

contributed 296,666 and the Federal Government 890,000 dollars. Some time must elapse before the effect of these widely distributed schemes shows itself on the wild-life population, but there is every reason to think that the result will be gratifying to the naturalist as well as to the sportsman.

Television Transmission over Telephone Cables

IN the *Record* published in October by the Bell Telephone Laboratories, Inc., L. Weis gives a helpful discussion of the problem of transmission signals over telephone cables. Most radio broadcasts originate in the studios of the broadcasting companies, and are transmitted thence to the radio stations over high-quality programme circuits. Not infrequently the 'pick-up' point is at a distance from the studio and circuits to the studio must be provided over telephone 'cable pairs' not normally employed for broadcasting. With television broadcasts such remote pick-up points are also required, but the utilization of ordinary telephone circuits to link them to the television studio is more difficult because of the much wider band of frequencies employed, besides certain exacting requirements for television transmission. Because of the experimental state of television broadcasting at the present time, no arrangements for transmitting from these remote pick-up points have as yet been standardized.

LAST May an experimental circuit of this nature was provided for the National Broadcasting Company. More recently a somewhat similar one was provided for the Columbia Broadcasting System. For ordinary telephone circuits a frequency band of about 3,000 cycles is sufficient, while for both these recent experiments the band extended from 45 to more than three million cycles—a range a thousand times greater than the voice band. When we consider the losses, we find that the loss in a co-axial cable at three million cycles is only one millionth that in a cable-pair of equal length. For satisfactory television transmission, equalizers must be provided to make the overall loss essentially the same for all frequencies. In addition to the variation in loss with frequency there is also a variation in the time of transmission. In television transmission, if this is not kept extremely small the detail of the picture will be blurred, and spurious transients and 'ghosts' will appear. Before a cable pair can be used for television, it is necessary to know the transmission time and then to provide phase equalizers to correct it. In the experiments the equalized line maintains the same transmission time to within plus or minus one tenth of a microsecond, and this can be measured.

Traffic Signals at 'Bank Complex'

A DESCRIPTION is given in *Roads and Road Construction* of November 1 of the 'electromatic' vehicle-actuated system operating on the 'flexible-progressive' system. Automatic traffic signals outside the Bank of England and on several important roads in the locality are to be installed as early as possible. It has been found that the signals in other parts of the

City have proved of such value during the black-out that police officers have been able to concentrate on other important duties, and it is only at a few intersections that it has been necessary for them to control traffic by hand signals. The name 'Bank Complex' has been given to the area which is the junction of Threadneedle Street, Cornhill, Lombard Street, King William Street, Princes Street, Queen Victoria Street, Poultry and Mansion House Street. A specification for traffic signals to control the heavy and complicated traffic at this junction was prepared by the Ministry of Transport in collaboration with traffic officials of the City of London Police.

A SCHEME to meet the requirements of the specification was prepared by Automatic Telephone and Electric Co., Ltd., using electromatic vehicle-actuated signals. As traffic is approximately equally heavy in all directions, the problem is mainly concerned with ensuring the most rapid transit of vehicles through the thoroughfares converging on the area of the Bank Complex. Traffic increases to a maximum at morning and evening periods, and, if congestion and traffic blocks are to be avoided, the available road space must be used with the greatest efficiency. The whole system will be 'electromatic', operating on the flexible progressive system, under the control of a 'dual master-timer', and vehicle detectors will be used in each approach to the 'Bank Complex'. Signals are actuated by a special control unit divided into seven sections, which are linked together to co-ordinate the signal phases. It is important to notice that right-of-way is given to an approach only if there is a demand, and the length of this right-of-way period depends, up to a predetermined maximum, on the volume of the traffic. A novel feature of this system is provision of accommodation for traffic assessors in Cornhill and Poultry to determine the volume of traffic entering the complex on these approaches, so that variations of the right-of-way time can be made automatically.

The International Seismological Summary

THE International Seismological Summary for October, November and December 1933 has just been received. It deals with 123 epicentres for earthquakes which occurred during that quarter, of which 47 were new epicentres and 76 repetitions of earthquakes from old epicentres, thus again confirming the knowledge that earthquakes tend to recur from the same epicentres. The five earthquakes with abnormal focus during the quarter all had deep foci. The first was on October 25, with epicentre in the Andes, north-west of Jujuy (Argentina) with focus 0.03 of the earth's radius below normal. The second was on November 14 with epicentre north-east of Santiago on the borders of Chile and the Argentine with focal depth 0.02 of the earth's radius below normal. The third was on November 19 in the Pacific Ocean off the Japanese coast nearly south of Tokyo with focal depth 0.035 of the earth's radius below normal. The fourth and deepest was on December 1 with epicentre in the Pacific Ocean immediately to the south of the island

of Aneityum (Loyalty Islands, Melanesia) with focus 0.09 of the earth's radius below normal. The fifth was on December 4 with epicentre in the Sea of Okhotsk to the east of Odomari with focus 0.040 of the earth's radius below normal. In continuation of the "Catalogue of Earthquakes 1925-1930", by Miss E. F. Bellamy, it has been decided to publish annually indexes to the International Seismological Summary. The first three of these for the years 1931, 1932 and 1933 arrived with the International Seismological Summary for the last quarter of 1933 and they form a very valuable addition to the summary for quick reference. The indexes are on a time basis, whereas Miss Bellamy's Catalogue 1913-1930 was on a geographical basis. The geographical basis is in many respects the better owing to the tendency mentioned above for earthquake shocks to recur from the same epicentre.

'Vibrated' Concrete

It is generally known that within certain limits the drier the concrete when it is mixed, the stronger it is when set. But it is not generally known, even among engineers, that it has been the practice for some years to contrive by mechanical means to produce super-compacted and hence super-strong concrete from materials which, treated in the normal way, would give normally strong results. A paper by R. F. Irving in the *House Journal of the Bournemouth Gas and Water Company* of October 2 gives the history and methods of manufacture of 'vibrated' concrete. In 1917, vibration of concrete was started in France on a commercial scale, and these machines have been extensively developed in America. Originally, the machines were driven by compressed air. The vibrating unit consisted of a freely moving piston, reciprocating as a shock producer, striking blows at a speed of 5,000-9,000 blows per minute. More modern machines, driven either by electric or petrol motors, have a rotor shaft provided with an unbalanced weight producing vibrations from 6,000 up to 21,000 per minute, the size of the motor unit varying from $\frac{1}{4}$ to $1\frac{1}{2}$ h.p. With the construction of No. 5 Reservoir at Alderney, the opportunity arose of taking advantage of the great developments in concrete construction. Preliminary tests of the relative strengths of unvibrated and vibrated concrete fully justified this procedure. Further, the vibration method led to a shortening of the time required for setting of the concrete and the consequent rapid release of the shuttering for use on new sections.

Earthquakes registered at Kew during October 1939

FOURTEEN earthquake shocks or earth tremors were registered on the seismographs at Kew during the month of October 1939. Four of these are reported to be very small, and some others have been confused by microseisms. The best seismograms obtained were for the earthquakes of October 10 and 17. That on October 10 had a probable epicentral distance of 88° from Kew and a depth of focus of 75 km. The earthquake of October 17 was again a deep focus shock, being thought provisionally from

Kew records to have had a focal depth of about 150 km. It was probably situated in the New Hebrides and was strong enough to give a full complement of pulses, including *ipPPP*, a longitudinal body-wave reflected three times at the earth's surface, coming to the surface for the fourth time at Kew where it was registered.

Earth Tremor in New England

AN earth tremor was felt on Tuesday night, November 14, in the New England States of Pennsylvania, New Jersey, Maryland and Delaware. The epicentre of the shock was probably very close to Philadelphia, and in Baltimore pictures were knocked off walls and furniture overturned, which indicates at this place a probable intensity of IV on the Rossi-Forel scale. Damage was not serious and there were no casualties. Although earth tremors are not unknown in New England, it is unusual to have one so strong as this. California and the western States are much more liable to shocks than the eastern States.

Earthquakes in Central America and Canada

USING instrumental reports from Georgetown, Fordham, Philadelphia, Weston and Guatemala, the United States Coast and Geodetic Survey in co-operation with Science Service and the Jesuit Seismological Association has determined the epicentre of the earthquake of September 20, 1939, to be between Corquin and Ocotepeque on the mountainous border between Honduras and Guatemala in Central America. From readings of seismograms obtained at Pittsburg, Tucson, Ottawa, St. Louis and Fordham, the provisional epicentre of the earthquake of October 23, 1939, has been determined to have been some twenty miles south-west of Tadoussac in the Province of Quebec. Both districts are liable to small earthquake shocks, though those in Central America are usually somewhat more intense than the Canadian shocks. Further news of these shocks is awaited from the observatories at Guatemala and Ottawa.

The Polarograph

FIFTEEN years ago Prof. J. Heyrovský, of the Charles University of Prague, described a polarographic apparatus with the dropping mercury cathode which he used for showing the presence of certain metals in solution by the position of 'waves' produced in the deposition potential curves automatically recorded as 'polarograms'. Since that time, Heyrovský and his co-workers have carried out many academic physico-chemical researches with the polarograph, and in recent years it was beginning to find application for other purposes in pure and applied science, ranging from its use in examining sera for the diagnosis of cancer (*NATURE*, 142, 316; 1938) to, say, the estimation of iodine in Chile saltpetre. The genuine apparatus has hitherto been difficult to obtain, since it was only made in Czechoslovakia, and research workers and others will be interested to learn that although instruments are no longer obtainable from Czechoslovakia, an improved model, complete with