mitted the land speculators to superimpose the typical grid plan over the radial one, creating much confusion and a host of irregular sites where the radial avenue intersected with the grid. In later years, millions of dollars have been paid in compensation to property owners in an endeavour to return as nearly as possible to L'Enfant's plan.

In New Zealand, the Town Planning Act required cities and towns to produce within a period of years proposals for improvements; in brief, a long-term plan. The response has been poor and the results, with few exceptions, disappointing. There has been lack of co-ordination and the architectural profession has not had opportunities of participating and assisting. It would seem that if civic authorities had set out to produce a comprehensive contour plan of their areas as a sound basis, then surveyors, architects and engineers could have studied the problems and produced worth-while plans. It is up to us as a profession to take the keenest interest in all town-planning legislation and development if we are to assist in the improvement of our cities, their traffic problems and general amenities.

ABSTRACTS.

The Present State of Main Line Electrification.

By S. A. Vincze, New Zealand Railways.

(a) Electrification in various countries.
(b) Choice of the system and energy supplied—
  i. D.C. systems.
  ii. Three-phase systems.
  iii. Single-phase A.C. systems.
(c) Overhead systems for high speeds.
(d) Modern D.C. and A.C. locomotives.
(e) Electric railcars and multiple units.

This paper has been published in *New Zealand Engineering.*

Technology and the Patent System

By J. W. Miles, Deputy Commissioner of Patents.

Technology, the key to industrial production and upon which national prosperity and world economy depend, is largely controlled through the bottleneck of the Patent system. Recent world-wide investigations show that far-reaching reforms to Patent Law and administration are necessary in the adjustments and re-orientation of the Patent system to meet the needs of the post-war conditions.

Dr. Miles's paper, in extended form, has been published in *New Zealand Engineering*, November 10, 1946, pp. 690–95.

Recent and Potential Applications of Some of the Newer Plastic Materials.

By E. G. Bullough.

A review of some of the newer plastic materials and their established and potential applications. Some of the latest techniques of moulding and fabricating these newer materials were also outlined. A number of articles manufactured from these plastics were exhibited.

The Problem for the Hospital Architect.

By W. J. McKeon.

This paper traversed recent advances in the planning and equipment of hospitals in New Zealand. The authorities to be consulted, the general planning requirements, details of equipment, details of finishes, and details of lighting were summarised, with special reference to the planning aspect.

This paper has been published by the Institute of Architects.

The Architect and the Structural Engineer.

By J. I. King.

The collaboration between architect and structural engineer is most important in the formulation of any architectural project, and in this paper the author endeavoured to outline for the architect a new approach to the conception of structure.

This paper has been published by the Institute of Architects.

The Termite Problem in Relation to Building.

By A. F. Clark, Technical Officer, State Advances Corporation.

New Zealand has only two indigenous species of termites, *Calotermes brouni* Frogg, and *Stolotermes ruficeps* Broun, the former a dry-wood and the latter a damp-wood species. Subterranean termites were first discovered in the Dominion in 1938, and an intensive survey showed that three Australian species, *Coptotermes acinaciformis* Frogg., *C. frenchi* Hill, and *C. lacteus* Frogg., had been established. The first is much the commonest species. The distribution of these subterranean termites is confined at present to the towns of Auckland and New Plymouth. In the former there are three main areas of infestation which are widely separated and a number of spot infestations. In New Plymouth there is only one infested area. A small infestation which was found in the Poverty Bay district has been dealt with successfully. The variety of material infested is wide and includes houses and other buildings, fence posts, trees, tree stumps, utility poles and tramway sleepers. The absence of any form of protective measures in buildings, which in New Zealand are predominantly of timber construction throughout, makes these particularly vulnerable. There are few natural controls. the most useful being sparrows, which feed voraciously upon the winged forms.

In order to deal with the situation it was necessary to pass special legislation. "The Termites Act, 1940," and its regulations, which break new ground from a legal point of view, are administered by the State Advances Corporation. Local bodies in whose districts subterranean termites are reported are brought under the provisions of the legislation by Order-in-Council. At present seven local authorities are so placed. The duties of the local authorities include the house-to-house inspection of their districts. In order to carry out these inspections efficiently, inspectors are given a course of training as prescribed in the Termites Legislation. The transference and use of infested timber is prohibited.

The numerous other provisions of the legislation, e.g., the advancing of loans to persons whose property has been damaged by termites, will not be detailed here. The control measures are the responsibility of the State Advances Corporation, and these consist primarily of dusting with white arsenic. At the commencement the arsenic was dusted into the termite runways, but owing to the high humidity conditions, especially in Auckland, it was found the arsenic tended to cake in the runways, and the method was abandoned in favour of dusting the insects themselves. The method is highly effective, but at times difficult of achievement. For a short period, termitaria, when discovered, were dug out and destroyed. This procedure has also been abandoned owing to the fact that very few queens were recovered. Contrary to expectations, it was found that fully developed queens are by no means immobile, but on the contrary can and do move quite quickly, and thus escape from the termitarium, usually accompanied by a small number of workers. They establish new colonies in a comparatively short time. *Coptotermes acinaciformis* and *C. frenchi* have both shown the ability to produce supplementary queens.

It is required by the Termites Legislation that steps shall be taken to protect buildings which are to be erected in termite-infested areas. All blocks are to be of concrete not less than 12 in. high and generally a clearance of not less than 21 in. from the ground to the underside of the joists is required. A trap door is to be provided in the floor or foundation walls. All builders' debris, stumps, roots and other material likely to harbour termites is to be removed before the floor is laid. No steps, trellis or similar erections are to be fixed less than 1½ in. from any building. Termite caps and steps are to be placed over the blocks and foundation walls. Both stops and caps are to be of galvanized iron or other suitable metal, shall project 1¾ in. beyond the vertical face, bent down at an angle of not less than 45°, and shall be not less than 12 in. above ground-level.

Since 1941, the economic loss caused by subterranean termites in New Zealand has been kept at a very low level. The very large and varied amount of materials available for infestation, the distribution of the insects within the infested areas, and the ability of the two commoner species to produce supplementary reproductives make it essential that the termite-control campaign be continued for several years yet.

Discussion.

Q.: Was Mr. Clark aware that in California, at a research station, subterranean termites had been kept alive in glass jars for considerable periods?

A.: Yes. Subterranean termites were quite common in California and some species had developed interesting modes of behaviour. One species when infesting a house or similar structure would at times build mud tunnels down from the timber to the ground. On the other hand, another species tended to build mud structures from the ground to the timber. It would be possible to show these in a suitable glass container.

Q.: Did the kiln drying of timber give any immunity or other advantage?

A.: Kiln drying was a most useful process provided it was well carried out. It provided timber of a known moisture content which was less subject to "movement" and splitting. Kiln drying alone would not provide immunity from termite attack.

Q.: Was it likely that many insects attacking live trees would find their way into building timbers?

A.: Rather outside the scope of the paper. However, all insects which at present attack building timbers were originally forest insects. In the forest they formed part of the normal insect population, attacking fallen and dead trees or the dead portions of living trees. They assisted in the break-down of the waste material of the forest into humus. Some of these insects, e.g., the two-tooth longhorn, *Ambeodontus tristis* had, while still remaining forest insects, turned their attention to house timbers, and at times caused serious damage. However, New Zealand was fortunate that not more indigenous forest insects had become pests of house timbers

Q.: It was commonly believed that kerosene would kill termites. Was this correct?

A.: If kerosene was poured on to termites it might kill them, but owing to the system of colony development which had been described, the use of kerosene in this manner would not give effective control.

Q.: Was treatment of houses against insect attack effective?

A.: Again rather outside the scope of the paper. There were four main considerations if the successful treatment of house timbers against wood-boring insects were to be undertaken. These were: (i) sufficient knowledge of the insects to be controlled; (ii) the employment of suitable chemicals; (iii) the employment of efficient and thorough methods of application; and (iv) a policy which allowed the treatment to be carried on for not less than five years. If these considerations were met it had been found that very satisfactory results were secured.