Annual Summer Meeting, 1956
Visit to Signalling Installations at Cologne and Heidelberg

The Summer Convention was held in Germany from May 10th to 14th, 1956. The party, of 175 members and ladies, left London by the Hook of Holland route on May 9th, led by the President, Mr. J. C. Kubale, supported by the two Vice-Presidents, Mr. A. W. Woodbridge and Mr. J. F. H. Tyler; Messrs. R. Dell, E. G. Brentnall and T. S. Lascelles, Past-Presidents; several Members of Council; Mr. G. J. Dickin, Hon. General Secretary; Mr. B. Reynolds, Hon. Treasurer; and Mr. V. H. Smith, Hon. Secretary, General Purposes Committee, responsible for the arrangements.

On arriving at Cologne Central Station, the party was received by Dr. Fochlinger, Vice-President of the Divisional Management, German Federal Railway, acting for the President, Herr Kessler, and was entertained to lunch by the railway authorities, the chair being taken by Professor Dr. A. Dobmaier, Chief of the Engineering Department, who expressed a hearty welcome to all on behalf of the General Management. He recalled that it was in 1937 that he had had the pleasure of receiving the Institution in Berlin and showing the members the then latest types of mechanical and power lever frames and signalling installations, which represented a high level of progress in such matters. Since then what could be termed a revolution had taken place in their ideas and they had arrived at a very complete system of push-button relay interlocking equipment, which they had applied successfully at a number of locations and which the visitors would be able to see. Safety was still, of course, their first objective but next to that came the important one of securing maximum efficiency and economy. He congratulated them on having in Great Britain a body such as their Institution for dealing with these vital questions. He trusted they would not be disappointed in what they were going to see, either in the technical installations or in the countryside they would pass through.

Dr. Foehlinger, speaking again for Herr Kessler, also expressed a welcome to the party and referred to the installations that were to be inspected, especially the Gremberg marshalling yard, the largest in the Cologne Division. He hoped that an enjoyable

time would be spent by all.

Mr. J. C. Kubale, in reply, expressed the thanks of the party to the Management of the Federal Railway for the invitation extended to them and to Dr. Dobmaier and Dr. Foehlinger for their kind words.

After lunch, Dr. Walter Schmitz, Chief of the Signal Department, gave the following address, illustrated by numerous photographs and diagrams, dealing with the equipment to be inspected.

The Signalling Facilities of the German Federal Railways

By Dr. WALTER SCHMITZ

On the German Federal Railway there are (*a*) Mechanical Signal boxes, (*b*) Electro-mechanical Interlocking Frames (the majority being designed as single-row lever frames, but there are a small number equipped with two, three, or four row frames, and, introduced about eight years ago), (*c*) All-relay Signal boxes with Panel Apparatus. Block working between mechanical signal boxes is accomplished by the Siemens & Halske a.c. station block and between electro-mechanical and all-relay signal boxes by d.c. block. The a.c. section block with Siemens & Halske manual block instruments and, more recently, the automatic or train operated d.c. section block serve to increase the safety of train operation. Furthermore, the erection of two c.t.c. control machines must be mentioned as serving to ensure the remote control of all points and signals belonging to a designated track section. In addition to the above, there are other technical improvements and special signalling installations.

The signalling system of the German Federal Railway is known as the Main-and-Distant-Signal-System, permitting the simultaneous application of form and colour light signals.

The mechanical signal box has been most frequently erected and constitutes about 90 per cent of all cases. As far back as the year 1900, electro-mechanical signal boxes were designed in Germany, that is, electric power frames with mechanical locking. At one time each firm developed its own type of signal box but

in order to simplify maintenance and the storage of spare parts, both the mechanical and electro-mechanical were reduced to one standard type of each.

Although the mechanical and electro-mechanical signal boxes secure maximum safety in train operation it cannot be denied that they have only little influence on the speeding up of movements. To increase the line capacity by the installation of suitable signalling equipment it was decided, about 15 years ago, to develop a new type of signalling technique, and to endeavour at the same time, to modernise the existing facilities, belonging to the so-called " old " signalling technique, by rationalisation, simpler designs, standardisation of circuit arrangements and so forth, thus obtaining a standard contributing as far as possible to increase the safety of train operation and to simplify the operating service.

With this in mind, the standard mechanical (M 43) and standard electro-mechanical (E 43) signal boxes were developed in the field of the so-called " old " signalling technique. On account of the fact that the Siemens & Halske signal box type 1912 served as a basis for the evolution of the new standard type signal box E 43, which is manufactured by the above named firm. Moreover, both types of signal boxes—M 43 and E 43—were designed as mobile plants so that they can be readily used at temporary sites. Since it is not always feasible to provide mechanical boxes of old design, manufactured by various signalling firms, with mechanical section block locks, a new section block circuit arrangement has been introduced on double-tracked lines functioning without the aid of mechanical locks. To provide special block working for the tracks of a double-tracked line in case of bridge and permanent way maintenance jobs, auxiliary block equipment is used, permitting temporary working on one track only and alternative working on one track or on both tracks, retaining the advantages inherent in the section block system. Finally, mobile block posts and devices to cut out block posts and station equipment were developed; thus the division of a long block section can be accomplished for a brief period to shorten train intervals and to cut out temporarily block post and station equipment during light traffic hours to save personnel.

As a first step in the field of the new signalling technique an all-relay signal box for stations was developed. The first interlocking plant of this type was put into operation in 1948. The

all-relay signal box with panel apparatus of the German Federal Railway is a push-button control signal box with relay interlocking (Drucktastenstellwerk = Dr. Stellwerk). The point machines operate on 380-volt three-phase alternating current supplied directly from power company lines. Train and shunting signals are designed as colour light signals operating on 12 volts and fed across transformers from the power network. Signals located at through tracks and at passing sidings permitting through movements have been provided, in addition to the auxiliary filament of the generally employed double filament lamps, with a special emergency red light which, if necessary, is fed from a battery. The track circuits used for the track and point-occupancy indications are of the alternating-current type (2 to 5 volts), and alternating current motor track relays have been installed on electrified lines, while normal direct current relays have been used for steam operated lines. If the normal power fails all installations operated on three-phase a.c. and normal a.c. (e.g., points, signals, track circuits, etc.) are fed by 60-volt batteries via transformers; in order to relieve the batteries, stationary or mobile Diesel stand-by equipment is available.

The Dr-signal box is manufactured by the firms of Siemens & Halske and C. Lorenz. Such Dr-signal boxes can be seen at Cologne passenger station, Heidelberg passenger station, and at the Gremberg marshalling yard designed as control cabin for the "classification" of trains. The Dr-signal box as manufactured by the Lorenz Company have been installed at Selb-Stadt, Koblenz, Heidelberg (goods station), and at several other smaller stations.

At the beginning of 1956 a total of 186 all-relay signal boxes with panel apparatus were in operation. Moreover, the German Federal Railway erected a Siemens & Halske-made c.t.c. control machine (SDr-signal box) at Nuremberg station. The signals and points of all stations located on the approximately 100 kms. long double-line section between Regensburg and Nuremberg are remotely controlled. The line has been provided with automatic block signalling (train operated signals). The following four train operating methods can be applied on this section of line:

1—Through movements (in normal position all signals located at through tracks display a clear aspect);

2—Remote control operation (in normal position all station signals display a stop aspect; train routes can be changed and lined up for each train movement);
3—Local operation (release of the station signal box or point control hut for local operation);
4—Key operation (release of the point key hut for local operation).

The automatic train number recorder is considered as an inherent part of this interlocking plant. It replaces the Morse apparatus signalling method; the train numbers are indicated by an optical system and are automatically moved along in accordance with the train movement. At transition points the train numbers are stored with the aid of train number transmitters. To register the traffic over a longer line section a train operated movement recorder is employed indicating on a slowly moving paper tape the time at which the individual line sections are occupied and cleared by the trains. In lieu of manually kept train signalling record books a so-called train time printer has been introduced at major stations, automatically registering the train number, the track number, the time of arrival, and the time of departure. Examples can be seen at Cologne and Heidelberg stations. The automatic train number recording system is not confined to c.t.c. control machines but has also been introduced for signal boxes located at major stations (junctions) for the inner control circuits. For the longer control circuits, comprising all junctions, indicating devices to pre-signal approaching trains by an optical system have been provided, and similar apparatus is available to indicate information concerning delays.

The Bebra-Cornberg line section on the important North-South route with a heavy grade has been equipped with automatic block signalling and remote control reversible line working so that it is possible to use, under signal protection, both tracks for either running direction (non-stop overtaking). Other important stations, such as Frankfurt/Main Hbf, Mainz Hbf, Düsseldorf Hbf, Dortmund Hbf, are at present equipped with push-button control signal boxes in order to obtain a freer flow of traffic and to avoid congestions; the intention is, gradually to provide smaller stations with standard Dr-signal boxes, and to install automatic block signalling on the most important lines.

Owing to the relatively high percentage of small stations where from a signalling and operating standpoint no distinction

is made between a station equipped with two passing sidings, one for each direction, and a station provided with one passing siding capable of being worked in both directions, the Bundesbahn has developed a standard type Dr-signal box which can be manufactured in sectional production, and used as required, and which can be assembled very rapidly because all of its components are of the plug-in type. The space required for its installation is only very small and it is remarkably economical. This signal box is manufactured by the Siemens & Halske Company.

The latest edition of the technical journal *Signal und Draht* (" Signal and Wire ") describes a newly developed all-relay signal box type which is being tested at Kreiensen, Offenbach, and Cannstadt, i.e., the so-called " Spurplanstellwerk " (an all-relay signal box with panel apparatus, the circuit arrangements of which correspond to the track and point layout of a station). The panel design and its mode of operation differ by no means from the present all-relay signal box type; however, it has the great advantage that the design work, the time necessary for testing, and the modifications required in case track and point alterations are unavoidable, can be substantially reduced. Owing to the considerable reduction in individual, i.e., in free circuit arrangements and the resultant abolishing of the otherwise required interlocking plans and numerous wiring diagrams for the execution of the work, the periods required for the design and the construction work should be shortened. For this reason it is our intention to provide in future all major stations with this type of signal box exclusively (Spurplanstellwerk).

A further experimental plant for centralised traffic control is the so-called " Streckenfunkstellwerk " (wireless C.T.C. control machine) which, in the very near future, will be put into operation on the single-tracked line section between Malsfeld and Treysa. Similar to the Nuremberg C.T.C. control machine this plant has also been provided, as the main operating feature, with a line control board embodying all push-buttons and indicating lamps required for the signals located along the 40 kms. section of line. The transmission of the train positions and that of the signal aspects, in the form of cab signals, is accomplished by wireless. The otherwise required controllable wayside signals are no longer necessary and have been replaced by fixing signs located at all places where distant and main signals would be normally erected.

To ascertain automatically whether station or out-of-station

tracks using steel sleepers have been cleared or not, magnetic pulse transmitters with axle counting devices of the Siemens & Halske Company have been introduced.

The Siemens & Halske Type S 44 treadle exclusively purchased during the last years, operates without mercury or oil. It is sensitive enough to function reliably at a minimum wheel pressure of 1·25 tons so that, even if light-weight trains are worked such as rail buses or rail-road buses a sufficient influence is exerted.

To prevent overrunning of stop signals the most important railway lines with long-distance passenger traffic have been equipped with an inductive type automatic train control based on the three-frequency system. One track magnet of each has been installed at the distant signal (1,000 cycles), at the main (home) signal (2,000 cycles), and, in certain cases only, at a place located 150 metres on the approach side of the main signal (500 cycles). Cables serve to connect the first magnet to the distant signal and the two other magnets to the main signal; contacts fixed to the signals control the magnets. The locomotive equipment consists of a magnet, the electrical transmission circuits, and the " evaluation " device in the cab. The last mentioned item has been connected to the brake system. On passing over an active track magnet, i.e., with the distant signal at caution or the main signal displaying a stop aspect, an automatic brake application is caused unless the vigilance button was operated when passing the distant signal and the brake was subsequently applied.

To obtain greater economy the oil lit point signals have been replaced by reflectors, and the oil lamps of the distant and main signals have been provided with propane gas lamps.

To protect the ever increasing road traffic, level crossings at single-tracked lines will be equipped with flashing lights, partly supplemented with controlled signals for the engine driver. Level crossings within towns or at railway lines with several tracks will be furnished with train operated half-barriers.

Adequate instruction and training of the operating, maintenance and junior staff is of utmost importance for the operation and maintenance of the signalling facilities. For this reason special signal boxes for training purposes have been erected in railway schools, consisting, however, only of the most frequently used installations of the old signalling technique. A signal box for training purposes equipped for the new signalling technique

is at present assembled in the railway school attached to the Wuppertal signalling repair-shop.

After this general survey I would like to give more details with regard to the signal boxes at Cologne, Gremberg, and Heidelberg, the inspection of which is envisaged.

The Cologne passenger station with its 9 platform tracks is a through station constructed on a very restricted area. A total of up to 1,700 train movements (850 incoming and 850 outgoing trains) plus 250 shunting movements have to be made daily. This can only be accomplished by a modern signalling technique. The main passenger station is supplemented by two stabling yards: Cologne-Betreibsbahnhof on the left bank and the Deutzerfeld station on the right bank of the Rhine. Between Cologne main station and the Deutzerfeld stabling yard is located the Cologne-Deutz passenger station. From an operating point of view these four stations are considered as one unit separated only by the river Rhine. For this reason all four stations were provided with uniform signalling facilities in 1951 and 1952. On each station a Siemens post-war type all-relay signal box was erected. All-relay signal boxes are push-button power plants with relay interlocking. All push buttons serving to control points and signals are accommodated on an electric visual control panel and arranged according to the actual layout position of points and signals. The setting up of a route, including the positioning of all signals, is accomplished by simultaneously pressing two push buttons, the " line " and the " platform " track push buttons. While formerly the interaction of three signal boxes was required when a train approached this station, all train movements are now controlled by one signal box only. Similar conditions prevail at the other stations within the Cologne area.

At Cologne main station not only is the number of platform tracks very restricted, but also the incoming and outgoing running lines are limited at the smaller stations in the suburbs of Cologne, so that, within the City of Cologne, there are only 6 tracks available on the left bank of the Rhine and two tracks on the right bank. For this reason, all branch lines and connecting lines have been equipped with automatic block signalling so that the number of block sections could be increased in order to enhance the line capacity. The signals used are of the multi-aspect colour light type. Owing to the short block sections, in particular in the approach zone, and to the introduction of the automatic block

signalling, the track capacity of the double tracked bridge across the Rhine has been increased to such a degree that the number of trains passing this bridge exceeds that worked in pre-war times over the bridge with four tracks available.

If required, the spacing between following trains can be shortened to 2 minutes for trains in each direction. Reversible line working, under signal protection, permits the working of trains over each track in either direction which is of considerable importance in case of congestions or construction work. The maximum performance so far achieved over this bridge is 750 trains in a period of 24 hours; the average amounts to 650 trains per day.

Very satisfactory results have been obtained with the setting up of shunting routes—for the first time practised on a large scale in Germany at Cologne main station. The exchange of through coaches, very frequently required at Cologne after the war, can be completed within the shortest time and under safety conditions equal to those established for running moves, since each shunting movement is protected by a signal.

The " train protection " signals, erected some years ago, subdividing the extremely long platforms (up to 500 metres) at Cologne main station, have been improved and extended. They permit entry to tracks already occupied by other trains; according to the length of a train up to three trains can be accommodated on one track.

The extensive signalling facilities are supplemented by an electric-optical train number recorder. The train numbers are indicated on a large board, the train number panels of which are arranged according to the station track layout and the incoming and outgoing lines, including all block sections. Furthermore, the occupancy of all platform tracks of adjacent stations, in particular those of Cologne-Deutz station, is shown on this board located in the Cologne main station signal box. Signal repeaters serve to supplement the information given by this board. The train numbers are dialled by the smaller stations in the Cologne area in a manner similar to the dialling of a telephone number, and the train numbers are shown on a ground-glass screen. Under the influence of the moving train the numbers are shifted along the platform and out-of-station tracks, represented on the indicating board, from block section to block section until they disappear on one of the departure lines. This system gives the

chief signalman at Cologne main station excellent up-to-the-minute information on all train movements in the Cologne area so that he can intervene within the shortest time. The formerly practised signalling of train departures by means of a Morse teleprinter or telephone is no longer required. A portion of this large indicating board at Cologne main station is always reproduced at the smaller stations for their areas. The panel designed for train numbers consisting of up to 6 digits contains $6 \times 10 = 60$ small electric bulbs up to six of which may be simultaneously lighted. The light emitted by the bulbs is focused by a lens system and penetrates a glass panel with figures etched in it to fall on the reverse side of the ground-glass screen. The automatic recording of the train movements is accomplished by a train time printer. At the very moment when a train enters or leaves the platform track the following data are printed: the train number which is regularly available, the track occupied, and the exact time. The very tedious manual keeping of a special train signalling record book is no longer required. In case investigations concerning train movements have to be made, all required data can be obtained from the recording tape.

The signalling installation of the Cologne area, completed in the spring of 1952, is still the largest of its kind in Western Germany. It comprises, *inter alia*, 85 running signals, 149 shunting signals, 60 light " protecting " signals, 277 points, and 350 track circuits with an overall length of 75 kms.

The Gremberg marshalling yard is one of the most important yards in the Federal Republic. It serves for the classification of southward and northward traffic. It receives southbound goods wagons arriving from the Ruhr, from stations located on the left bank of the Rhine, from Holland, and from Belgium. These wagons are sorted and composed into new trains bound for stations in the south and south-west of Germany with some wagons consigned to Switzerland, Italy, and France. For the opposite running direction the yard receives goods trains arriving from southern Germany and trains composed of empty wagons to be distributed to the Ruhr and the soft and hard coal areas on the left bank of the river Rhine and, finally, goods wagons consigned to destinations in western and northern Germany, on the left bank of the Rhine, and in Holland and Belgium.

The Gremberg yard is composed of parallel installations,

i.e., there are a receiving yard consisting of 8 to 30 tracks, a classification yard of 32 sorting tracks, and a departure yard with 13 to 35 tracks for either direction. Goods wagons which have to pass both systems are very rare. Special engine tracks have been provided for the train locomotives so they can be worked from and to the roundhouse without any crossing being necessary.

The all-relay control cabin with its wagon retarders can be considered as the most important feature of each system. In the yard for the southbound trains only the points assigned to the first point area of the control cabin are automatically positioned while the yard for the northbound trains has been equipped with the first completely automatic control cabin.

Prior to the humping of the wagons the operator stores the controls for the sorting track to which a wagon or cut of wagons is to go by merely pressing the desired push button. The stored route descriptions are optically indicated on special panels in the control desk by illuminating the track numbers on a ground-glass plate so that it is possible to check at any time whether the correct track number has been stored or not. The storage of up to 42 route descriptions is possible, which is accomplished by relay combinations. The wagon running by the hump, the insulated track sections, and the stepping mechanism cause the correct positioning of the points for the following cut.

The operator knows the track to which each individual wagon or cut of wagons is to go from the information on the switch list which has been transmitted from the yard office by means of page teleprinters to all offices concerned. The clerk in the yard office receives the required data for the switch list from a checker who, after walking along the train to be sorted, reads the information into a handset which, over a telephone pair, operates a soundscriber (Dimafongerat).

In case of irregularities (e.g., premature stop of goods wagons) the control cabin operator, who has nothing to do during the humping operation, can always intervene by controlling points individually. The hump master directs the humping operation by means of wireless. At the present moment the retarder equipment of the south-north yard consists of 4 heavy retarders so that eight sorting tracks are assigned to each retarder. The retarders are hydraulically operated two-power brakes; the formerly used Thyssen retarders of the German Federal Railway functioning in accordance with the automatic-weight principle,

are no longer constructed. At the present moment the retarders are mechanically controlled by means of levers. An electric control system is under construction as test apparatus, and it is intended to introduce it in future, for the automatic retarder control.

In order to indicate the occupancy of the sorting tracks if the view is impeded (during night hours and in case of fog) special indicators have been provided in the cabins to show the number of wagons which can still be stabled.

The final capacity of the Gremberg marshalling yard which will be obtained at the end of 1956, will be approx. 9,000 goods wagons, i.e., 4,000 wagons bound for southern Germany and 5,000 wagons in the yard for the northbound trains. Following the completion of this yard it will be possible to close three other marshalling yards in the Cologne area. Consequently, the modern equipment of the Gremberg yard results in substantial savings of personnel and train hours.

The inspection of the all-relay signal box at the new Heidelberg passenger station has been programmed for Saturday. The plant was supplied by the Siemens & Halske Company and is of the Dr S type. Following a construction time of 13 months only, this signal box was put into operation approximately one year ago. The signal box comprises a centrally located control desk, released from a control centre which, in order to save cost, has been accommodated in the same room and not, as in Cologne, in a separate building adjacent to the western wing of the passenger station building. Contrary to the arrangement selected at Cologne, control desk and indicating panel have been united so that all push buttons are arranged on the panel showing the train number and track occupancy.

The following facilities are available to control, each day, 500 train movements, 1,000 shunting movements, 72 train routes, 54 emergency routes and 452 shunting routes:

—160 points and derailers;
45 main and distant signals of the colour light type;
75 shunting signals, and
150 insulated track and point sections.

Since the Heidelberg station is a completely new construction which, designed as a through station, has been erected to replace the old terminal station, a comparison with the number of signal boxes and operators formerly assigned to the terminal station

would certainly give only an inaccurate picture. However, it is worth mentioning that at the old terminal station—at which more or less the same operations had to be performed—the following installations were required:

One supervisory signal box.

three subsidiary signal boxes—each accommodated in a separate building; and

six so-called point posts acting partly still as route checkers,

so that owing to the erection of the new signalling plant a total of 52 operators could be saved.

When designing the signal box of the new station it was soon found the operations were so numerous that they could not be executed by one person; for this reason a chief signalman was assigned to operate a special control panel and a signalman to the centrally located control desk. As usual, the task of the chief signalman is confined to the release of the routes while the signalman is entrusted with the setting up of train and shunting routes. Following the pressing of two buttons per route, all points and signals are automatically positioned and locked. After the route has been cleared it is generally released automatically.

As in Cologne, the manually kept train signalling record book has been replaced by an automatic train number recorder of an improved design. Furthermore, two train-time printers, one for each running direction, have been installed which, in accordance with the future standard design of train-time printers, can be used for both directions in case one printer fails.

To relieve the chief signalman from other duties of minor importance, mechanical devices have been installed to indicate trains being late, i.e., telephoned train delays are indicated by an optical system on a panel.

All lines converging at Heidelberg main station have been sub-divided by the erection of additional block signals, and they are all equipped with automatic block signalling.

On account of the fact that the lines are electrified, i.e., that the rails are used to feed back the traction current to the substations, both rails are insulated and have been provided at the insulated joints with impedance bonds blocking the track currents but permitting the free passage of the traction current.

Based on modern conceptions of signalling it was quite natural to remotely-control the junction points at Königsstuhl, located adjacent to the main passenger station, from a station

(Karlstor) located beyond a lengthy railway tunnel. To avoid a local interlocking which would have to be manned in case the remote control system failed, the equipment necessary for the remote control of this junction has been installed in the central signal box at the main station from which it can be operated by mechanical appliances in case the remote control system fails.

As at Cologne, the Heidelberg station has been provided with automatic train protecting signals, permitting under signal protection, train movements in partly occupied tracks, with mechanical signals serving to indicate that the train is ready for departure, with local departure signals, and, finally, with brake test signals.

In closing I would like to ask you to inspect our installations during the now following visits from a very critical point of view and to inform us about everything not finding your consent. In case the explanations given during the inspections should be unsatisfactory it will be a pleasure to me to give you any additionally desired information.

While the address was being given the ladies were taken on a tour of the city and neighbourhood and on its conclusion members proceeded to inspect, under the guidance of a number of engineers and technical assistants, the Gremberg yard and the power signalling at Cologne Central Station. The yard is equipped with the latest automatic point operation with stored controls, track circuiting and axle counting, rail brakes and associated equipment, with teleprinter and communications apparatus of specially complete form. The sorting of several trains was witnessed. At Cologne the relay room and operating room of the signal box which has replaced three others, were visited and the working was fully explained. The division of it between the traffic supervisors and the signalman and the operation of the illuminated automatic train number describers proved of especial interest, and, as traffic happened to be heavy at the time, the flexibility of the working, which included reversible operation over the lines on the river bridge, was particularly noticeable.

On May 11th, a special train conveyed the party through Coblenz to Assmanshausen, where buses conveyed the visitors to the Niederwald Jagdschloss where they were kindly entertained to lunch by Messrs. Siemens & Halske A.G. Direktor G. Rehschuh, in a short address, expressed his pleasure at being able to

renew contact with the Institution and at seeing so many present that day. He hoped that the convention would bring both instruction and pleasure to those participating in it. His Company counted it an honour to be able to offer some hospitality to them. Mr. Kubale, replying, offered the party's thanks to Direktor Rehschuh and his firm for the generous manner in which they had entertained it and spoke of the high standing enjoyed by Messrs. Siemens & Halske in the signalling world. The visitors then proceeded by buses to Rüdesheim and thence travelled by special train through Darmstadt to Heidelberg.

On the morning of May 12th, members assembled at the newly completed station where an address describing its features and the history of the lines in the vicinity was given by Herr Fakiner, Divisional Operating Superintendent, who was accompanied by Herr Rebman, District Signal Engineer, Karlsruhe, and, at its conclusion, inspected the signal box in the station, constructed by Siemens & Halske A.G., and the one in the stabling sidings, built by C. Lorenz A.G., as well as the automatic telephone exchange. Members and their ladies were then entertained to lunch by the Federal Railway, where the chairman of the Board of Management, President Dr. Frohne, accompanied by Herr Henrici, Assistant Divisional Manager, presided. He spoke of the growing collaboration in technical matters obtaining between railway engineers in the different countries and referred to the work of the International Union of Railways, of which he had the honour to be a Vice-President. It was interesting to know that as long as 75 years ago the first steps had been taken in that direction. The work of bodies such as the Institution of Railway Signal Engineers was of greater importance than ever, now the railways were faced with competition on all sides.

Dr. Frohne then presented to Mr. Kubale a specially fine copy of Shakespeare's *The Tempest* as a mark of appreciation of the Institution's visit to the Federal Railway. Mr. Kubale acknowledged the kind words spoken by Dr. Frohne, thanked him for the generous hospitality accorded to the party that day, and expressed admiration for the installations inspected earlier.

After lunch the entire party proceeded on a tour of the city and surrounding country, during which tea was provided by the courtesy of Messrs. C. Lorenz A.G., whose Chief Engineer, Dr. Wilhelm Schmitz, spoke of the pleasure this afforded his manage-

ment. Mr. Kubale, in a few words, expressed the party's appreciation of his kindness.

In the evening the Institution's own informal dinner was held at the Heidelberger Schloss, where the chief guest was President Hatje, a member of the Board of Management of the Federal Railway. Among other German guests present was Dr. Rudolf Tetzlaff, publisher of the technical signalling journal, *Signal und Draht*, then celebrating the jubilee of its first number, which appeared in 1906.

The chair was taken by Mr. Kubale, who spoke of the great kindness with which the party had been received which went to renew the contacts they had had with their colleagues in Germany in earlier years. They were happy to do so again and as a sign of their gratitude he asked Dr. Dobmaier to accept an illuminated address, designed and beautifully prepared by a Past President of the Institution, Mr. F. Horler.

President Hatje thanked the Institution for the invitation to attend and said how much his Board appreciated its visit to Germany. He hoped it would greatly strengthen the ties between the railway engineers of the two countries and contribute to the technical and economic improvement of railway operation.

Mr. A. W. Woodbridge, Senior Vice-President, moved a vote of thanks to Mr. V. H. Smith, to Mr. B. Reynolds and the General Purposes Committee, for the excellent work done in organising the visit, which had been an outstanding success in every way, and he thanked also specially the interpreters who had accompanied the party, particularly Fräulein Nonweiler, and Herr Neubert, also Mr. J. B. Heyman, British Railways Representative at Cologne.

The return journey was made by special train to Bingen and Rhine steamer onwards to Coblenz where the "Rheingold" express was taken to the Hook of Holland, London being reached on the morning of May 14th.