers of staff, the renovation of certain existing hospitals and the replacement of others.

(14) That the extensions and alterations necessary to certain hospitals to make them self-contained central hospitals should be implemented immediately and that wherever necessary additional ground should be obtained to provide for their future development.

(15) That the hospital development scheme should be reviewed from year to year to determine, in the light of the information collected, what new hospitals should be provided during the next succeeding year.

(16) That the ultimate arrangement of hospitals in this Province should be as represented graphically on page 17.

(17) That full laboratory services should be provided in central hospitals.

(18) That in the interests of efficiency and economy one authority should undertake the responsibility of providing in each area full laboratory services which may be utilised also by other authorities and by private hospitals, subject to satisfactory arrangements being concluded financially and otherwise between the various authorities and bodies concerned.

(19) That similar arrangements should be made between the various health and hospital authorities for other common services such as the maintenance of blood banks, the manufacture of splints and artificial limbs, etc.

(20) That in connection with these matters broad decisions should be arrived at between the authorities represented on the Co-ordinating Council and also with the other health and hospital authorities as soon as possible.

(21) That specialist hospitals should as a general rule not be erected but that all specialists should be provided in special sections forming parts of a general hospital.

(22) That in large centres specialist hospitals for pediatrics, chronic sick, and convalescents may be justified when large well equipped hospitals to accommodate patients of these types can be provided.

(23) That psychiatric wards be provided in general hospitals.

(24) That every care should be exercised to retain the atmosphere of the general hospital and to avoid a stigma being attached to a patient admitted to a psychiatric section.

(25) That psychiatric wards should not be allowed to assume functions which are normally associated with mental hospitals.

(26) That the staff position in the various branches of the Provincial Administration should be adjusted to cope with the additional work resulting from the hospital development scheme.

(27) That the Hospital Department should be fully informed at all times of the activities in all sections of the hospitals or health services under its control and should keep adequate statistics and records.

(28) That the Provincial Administration should have effective machinery whereby policies decided upon by the Administrator may be efficiently carried out.

(29) That in the absence of reliable information and adequate records hasty decisions in regard to policies, placing of hospitals, or method of administration should not be taken.

(30) That the existing hospital services should be extended and improved by the adoption of the following broad scheme :

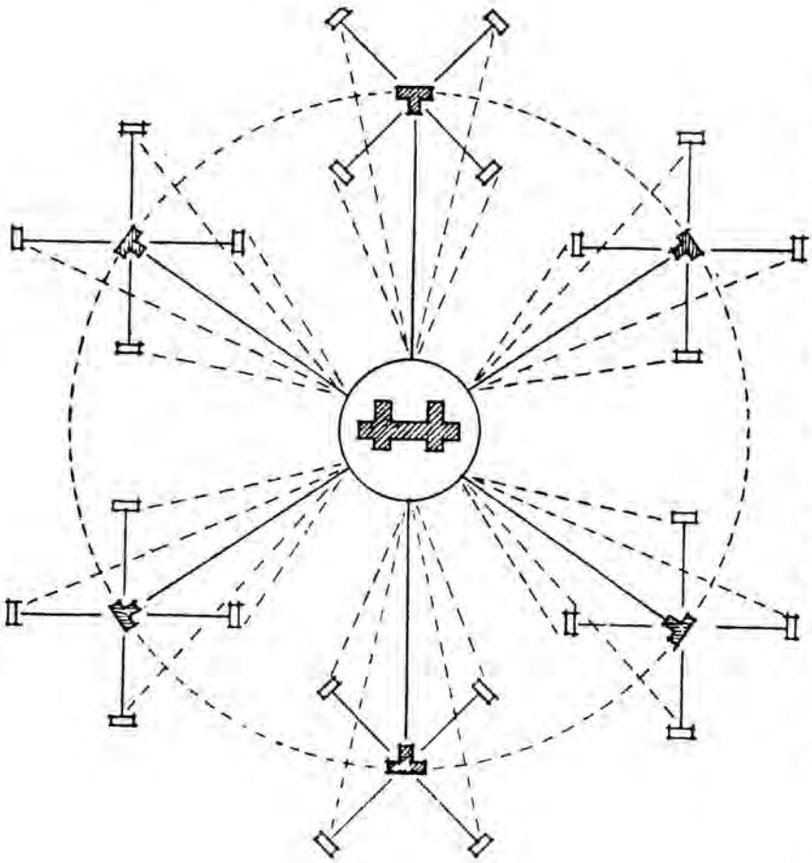
(a) In the planning of a hospital development scheme, the most important aim is to ensure that full medical and nursing facilities will be, as far as possible, equally available to all citizens of the community. In view of the great advances in medicine, this means that, although not required for every patient, the advice of a specialist, or of a group of specialists, must at all times be reasonably available to any patient. Modern medical practice is, however, divided into so many different specialties that, except in large densely populated urban areas, sufficient cases falling within his particular specialty, may not occur to occupy a specialist fully. For this reason, and following the law of supply and demand, specialists in the sparsely populated area of the Cape Province are at present to be found only in the large centres and specialists in certain fields only in a few of our largest cities on the coast. For the same reasons it is necessary in the planning of a hospital scheme to make provision for out-lying feeder hospitals staffed by general practitioners who may refer cases to specialists employed in larger district hospitals and to place district hospitals in such a manner that any patient requiring specialist treatment may be transferred to a district hospital without undue delay or risk to the patient.

(b) It is, however, unlikely that for many years to come full-time specialists in every branch of medicine will be required at every district hospital and the Commission considers the schemes in vogue in the Scandinavian countries best suited to the needs of this Province. As mentioned in earlier chapters of this report district hospitals in these countries all provide specialist services for surgery, internal medicine and obstetrics and, in addition, each hospital provides one or two other specialist departments. By transferring patients from feeder hospitals to one or other of the district hospitals or from one district hospital to another, consultations may be obtained in all fields of medicine.

(c) It is generally accepted that the highest quality of medical treatment is to be found in medical training hospitals and that a hospital which is affiliated to a university stimulates efficiency in the practice of medicine not only in that hospital, but also in other hospitals in the vicinity. For this reason it is usual to find that in most of the hospital development schemes of other countries, the university training hospital forms the focal point around which are placed central specialist hospitals with which are associated several surrounding district hospitals and outlying feeder hospitals and health centres. In this Province, with its only medical school located at its south-western extremity, such an arrangement is, unfortunately, not possible at the present time. The Commission is of the opinion, however, that large central hospitals providing all specialist services which, to a large extent, will fulfill similar functions as do the university hospitals in other countries, should be placed at strategic points throughout the Province with district and feeder hospitals situated in various parts of the area to be served by the central hospital. It is also considered desirable that in any hospital scheme for this Province arrangenments should be made for all full-time medical staff serving in non-training hospitals, to attend refresher courses at the university training hospitals at regular intervals.

(d) Any of the specialists attached to the central hospital, as well as those attached to district hospitals, should be available for consultation to any of the other hospitals within the group, and, if suitable arrangements can be concluded with the Central Government, to the health centres in the area as well.

(e) There exists in the Cape Province a great shortage of registered specialists in the various branches of medicine. It is, therefore, unlikely that the arrangements here adumbrated can be brought fully into operation for many years to come. In the meanwhile considerable developments may occur in certain areas with consequent shifts in the population. The rapid growth of Port Elizabeth as an industrial centre in recent years is an example of such development. It is, therefore, not considered advisable to determine pre-



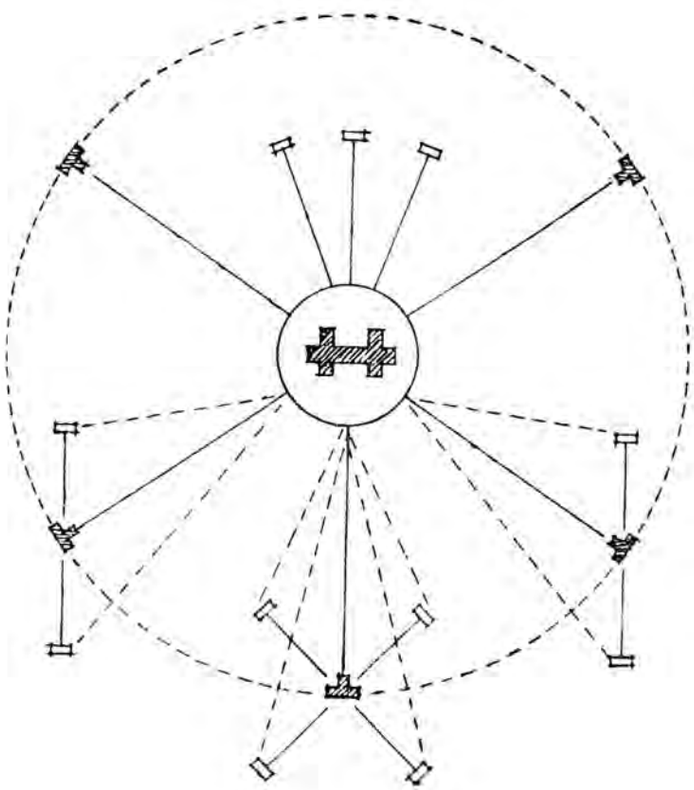
CENTRAL HOSPITAL

Medicine.
Major Surgery.
Obstetrics.
Gynaecology.
Ear, Nose and Throat.
Ophthalmology.
Pediatrics.
Orthopaedics.
Cardiology.
Psychiatry.
Urology.
Dentistry.
Chronic Sick.
Convalescent.
X-Ray Diagnostic.
X-Ray Therapy.
Radium Therapy.
Physiotherapy.
Occupational Therapy.
Other.

Laboratories :
- Pathology.
- Bacteriology.
- Chemistry.

Teaching :
- Doctors.
- Nurses.
- Others.

Research :



DISTRICT HOSPITALS

Medicine.
Major Surgery.
Obstetrics.
X-Ray Diagnostic.
Laboratory Clinical.

Teaching :
- Nurses.
- Others.

Plus one or more of the following specialties :
- Gynaecology.
- Ear, Nose and Throat.
- Ophthalmology.
- Pediatrics.
- Urology.
- Psychiatry.
- Physiotherapy.
- Dentistry.
- Other.

COTTAGE HOSPITALS

General Medicine and Surgery (Minor).
Maternity.

cisely, at this stage, where hospitals should be placed in the future. On the other hand a number of large centres clearly require central specialist hospitals and, in fact, in most instances already possess hospital facilities which only require certain minor extensions and alterations and correct staffing to make them self-contained central hospitals.

(f) The Commission considers that the extensions and alterations necessary to certain hospitals to make them self-contained central hospitals should be implemented immediately and wherever necessary additional ground should be obtained to provide for their future development. The Commission also wishes to endorse the recommendations of the Hospital Survey Committee that a start should be made with the training of adequate numbers of staff, renovating certain existing hospitals and replacing others and that the position should be reviewed from year to year to determine, in the light of the information collected, what new hospitals should be provided during the next succeeding year.

(g) The ultimate arrangements of hospitals as recommended by the Commission may be represented graphically as shewn on page 17.

SECTION 5. SITING OF HOSPITALS.

1. Great care and discrimination must be exercised in the selection of a building site for a hospital if the maximum efficiency is to be attained. In all cases the most difficult feature to assess is the trend of local development, which may at a later date follow lines which could rob an ideal site of all its desirable features. Many of the hospitals visited in Europe and America are for this reason now situated on restricted sites surrounded by busy built-up areas.

2. It is frequently argued that with the efficiency of modern transport, it is unnecessary for hospitals to be sited in built-up areas when patients can be treated in more congenial surroundings on the outskirts of towns. In this connection it is, however, interesting to note that the Survey Commission appointed by the British House of Commons considers the arguments raised in favour of placing hospitals on the outskirts of towns not altogether well-founded and remarks as follows :—

> "Trees, grass and flowers can surround town hospitals if planning is adequate and for the out-patient and for the in-patient and for his visitors ease of access with the minimum of travel or expense are at least as important as suburban air."

It is also important from the point of view of nursing and other staff with only short periods of "off duty" that the hospital should not be too remotely removed from the amenities of a town or a village.

3. While it is agreed that the surroundings of a hospital should be quiet and restful, it is considered most important that it should be readily accessible to all sections of the community which it is intended to serve and these remarks apply particularly to the accessibility from industrial areas though hospitals should in all cases be well removed from noisy and odorous factories. The direction of prevailing winds must be taken into account when considering a site in relationship to factories. Sports-grounds should also be avoided on the score of noise, though parks constitute desirable neigbours for any hospital. Orientation and elevation and the suitability of the subsoil for building and drainage purposes are other factors which should be given full consideration before arriving at a definite decision. In most parts of the Cape Province a site having a north or north-easterly aspect and a gentle slope in the same direction is considered the most desirable, though less sunny aspects may be preferable in the hotter areas.

4. Too much stress cannot be laid upon the need for adequate water, sanitary and electrical services in connection with modern hospitals. The water services should be capable of supplying the needs of the hospital at all times without excessive storage reservoirs to carry over peak draw-off periods and the pressure should be sufficient for fire-fighting purposes. Sewers should be at sufficient depth to allow for the carrying off of all sewage by gravity. As pointed out by the Hospital Facilities Section of the United States Public Health Service, the expense of operating pumps for sewage or water supply should be avoided whenever possible.

5. Hospital sites should be large enough to provide for all probable future requirements and should include an ample surrounding area of park land and gardens in order to isolate the hospital from public view and noisy thoroughfares. As it is impossible to foresee the nature of the development of urban areas it is desirable, wherever possible, to select sites in areas expressly reserved for residential purposes.

6. The site should be easily accessible from all parts of the area which the hospital is intended to serve ; it should be approached by good roads and served by cheap and efficient public transport systems. The most important branch of transport connected with a hospital is the ambulance service. The need for an efficiently organised ambulance service cannot be over-stressed as the care of the injured or the seriously ill during the journey to the hospital can greatly affect the ultimate recovery. The efficiency of an ambulance service like that of any other hospital activity is largely dependent on the ability of the staff. Ambulances should be operated by properly trained personnel and up-to-date and comfortable vehicles, fully equipped to deal with all emergencies, should be used. Adequate facilities should also be available for the disinfecting and cleansing of vehicles and equipment.

7. In most of the countries visited, the provision and maintenance of ambulance services is the responsibility of the local authorities, many of whom are also the authorities responsible for hospitalisation. In England and in other countries where the system of voluntary hospitals still prevails, private ambulance services are frequently maintaind by the individual hospitals, but in all these countries, State or local authority ambulance services are also provided. For the conveyance of patients from outlying areas to the larger centres for specialised treatment air ambulances are being increasingly used, particularly in the United States of America.

8. The Commission recommends :—

(1) that great care and discrimination should be exercised in the selection of building sites ;

(2) that the hospital should be reasonably close to the amenities of a town or village ;

(3) that the surroundings of a hospital should be quiet and restful ;

(4) that the hospital should be readily accessible to all sections of the community which it is intended to serve ;

(5) that the direction of prevailing winds should be taken into account when considering a site in relationship to factories ;

(6) that in most parts of the Cape Province a site having a north or north-easterley aspect and a gentle slope in the same direction should be selected, but that less sunny aspects may be preferable in the hotter areas ;

(7) that adequate water, sanitary and electrical services are essential ;

(8) that hospital sites should be large enough to provide for all the probable future requirements and should include an ample surrounding area of parkland and gardens ;

(9) that wherever possible hospital sites should be selected in areas expressly reserved for residential purposes ;

(10) that hospital sites should be approached by good roads and served by cheap and efficient public transport systems ;

(11) that ambulances should be operated by properly trained personnel and should be fully equipped to deal with all emergencies.

SECTION 6. DESIGN OF HOSPITALS.

1. With the advances in medical science and nursing techniques and with the development of new materials and practices in building, many changes have taken place in the outlook of hospital designers. The problems of economy and costs are much more seriously and scientifically studied, and it is now fully realised that economy and efficiency in operation is far more important than economy in first costs.

2. Though modern hospital designers tend more and more to centre their attention on the efficiency of internal planning and strive to concentrate expenditure on the functional requirements demanded by medical science, the benefit derived from well proportioned and sympathetic external and internal architectural treatment is not overlooked. The keynote of the external architecture of every hospital should be efficiency coupled with homliness and generally a hospital should depend on clean lines and well proportioned structural elements for its effect. The patients and their relatives are often greatly influenced by the first impressions created by the appearance of a hospital and any suggestion of austerity or meanness on the one hand or of pomp and ceremony on the other hand should therefore be avoided. The Commission was much impressed by the direct simplicity of the external treatment of the hospitals in Sweden and Finland. In these countries the hospitals depend almost solely on good massing and logical fenestration for their effect.

3. The windows in hospitals in the Northern countries are large enough to create bright and cheerful internal conditions, but the use of excessive glass areas has been avoided on the score of coldness in winter. It would appear that it is desirable to employ a similar type of fenestration in this country and that excessively large windows should be avoided on the contrary score of heat and glare.

4. In many of the countries visited colour-schemes are being increasingly used to add cheerfulness to the interiors of hospitals and whites and greys, the almost universal finishing colours for hospitals, are rapidly giving way to more cheerful pastel tints. In Northern Europe a great variety of colour is used in wards, day rooms, corridors, etc. Cool colours predominate in all rooms having a sunny aspect while in rooms facing away from the sun, yellow predominates in order to add warmth to the colour schemes. In Finland it is not unusual to find two or more completely different pastel shades used in the same room. For instance, a room may have two walls and the ceiling finished in sky blue, one wall finished in canary yellow and the fourth in cream. Besides the use of colour, works of art such as low relief, sculpture, murals and pictures are used in many of the modern hospitals to add interest to vestibules and public rooms. The Commission considers that the use of cheerful colours, works of art, etc., should be encouraged in hospitals.

5. In the United States of America and in Sweden departments have been established to study hospital design on a scientific basis. Both these departments deem it undesirable, if not impossible, to standardise hospital design. They point out that fixed standards tend to stunt progress and that this should be avoided at all costs in so vital a service as hospitalisation where the continual advance and development in diagnostic and therapeutic methods constantly demands new types of equipment and accommodation. Both these authorities take great pains not to dogmatize in any way and prefer to indicate the manner of approach to each problem confronting the architect rather than to present cut and dried solutions. Both in the United States and in Sweden, vast amounts of statistical information regarding existing hospital facilities, incidence of disease, time studies, job analyses, etc., are maintained in order to provide a sound basis upon which to formulate recommendations. It is now generally agreed that large hospitals become unmanageable and consequently cannot provide efficient services for their patients and despite the increased building costs to provide smaller hospitals the opinion is held in most overseas countries that acute hospitals should not contain more than 750 beds. In Sweden expert opinion is so certain that 600 beds is the optimum size for a general hospital that when the hospital serving the South of Stockholm was under consideration and it was found that the density of population demanded well over 1,000 beds, the new hospital was designed as two independent units of 600 beds each in one block with only the major services and rare specialties in common. In Finland the maximum of 750 beds is considered permissable, while in America, where hospitals of three and four thousand beds are not uncommon, modern opinion considers the optimum size to be between 500 and 750 beds. Professor Ylppo of Finland and Professor Gyllenswärd of Sweden, both consider that children's hospitals should be even smaller and should not provide for more than 300-350 patients.

6. In the light of the information obtained the Commission considers that the size of a hospital should be determined by its manageability and not by density of population.

7. In most of the modern hospitals in Europe and America very full consideration has been given to the correlation of the various units and services to facilitate communication. In Sweden, Finland and the United States of America good traffic lines, both internal and external, are a feature of the plans of all the modern hospitals. In these countries, possibly more so than in any of the others, it has been recognised that the efficiency of a hospital plan like that for any other building, is entirely dependent, in the first instance, on

well arranged traffic lines. Though conflicting or cross traffic streams should be avoided wherever possible, some deficiency in this respect in inevitable in every plan. Entrances and exits should be carefully arranged in regard to their functions, for instance, ambulance and casualty entrances should be well screened from those used by walking cases and the removal of bodies from wards to the mortuary and thence to the cemetries should be accomplished in the most unobtrusive manner possible. Stores' entrances and heavy traffic should be kept reasonably distant from ward units.

8. The concentration of units reduces cost, length of corridors and labour, but must not be brought about at the expense of ventilation or light. Multi-storeyed buildings are generally cheaper in initial and mainteance costs due to the concentration of units and services and the shortening of traffic lines by vertical travel, but such buildings are difficult to extend. On the other hand the new development of centralised services for sterilizing, food, laundries, etc., discussed in paragraphs 1 and 2 (section 7) of this chapter, can only be effectively carried out in multi-storeyed buildings provided with electric hoists and conveyors if excessive traffic and transport are to be avoided. The centralisation of treatment rooms in wings or on floors (a feature of many of the European hospitals) also simplifies the reticulation of water supply, steam and drainage systems.

9. The greatest difficulty confronting the hospital designer is the provision to be made for future extensions. Every effort should be made to anticipate in which direction the major developments are likely to occur and when planning such general services as kitchens, dining-rooms, records departments, centralised sterilizing units, steam supplies, etc., provision should be made for easy and economical extension. If it is known that the bed accommodation is likely to increase considerably, it may be economical in the long run, to provide these services on a sufficiently large scale to cater for the ultimate requirements. Even when extensions cannot be anticipated, hospitals should be as flexibly planned as possible to enable extensions and alterations which may become necessary in any department or section to be carried out as conveniently as possible.

10. As previously mentioned in the report (Chapter VI, paragraph 21, Chapter VII, paragraph 17), complete experimental units have been erected in some instances to assist designers with the more detailed planning of individual units and it is considered that the costs connected with such experiments are well worth while in all cases where repetition of units is likely to be necessary on a large scale.

11. A marked preference is shown for small wards in all the modern hospitals throughout Europe and America. None of the recently constructed hospitals visited provides wards accommodating more than eight beds, while six and four-bedded wards are much more frequently encountered. In Sweden the four-bedded ward is regarded as the optimum. The reason for the provision of smaller wards is the benefit derived by patients from the restful and less disturing atmosphere of the smaller units where distractions and disturbances arising from the administration of treatments and from restless cases affects a lesser number of patients. The Commission is satisfied that notwithstanding the increased capital and maintenance costs of smaller wards the four-bedded unit is the best compromise between expenditure and the comfort of the patients.

12. In many of the hospitals visited in Europe, most of the major treatment rooms are concentrated in wings or departments and are usually well separated from the nursing departments. This characteristic in modern planning is particularly noticeable in Finland, Sweden, and Switzerland. In Sweden every effort is made to reduce the number of treatments given in wards and special treatment rooms are provided adjacent to the wards, even to the extent of providing rooms for bedpanning in close proximity to the sluice rooms, but this demands that the hospital beds must be highly mobile.

13. In Holland and Sweden physiotherapy is particularly well developed and many complex bathing and electrical appliances are provided. The physiotherapeutic departments like the radiodiagnostic departments are planned so as to be readily accessible from the out-patients departments. The Commission anticipates considerable development of physiotherapy in this country and regards flexibility in the planning of these sections in the new hospitals as essential.

14. Ample and convenient accommodation for conferences is provided in all the larger hospitals visited and on the Continent spacious viewing rooms equipped with rows of illumniated viewing panels are a feature of the X-Ray diagnostic departments to enable radiologists to discuss cases with the other specialists. The Commission is satisfied that frequent regular conferences of the medical staff are essential and considers that adequate accommodation for this purpose should be provided in hospitals.

15. The need for good clinical records has been stressed elsewhere in this report and ample provision of large well-lit rooms should be made for the housing of these records. All the records should be readily available to the staff and the department should be placed in close proximity to the out-patients department as it is to this department that most direct service is rendered by the clinical records staff. The clinical records department in larger hospitals should include adequate office accommodation for statistical staff and reading rooms in which medical staff may consult the clinical records.

16. In planning a kitchen care should be taken to avoid, as far as possible, the entry of cooking odours into the rest of the hospital, and the provision of light, airy and well ventilated kitchen departments is imperative. In several of the hospitals visited the kitchens are planned on the top floors and there is much to recommend this position, as ample natural ventliation and light is at once assured, but this position involves the double transportation of all food, and complicates the removal of kitchen refuse.

17. In most of the hospitals visited cooked food is issued in bulk from the main kitchen and provision for sculleries and crockery stores is necessary in the ward kitchens. In many of the small hospitals and in a few of the larger hospitals visited, individual trays are set in the main servery and are transported either manually or on specially designed trolleys to the patients. Where this system is in operation the work performed in the ward kitchens is greatly reduced and less accommodation is accordingly required. In the United States conveyor belt systems for the transportation of food, from the centrally situated main servery to the ward floors, are in use in several hospitals. These systems have the advantage of accelerating food service and reducing labour, but their introduction, except in the large institutions, would not seem warranted in this country.

18. The preservation of prepared vegetables by the "Quick-Freeze" process discussed in paragraph 38, chapter X, may be of great interest to this country where local and seasonal conditions render it difficult for many hospitals to obtain regular supplies of fresh vegetables and fruit. The

storage of frozen foods requires the provision of complex refrigerated stores and methods of transport and it is difficult to determine whether the initial expense of introducing such a system would be justified. The Commission considers, however, that the subject deserves further investigation by suitably qualified persons.

19. The freezing of cooked foods referred to in chapter X, paragraph 39, was also of considerable interest to the Commission, but it is considered that it will be many years before the system is fully developed even in the United States except in the larger cities and it is, therefore, of little practical interest to this country at present.

20. Where nursing staff accommodation is provided in Europe and America, it is usually planned on much more generous lines than has been the case in the past in the Cape Province. In Europe particular emphasis is laid on the necessity of a happy and contented staff and it is maintained that these conditions are most likely to be brought about by the provision of pleasant and comfortable accommodation. Most of the nurses' homes visited are amply provided with recreational rooms, sitting rooms, studies, libraries and lecture rooms and special facilities are provided for the entertainment of guests by the nurses. Gymnasia, swimming baths and sports fields are frequently provided in conjunction with the larger nurses' homes. The Commission considers that nurses should be provided with comfortable accommodation and that adequate facilities for recreation are essential.

21. The Commission recommends :—

(1) that in hospitals economy and efficiency in operation should take preference over economy in the first costs ;

(2) that expenditure should be concentrated on the functional requirements demanded by medical science but that the benefit derived from sympathetic external and internal architectural treatment should not be overlooked ;

(3) that on the score of heat and glare excessively large windows should be avoided ;

(4) that the use of cheerful colours, works of art, etc., should be encouraged in hospitals.

(5) that the size of a hospital should be determined by its manageability and not by density of population ;

(6) that conflicting or cross traffic streams should be avoided wherever possible and that entrances and exits should be carefully arranged in regard to their functions ;

(7) that hospitals should be as flexibly planned as possible to enable extensions and alterations to any department or section to be carried out as conveniently as possible ;

(8) that where large scale repetition of units is likely the costs connected with the erection of exeperimental units are justified ;

(9) the four-bedded ward unit as the best compromise between capital and maintenance expenditure and nursing efficeiency ;

(10) that as considerable advance in the development of psysiotherapy in this country is anticipated there should be great flexibility in the planning of these sections in the new hospitals ;

(11) that adequate accommodation for regular conferences of the medical staff should be provided in hospitals ;

(12) that adequate accommodation should be provided for clinical records departments ;

(13) that the preservation of prepared vegetables by the " Quick-Freeze " process should be investigated by suitably qualified persons ;

(14) that nurses should be provided with comfortable and homely accommodation and adequate facilities for recreation.

SECTION 7. CENTRALISED SERVICES.

1. The centralising of services which are common to various sections of a hospital or to various hospitals rather than to supply the services in a fragmentary manner wherever they are required, has obvious advantages. Such centralisation not only reduces total costs, but renders it possible to improve and to expedite the services. By the concentration of services into a single department, it becomes possible to replace manual labour by mechanical contrivances and for technicians to specialise in the branch of the service required. The country par excellence where centralisation has been adopted in hospitals is the United States of America where the " line assembly " of mass production has spread to the hospitals.

2. The centralising of services may be most conveniently discussed under the following three heads :—

(a) Centralised services within each hospital ;

(b) Centralised services for a group of hospitals ;

(c) Centralised services for all the hospitals controlled by one authority.

(a) Centralised services within each hospital :

(1) There are a number of services in every hospital which lend themselves to centralisation with consequent improvement in the services. For example, dietary, sterilizing, linen and stores services. Elsewhere in this report descriptions have been given of certain of these centralised services and they do not require recapitulation here. It is obvious, however, that numerous advantages may be derived from the centralisation of these hospital services of which the following are examples :—

(i) By relieving them of the responsibilities for setting of trays, serving of food, supervising and handling and storing of crockery, surgical equipment, ward linen, etc., maintaining inventories of articles and so forth, the time of the nursing personnel is conserved and they are left free for their normal nursing duties ;

(ii) Surgical equipment is handled by persons trained specifically to care for such equipment and items such as rubber goods, syringes and needles, etc., by being properly cared for, give longer service and are always supplied in the best condition for use ;

(iii) Delays are avoided for example, in the doctor's time whilst waiting for instruments to be collected, sterilized and set out on a tray before he can perform some minor surgical procedure or in the serving of meals because of other urgent calls on the nursing staff ;

(iv) Supplies of equipment, for example, of linen, surgical instruments, rubber gloves, sterilizzers, etc., need not be maintained in every ward at all times and stocks of such articles may be reduced as they are readily available to all sections in one central supply room ;

(v) By centralising work into one department, it becomes possible to instal mechanical contrivances such as, for example, dish washing machines which save a great deal of expensive manual labour but which cannot be economically provided in every section of the hospital ;

(vi) By reducing the stocks and obtaining more service from articles of equipment, instead of allowing them to perish through lack of use, financial saving is effected ;

(vii) Thefts of articles can be better prevented in large centralised stores than in individual stores distributed throughout the hospital ;

(viii) Employees handling certain types of articles of equipment become expert in their care and maintenance ;

(ix) Replacements of worn articles of the purchase of new articles can be more readily controlled as they are dealt with by specific centralised sections instead of being ordered on independent requisitions from each of the sections of the hospital.

(2) The Commission considers that the advantages attached to the centralising of certain services in a hospital are such that the Administration should consider the introduction of centralised services in its hospitals in future.

(b) Centralised services for a group of hospitals :

(1) The Commission had the opportunity of seeing in a number of areas the advantages accruing from the centralisation of such services as laundering, maintenance, breadmaking, etc. Similar centralisation has been in vogue in regard to maintenance services and laundry under the Cape Hospital Board for a number of years. The experience of the Prefecture de la Seine proves that considerable saving can be effected by the establishment of a centralised bakery and of centralised purchasing of perishables, such as meat, vegetables, eggs, etc. In certain areas soiled linen is transported many miles to centralised laundries.

(2) The commission is satisfied that by centralising laundries, maintenance workshops, stores departments, etc., considerable savings can be effected, a better qualified personnel can be employed for the services, and, by installation of machinery, the quality of the work can be improved and the labour charges reduced. The Commission, therefore, considers that the centralisation of services for groups of hospitals should be extended wherever possible.

(c) Centralised services for all the hospitals controlled by one authority :

(1) The establishment of a centralised buying department, together with a large central store, has previously been agreed upon as a policy by the Executive Committee. The Commission is satisfied that such a scheme would result in considerable economy and in improved efficiency. By the purchase of certain standardised items of equipment, such as beds, machinery, etc., it becomes possible to carry stocks of spares in the central department which could not economically be maintained by each individual hospital. By centralised buying, also, large orders can be placed and special types of articles can be manufactured to specification at reasonable cost. It would also appear that specialised types of mechanical workshops which would not be justified at the district or central hospitals should be centralised at one or two strategic points in the Cape Province. By sending trained X-Ray technicians, for example, to inspect and, if necessary, to repair X-Ray units in hospitals in the Cape Province, better services could be obtained from the equipment and a considerable saving could be affected.

(2) The Commission found that in many areas in other countries certain services were centralised by large local authorities, for example, London and New York under the respective departments which also serve other departmental activities, such as roads and engineering, and it would appear that a similiar arrangement may be possible in this Administration.

(3) The Commission, therefore, considers that the establishment of a central buying department should be proceeded with immediately and that the possibility of centralising certain maintenance services under such other departments of the Administration as may be necessary should be investigated.

3. The Commission recommends :—

(1) that the introduction of centralised services in future hospitals should be considered ;

(2) that the centralisation of services for groups of hospitals should be extended wherever possible ;

(3) that the establishment of a central buying department should be proceeded with immediately ;

(4) that the centralising of certain maintenance services under the Administration should be investigated.

SECTION 8.

This section deals with Research and Conferences and a summary of the recommendations contained therein is :—

(1) That research work in hospitals should be encouraged.

(2) That medical resarch should only be undertaken under the direct control of the personnel of central hospitals and preferably by persons specifically trained and selected for such work.

(3) That this Province should not divert too large a portion of its limited financial resources into avenues other than the treatment of the sick.

(4) That regular conferences between members of hospital staffs should be held.

(5) That regular conferences should be arranged between the members of the staffs of different hospitals.

EXPERIMENTS IN DOMESTIC HEATING

A general view of part of the site, shewing the weather recording instruments.

A SCIENTIFIC experiment of great importance to the people in Britain is being carried out at the Building Research Station, D.S.I.R. It is the latest stage in research to find out how houses can be kept properly warm for the smallest consumption of fuel.

The experiment is in two parts. In the first part eight houses have been built, indentical in design but with different degrees of thermal insulation. Heating systems inside are all the same, so the scientists can find out under actual living conditions how much heat in conserved by better insulation In the second part of the experiment 20 houses similar in design and with identical thermal insulation have been built In these houses the heating systems and applances are all different, and the results will show which stoves, grates and heating systems are the best and most economical in fuel.

This is an original scientific experiment and the only one of its size and type in the world. It will be of importance not only to the occupants of new houses but also to those of older houses, for many of the appliances being tested are also suitable for installation in existing houses.

In Britain more coal is consumed for heating houses than for any other single purpose. In 1938, 60,000,000 tons, or one-third of all the coal consumed was used for this purpose. The results of the expenditure of this coal can only be described as inadequate. Before the war the total number of available heat units per dwelling per year in Britain was 1,500. In the U.S.A. the figure was 1,700, but in that country the house, and the whole of the house, was much warmer. In Germany the figure was 880; although the consumption of heat was so much lower. German houses were at least as warm as those in Britain.

The two main reasons for this relative inefficiency in Britain are that in that country much of the heat is wasted up the chimney of through the poorly insulated walls and roof, or is carried off by cold draughts of air.

With the present scarcity of coal and its high price, it is of great importance that the amount of fuel used for heating should be reduced. At the same time, houses should be better warmed than they have been. Much research has already been carried out on these subjects by the Building Research Station and the Fuel Research Station of D.S.I.R. However, a precise picture of the thermal conditions in houses, as they are lived in, has not been easy to obtain. For example, some advances were made between the wars in the economical use of coal for heating houses, leading to a greater output of heat per pound of coal burned. Yet it is not possible to give a measure of the advance in figures such as are given by the electricity industry which can state that coal consumption per unit of electricity generated has decreased from 3.74 lb. to 1.43 lb. in recent years.

Two large-scale experiments are being carried out by the thermal conditions. The first of these is concerned with thermal insulation of houses and is being carried out on eight specially built similar houses. In these houses the heating systems are the same while the insulation differs. These houses have now passed from the stage of being unoccupied laboratories and have been lived in by families for more than a year, while the exepriments continue.

In the other experiment 20 houses of identical size and similar design have been built. In these houses the constant factor is the thermal insulation, so that similar amounts of heat will be lost through the walls, roofs, floors, etc., in every case. The variable factor is the method of heating. Some houses are fitted with complete central heating systems, others with devices to carry convected heat to the bedrooms and all are fitted with a variety of modern designs of stoves and open fires.

Each room of each house is fitted with many instruments, including thermometers, both of the ordinary kind and also of special types for giving a continuous record over the 24 hours, arranged to register at a central control room. In the first stage of the experiment the ventilation and the opening of doors and windows will be carefully controlled, so as to keep conditions comparable between all the houses. All the fuel used in each house is carefully recorded. Times of stoking or switching on and off of applances are noted, and in consequence the amount of heat put into the house and the amount usefully used will be known. In all, 92 different appliances are being tested.

Electronic equipment being used to measure the amount of noise travelling through heating ducts.

Stoking up a modern boiler with carefully measured and analysed quantity of fuel.

There are two meteorological stations which give complete details of the weather on the site, such as temperature, humidity, direction and force of wind and duration of sunshine.

All arrangements are now complete and this exceedingly complex experiment has begun. For the first period the houses will be empty, so that the scientists can carry out the investigations without the variables which residents would cause. A party of 30 scientists and building technicians will be engaged day and night during this phase in order to ensure its rapid completion.

As soon as the results of the initial period are complete, tenants will move into the houses and the experiments will continue. Arrangements for selection of the tenants have been initiated by the rural district council in conjunction with the Building Research Station. During the first period, each house will be assumed to be occupied by an exactly similar imaginary family. This family "X" will consist of father, mother and two children of school age. While the mother stays at home, the father is engaged in a local occupation but does not return home for lunch. The tenants, who will have to agree to the experiments continuing during their occupancy, will not, of course, follow the pattern of family "X," but the scientists having got their figures for the theoretical family, will be able to make allowances for size of family, hours of work and so on of the actual tenants in each house.

As the result of these experiments it will be possible to say what is the best method of construction to ensure good insulation and what are the best appliances to fit into a house. It is already possible to give advice on these subjects based on laboratory investigations and experience, but these two experiments will enable the advice to be based on actual living conditions.

"The Builder."

The Euclid Loader and Bottom Dump Wagon in operation, shewing the depth of cut.

TENDERS INVITED

THE following are particulars of the more important tenders which have been invited up to the time of going to press for Public Works by Government Departments, Provincial Administrations and Municipalities. In each case the date by which the tender must be submitted is given. While every endeavour will be made to maintain accuracy in these columns it is pointed out that readers using this information do so entirely at their own risk.

Note : S.A.R. & H. Tender Board address is : 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg.

BUILDINGS :

O.F.S. Provincial Tender Board, P.O. Box 521, Bloemfontein : District Representative, Public Works Dept., Bloemfontein. Parys Volkskool : Repairs and renovations. Due, 3/3/48.

Rand Water Board, P.O. Box 1127, Johannesburg : Chief Engineer, Johannesburg. Erection of three pairs of semi-detached houses at the Board's Zwartkoppies pumping station. Deposit of £2-0-0 — extra copies at £1-0-0-each. Due, 2/3/48..

South African Railways, Park Chambers, Rissik Street, Johannesburg : General Manager, 207, Helpmekaar Buildings, Johannesburg. Erection and completion of 5 houses at Hamilton, O.F.S. Tender No. CTO(R)104. Deposit of £2-2-0. Due, 4/3/48.

Benoni Municipality : Erection and completion of 50 pairs of semi-detached houses and one single house at the Cape Coloured Section of Location. No. 315. Due. 1/3/48.

Natal Provincial Administration, P.O. Box 358, Pietermaritzburg : Provincial Works Office, Durban. Additions to Gordon Road Girl's School. Due, 3/3/48.

Natal Provincial Administration, P.O. Box 358, Pietermaritzburg : Provincial Works Office, Pietermaritzburg. Additions to Wartburg Government School. Due, 3/3/48.

BRIDGES, EARTHWORKS, ETC.:

Ladysmith Municipality : Town Clerk, Ladysmith. Proposed bridge over Klip River. Contract C/1947. Extended to 18/3/48.

ELECTRICAL EQUIPMENT, ETC.:

S.A.R. & H. Tender Board: Electric passenger and freight locomotives. No. 6375. Due, 20/5/48.

S.A.R. & H. Tender Board: Telegraph line material. No. 7376. Due, 4/3/48.

S.A.R. & H. Tender Board: Electric shunting locomotives. No. 6374. Due, 10/6/48.

S.A.R. & H. Tender Board: Signal wire. No.7662. Due 4/3/48.

S.A.R. & H. Tender Board: Static condensers. No 7796. Due, 4/3/48.

S.A.R. & H. Tender Board: Automatic exchange. No. 7678. Due, 4/3/48.

S.A.R. &. H. Tender Board: Electrical Instruments. N.o 7741. Due, 18/3/48.

S.A.R. & H. Tender Board: Loading resistance. No. 7740. Due, 18/3/48.

S.A.R. & H. Tender Board: Electrical signalling material. No. 7766. Due, 25/3/48.

S.A.R. & H. Tender Board: Electric conduit. No. 7832. Due, 11/3/48.

S.A.R. & H. Tender Board: Relays and switches. No. 7830. Due, 11/3/48.

S.A.R. & H. Tender Board: Electric motor coaches and electric plain trailers. No. 6116. Extended to 7/5/48.

S.A.R. & H. Tender Board: Transformer and switchboard. No. 7783. Due, 13/5/48.

S.A.R. & H. Tender Board: Telegraph material. No. 7673. Due, 8/4/48.

S.A.R. & H. Tender Board: Telephone cable. No. 7579. Due, 8/4/48.

S.A.R. &. H. Tender Board: Copper wire. No. 7770. Due, 13/5/48.

S.A.R. & H. Tender Board: Train lighting material No. 7692. Due, 13/5/48.

S.A.R. & H. Tender Board: Instrument landing system receivers. No. 7901. Due, 8/4/48.

S.A.R. & H. Tender Board: Train lighting belting. No. 7913. Due, 18/3/48.

S.A.R. & H. Tender Board: Sparking plugs. No. 7899. Due, 11/3/48.

S.A.R. & H. Tender Board: V.H.F. radio equipment for aircraft. No. 7900. Due, 1/4/48.

S.A.R. & H. Tender Board: Copper strips. No. 7873. Due, 11/3/48.

S.A.R. & H. Tender Board: Batteries. No. 7824. Due, 25/3/48.

S.A.R. & H. Tender Board: Insulators for overhead equipment. No. 7854. Due, 11/3/48.

South African Railways, Park Chambers, Rissik Street, Johannesburg: Insulation material. Enquiry C. 7850 Due, 7/4/48.

South African Railways, Park Chambers, Rissik Street, Johannesburg: Chief Stores Superintendent. One only public address equipment, Airways Dept., Maritime House, Johannesburg. C.7794. Due, 10/3/48.

South African Railways, Park Chambers, Rissik Street, Johannesburg: Chief Stores Superintendent. One only public address equipment, Native Compound, Langlaagte, Johannesburg. C.7795. Due, 10/3/48.

Department of Posts and Telegraphs, Pretoria: Electrical equipment for laboratory. P.O. 888. Due 18/3/48.

Department of Posts and Telegraphs, Pretoria: Tropical model triple-diversity single side band reduced carrier receiver. P.O. 887. Due, 18/3/48.

Post Office Stores, Johannesburg: Accumulators. P.O. 891. Due, 8/4/48.

Union Tender and Supplies Board, P.O. Box 371, Pretoria: Witrand Institution, Potchefstroom. Electric incubator. S.O. 2297. Due, 11/3/48.

Union Tender and Supplies Board, P.O. Box 371, Pretoria: Electrical test equipment to Civil Aviation Telecommunications. S.O. 2324. Due, 25/3/48.

Union Tender and Supplies Board, P.O. Box 371, Pretoria: Electrical and radio accessories to Department of Defence. S.O. 2293. Due 4/3/48.

Department of Public Works, Pretoria: One 4-panel low-tension switch board, Chemical laboratory, Pretoria. P.W.D. S.148. Due, 4/3/48.

Department of Public Works, Pretoria: High-tension switch gear, Pumping Station and No. 91 Ammunition Depot, Voortrekkerhoogte. P.W.D. S.150. Due, 4/3/48.

Department of Public Works, Pretoria: One Diesel alternator set, P.W.D. Johannesburg. P.W.D. S. 139. Due, 1/4/48.

Department of Public Works, Pretoria: Apparatus for electric clock system for new Public Offices, Springs. P.W.D. S.178. Due, 18/3/48.

Irrigation Department (Controller of Stores), P.O. Box 277, Pretoria: 10 portable electric arc welding sets. Irr. 281. Due, 4/3/48.

Cape Provincial Administration, 81, Castle Street Cape Town: Writing plates. F.116/47. Due, 9/4/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Electric fans. No. 76/48. Due, 3/3/48.

Electricity Department, Durban: Transformers. E. 2154. Due, 5/3/48.

Electricity Department, Durban: Electric ranges for City Fever Hospital. E. 2155. Due, 5/3/48.

Bloemfontein Municipality: City Electrical Engineer, Bloemfontein. Electrical equipment: 3-phase transformers. Enquiry 37/1947. Due, 1/3/48.

Bulawayo Municipality: Town Clerk, Bulawayo. Supply, delivery and erection of switch gear for the N'cema and Fern Spruit Pumping Stations. Contract E. 27/1947. Due, 6/3/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. Cables and jointing material. Specification 1462/1947. Due, 17/3/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. Transformers. Specification 1464/1947. Due, 17/3/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. 30 amp. 230 volt, single pole miniature circuit breakers. Specification 1463/1947. Due, 2/3/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. Cast iron bases of electric light poles. No. 1466/48. Due, 4/4/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. Metal clad multihole connection blocks. No. 1465/48. Due, 24/3/48.

Cape Town Municipality: City Electrical Engineer, Cape Town. Supply and delivery of traffic control equipment. Specification No. 1468/1948. Due, 24/3/48.

Potgietersrust Municipality: Supply, delivery and erection where specified of the plant and materials for the following:—

Complete steam raising plant, including coal and ash handling equipment, valves, piping, watertanks, water softener and feed pumps. Contract A;

Two 750 k.w. steam turbine-driven generating sets, main and auxiliary switch gears, station transformers, main and auxiliary cables and power station wiring, circulating water piping, pumps and cooling pond equipment. Contract B. Consulting Engineer: George Drewett, Manlin House, 17, Harrison Street, Johannesburg. Duplicate copies of specifications on deposit of £3-3-0 per contract — extra copies at 10/6 each. Due, 22/3/48.

Strand Municipality: H.T. and L.T. switch gear for sub-stations. Specification E.1/48. Due, 1/3/48.

Transformers. Specification E.2/48. Due, 1/3/48.

Overhead line material and underground cables. Specification E.3/48. Due, 1/3/48.

City Council of Pretoria: Controller of Stores and Buyer, P.O. Box 48, Pretoria West. Supply and delivery of E.H.V. and L.V. underground cable. No. 316. Due, 22/3/48.

Pietermaritzburg Municipality: City Electrical Engineer, Pietermaritzburg. Street lighting material. 240/E. Due. 25/3/48.

Boksburg Municipality: Electrical Engineer, Boksburg. (a) Paper insulated, lead covered steel tape armoured cable in accordance with B.S.S. 480/1942 and C.M.A. standards for cables.

(b) Cable terminal boxes.

Contract No. 4/48. Due, 10/3/48.

Johannesburg Municipality: Electric meat saws. Contract 276. Due, 23/3/48.

Johannesburg Municipality: Stores Controller, 271, Main Road, Newtown. Lighting poles, No. 363; Insulating tapes, No. 365; Cable and boxes, No. 364; Joint box compound, No. 367. Due, 19/3/48.

Johannesburg Municipality: Stores Controller, 271, Main Street, Newtown. Electrical wiring materials. No 369. Due, 22/3/48.

Johannesburg Municipality: Stores Controller, 271 Main Street, Newtown. Copper conductor. No. 361. Due, 22/3/48.

SEWERAGE INSTALLATIONS, ETC.:

Benoni Municipality: Supply, delivery and installation of duplicate sewage pumping plant at Glasgow Road pump station in Benoni Ext. 12. Contract No. 314. Due, 1/3/48.

Benoni Municipality: Construction of sewerage gravity main, Tom Jones Street. Contract No. 313. Due, 1/3/48.

Benoni Municipality: One 1,250 gallon vacuum tank. Contract No. 357. Due, 1/3/48.

TRACTORS AND ROAD MAKING PLANT, ETC.:

S.A.R. & H. Tender Board: Tractors with tipping and platform type bodies. No. 7789. Due, 4/3/48.

S.A.R. & H. Tender Board: Air compressors. No. 6626. Due, 4/3/48.

Theunissen Municipality: Erection of stone crusher plant on the Town Commonage. Town Clerk. Due, 5/4/48.

Cape Provincial Administration, 81, Castle Street, Cape Town: National Roads — workshop equipment for Belville workshop. F.120/1947. Due, 19/3/48.

Durban Municipality: City and Water Engineer, Durban. One shuttle type dumper. B. 1578. Due, 5/3/48.

Natal Provincial Administration: Roads Engineer, Pietermaritzburg. One 40 h.p. wheeled Agricultural tractor 72/47; One 7ft. Trailer-type mower for tractor draught, 73/47; One Tandam disc harrow for tractor draught, 74/47; One three-furrow Mouldboard plough, 75/47. Due, 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Wheel type tractors. 58/1948. Due, 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Portable huts. 61/1948. Due 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Diamond bore drilling machines. 65/1948. Due, 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Dumpers. 69/1948. Due, 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Mobile crane. 70/1948. Due, 3/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Bitumen pre-mix plants. 78/1948. Due, 10/3/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria: Tank car steam heaters. 67/1948.Due, 3/3/48.

WATER SUPPLIES, ETC.:

Irrigation Department, P.O. Box 277, Pretoria: Water purification plant. Irr. 247. Due, 15/4/48.

Department of Public Works: Supply, delivery and erection of boiler plant at National Hospital, Bloemfontein. P.W.D. 983. Address to Secretary, O.F.S. Provincial Administration, P.O. Box 521, Bloemfontein. Due, 2/3/48.

Durban Municipality: Stores Department, Durban. Water tower and escape. S. 2787. Due, 25/3/48.

Blyderiver Irrigation Board, Pearston: Secretary. The construction of an irrigation furrow out of the Vogel River. Due, 10/3/48.

Cape Town Municipality: City Engineer, Cape Town. Steel pipes and specials. Form of Tender A.94/47. Due, 5/3/48.

Durbanville Municipality: Supply and delivery of water meters and stopcocks. Deposit of £2-0-0. Consulting Engineer: Ninham Shand, 806, Groote Kerk Buildings, Cape Town. Due, 20/3/48.

Johannesburg Municipality: Water softening plant. Contract 377. Due, 23/3/48.

Benoni Municipality: Supply, excavation for the laying of 12" and 15" diameter reinforced concrete rising mains. Contract 312. Due, 1/3/48.

VEHICLES ETC.:

S.A.R. & H. Tender Board: Electric motor coaches. No. 6116. Due, 25/3/48.

Separate price required for electrical equipment and mechanical portion.

S.A.R. & H. Tender Board : Inter- urban coaches manufactured in South Africa. No. 7471. Extended to 29/7/48.

Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria : Vans for surveyors. No. 79/48. Due, 10/3/48.

Benoni Municipality : Supply and delivery of one light motor truck. No. 321. Due, 1/3/48.

Johannesburg Municipality : Ford truck. Contract 358. Due, 19/4/48.

MISCELLANEOUS :

Anatomical teaching apparatus to Dept. of Health : Union Tender and Supplies Board. No. S.O. 2309. Due, 4/3/48.

Aluminium foil : S.A.R. & H. Tender Board. No. 7850. Due, 16/3/48.

Automatic couplers : S.A.R. & H. Tender Board. No. 7773. Due, 8/4/48.

Aviation fuel : S.A.R. & H. Tender Board. No. 7203. Due, 11/3/48.

Bioler stay taps and reamers : S.A.R. & H. Tender Board. No. 7776. Due, 11/3/48.

Bus tickets : Benoni Municipality. Contract 360. Due, 1/3/48.

Binoculars : Post Office Stores, Johannesburg. P.O. No. 892. Due, 8/4/48.

Bush and tree cutting machine : P.O. Stores, Johannesburg. No. 894. Due, 15/4/48.

Boiler plates : S.A.R. & H. Tender Board. No. 7829. Due, 18/3/48.

Brass and copper bar, piping, etc.: S.A.R. & H. Tender Board. No. 7721. Due, 18/3/48.

Catering equipment — crockery ware : S.A.R. & H. Tender Board. No. 7603. Due, 22/4/48.

Catering equipment — Kitchenware : S.A.R. & H. Tender Board. No. 7604. Due, 15/4/48.

Catering equipment — electro-plated ware : S.A.R. & H. Tender Board. No. 7595. Due, 8/4/48.

Cast steel friction or rubber draw gear : S.A.R. & H. Tender Board. No. 7774. Due, 18/3/48.

Crucibles and parts : S.A.R. & H. Tender Board. No. 7788. Due, 11/3/48.

Chemicals and laboratory equipment : Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2306. Due, 6/5/48.

Cotton waste : S.A.R. & H. Tender Board. No. 7915. Due, 29/4/48.

Carbon brush material : S.A.R. & H. Tender Board. No. 7836. Due, 4/3/48.

Cotton rope : S.A.R. & H. Tender Board. No. 8505. Due, 15/4/48.

Capping metal for steel wire rope — approximately 2,000 lb.: Irrigation Department, P.O. Box 277, Pretoria. Irr. No. 333. Due, 18/3/48.

Fittings for aluminium ware : S.A.R. & H. Tender Board. No. 7725. Due, 4/3/48.

Fire-side chairs : Johannesburg Municipality. Contract 374. Due, 23/3/48.

Flax machine twine : S.A.R. & H. Tender Board. No. 7817. Due, 8/4/48.

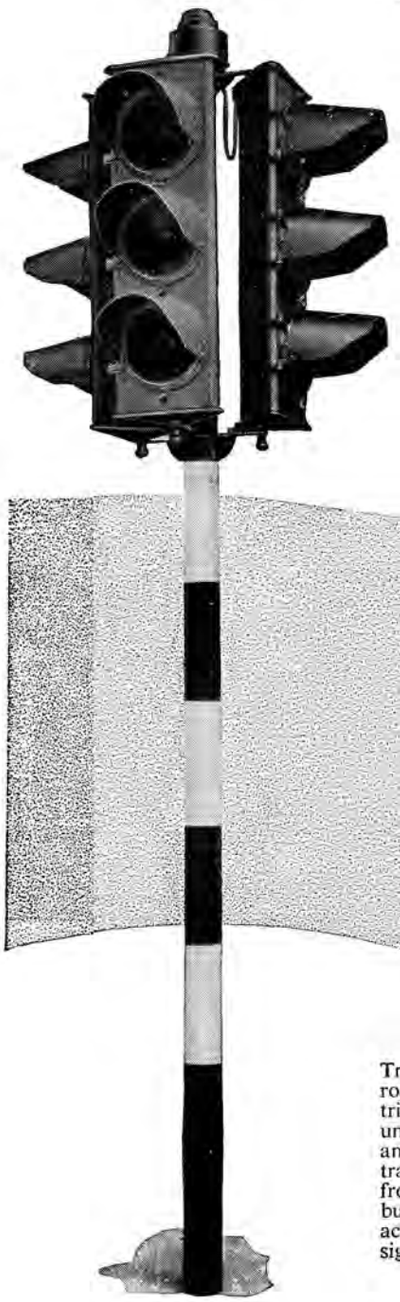
Flax tow sheeting canvas : S.A.R. & H. Tender Board. No. 7734. Due, 15/4/48

Glass : S.A.R. & H. Tender Board. No. 7802. Due, 18/3/48.

Gear cutting machine : Irrigation Department, P.O. Box 277, Pretoria. Irr. No. 337. Due, 18/3/48.
Hydraulic hoist : Johannesburg Municipality. No. 357. Due, 5/4/48.
Jackhammers : Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria. 71/48. Due, 3/3/48.
Jacks : S.A.R. & H. Tender Board. No. 7797. Due, 15/4/48.
Lancashire boiler furnace : Johannesburg Municipality. Contract 371. Due, 22/3/48
Mobile crane and a manual stacker : Post Office Stores. P.O. Tender 898. Due, 1/4/48.
Motor body enamels : S.A.R. & H. Tender Board. No. 7787. Due, 11/3/48.
Mobile crane : S.A.R. & H. Tender Board. No. 7551. Due, 1/4/48.
Mobile crane : Johannesburg Municipality. No. 359. Due, 19/4/48.
Oil engine pumping plant : Irrigation Department, P.O. Box 277, Pretoria. Irr. No. 323. Due, 1/4/48.
Pre-cast concrete paving slabs — Supply, delivery and laying. Benoni Municipality. Contract 320. Due, 1/3/48.
Pump trolleys and spares for push trolleys : S.A.R. & H. Tender Board. No. 7651. Due, 11/3/48.
Reinforcing steel : Transvaal Provincial Tender Board, P.O. Box 1040, Pretoria. 74/48. Due, 10/3/48.
Sparking plugs : S.A.R. & H. Tender Board. No. 7748. Due, 18/3/48.
South American Timber : S.A.R. & H. Tender Board. No. 7754. Due, 18/3/48.
Screw eye augers and auger bits for sleeper boring machines : S.A.R. & H. Tender Board. No. 7718. Due, 4/3/48.
Sofa springs : S.A.R. & H. Tender Board. No. 7523. Due, 11/3/48.
Sleepers and crossing timbers : S.A.R. & H. Tender Board. No. 7681. Due, 25/3/48.
Scissors, B.P. blades, sharp and blunt ends : Union Tender and Supplies Board, P.O. Box 371, Pretoria. I.T.S 5076. Due, 10/3/48.
Stainless steel sheets : S.A.R. & H. Tender Board. No. 7808. Due 18/3/48.
Sailmakers tools and requisites : S.A.R. & H. Tender Board. No. 7799. Due, 8/4/48.
Standard hand and pneumatic chisels : S.A.R. & H. Tender Board. No. 7804. Due, 25/3/48.
Transformer oil : Johannesburg Municipality. No. 373. Due, 22/3/48.
Track jacks : S.A.R. & H. Tender Board. No. 7837. Due, 29/4/48.
Universal pulleys and components : S.A.R. & H. Tender Board. No. 7912. Due, 18/3/48.
Veterinary and laboratory equipment, etc., to Director of Veterinary Services, Onderstepoort : Union Tender and Supplies Board. S.O. 2288. Due, 1/4/48.
Vacuum and steam pressure gauges : S.A.R. & H. Tender Board. No. 7576. Extended 11/3/48.
Woodworking machines : Public Works Department, Pretoria. P.W.D. S.124. Due 11/3/48.
Woodwork vices : Transvaal Provincial Administration, P.O. Box 857, Pretoria. No. 75/1948. Due, 7/4/48.
Wire rope electric hoists : Johannesburg Municipality. No. 360. Due, 19/4/48.

Electro-matic Vehicle-Actuated Road Signals

ELECTRO-MATIC VEHICLE ACTUATED-ROAD SIGNALS can be installed in a form suitable to every type of road-intersection and to every variety of traffic. They provide speedy, smoothly-maintained traffic flow with perfect safety for every type of road-user, whether vehicle-driver or pedestrian.



Electro-matic Controllers consist of a compact unit comprising a main switch, fuses, facility switch, radio interference suppressor, controller unit, etc., mounted in a pillar fitted with both front and rear doors. The facility switch can be set in any of its positions by means of a special key without opening the doors. The controller units available are of several types according to local requirements.

Traffic detectors are of three general types: normal road-vehicle detectors, tramcar detectors and pedestrian push buttons. The former is a pressure operated unit set flush with the road surface and is moisture and dust-proof. Tram detectors are fitted to overhead tram wires and are arranged to exclude high voltages from the local detector circuit. Pedestrian push buttons can be associated either with vehicle-actuated signals or with pedestrian-crossing-only signals as required.

Various types of signal heads for vehicle driver and pedestrian use are available according to road layout and traffic requirements. They consist of separate lightweight units which can be fitted by means of simple attachments to standard, bracket or suspended type mountings. Wiring is carried by means of a flexible metallic tube. Signal heads can be tilted to angles which provide maximum visibility.

EVA ELECTRO-MATIC VEHICLE ACTUATED SIGNALS

AUTOMATIC TELEPHONES (SOUTH AFRICA) LIMITED

701 Kelvin House, Corner Hollard & Marshall Streets, Johannesburg

(P.O. Box 6687) *Telephone : 33-3200*

Associated Distributing Company for London & Liverpool

Automatic Telephone & Electric Co. Ltd. England

A1009/1-A3

Printed by Caxton, Limited, 265, Pretorius Street, Pretoria, for the proprietors and publishers, Public Services Publicity (Pty.), Limi Norwich Union Buildings, Main Street, Johannesburg.