As an encouragement to bring out information of this type, *Railway Signaling* invites its readers and others to submit brief articles, each giving in detail an explanation of some unusual case of signaling trouble which was located and corrected. Articles of this character suitable for publication, which are received by the editor before March 1, will be paid for at the rate of $5 each.

Rehabilitating Flooded Signaling

AT THE time of this writing, the Ohio river and its tributaries are at record-high flood stages, inundating extensive mileages of main line railroads and terminals equipped with signal and interlocking facilities. Furthermore, if the volume of rainfall continues at the present rate throughout the spring season, further floods may be expected. Those faced with the problem of rehabilitating flooded signal apparatus might well recall that similar floods devastated numerous eastern roads in March and April last year, and that a series of articles explaining methods used to rehabilitate the signaling was published in the May and June issues. For ready reference, it might be well to summarize here some of the most effective methods developed following the 1936 floods.

Some roads when investigating the damage done by the 1936 floods realized at once that it would not be economical to rehabilitate certain types of the old relays or signals, and, therefore, several hundred new relays and numerous signals were secured on rush orders, thus not only restoring the signaling to service much quicker but also securing modern equipment which would pay for itself by effecting safer and more economical operation.

Aside from the actual loss of apparatus washed away, perhaps the most serious handicap, in returning signaling to service after it has been flooded, is the work required in cleaning the mud and water out of such instruments as relays, circuit controllers, switch machines and rectifiers. The consensus of the men engaged in the rehabilitation work during the spring of 1936 was that an instrument which had been under water for hours or days will not be harmed further by washing out the mud with water. Therefore, the majority of the roads used buckets, streams from a hose and even hot water from a locomotive, to wash mud out of instruments, relay cases, switch fittings and switch machines.

The next problem is to remove the remaining moisture. Air pressure, where available, is effective in this effort. Warm air, as delivered from an ordinary electric hair dryer, acts quickly in drying moisture, and such devices were used extensively, especially on the Eastern Region of the Pennsylvania. In instances where relays are damp but no mud is present, these dryers can be used in the field. The use of alcohol to wash out a relay will remove moisture, this method being used as a temporary measure on one road.

Of course, if a layer of mud has been deposited inside a relay, the only logical procedure is to dismantle it and clean all the parts thoroughly. Following the floods of 1936, several roads set up temporary relay shops in which the relays were given thorough overhauling, insofar as mechanical operation was concerned, on a very fast schedule. Different methods of drying parts and coils were used on the various railroads. The use of ordinary portable sheet-metal cook-stove ovens, especially for baking the coils, seems to have advantages over the use of racks around stoves, for in an oven, the entire coil is subjected to a uniform temperature whereas when hung near a stove, the side toward the stove may get too much heat, which may cause damage. The New Haven, which had a number of car-retarder motors as well as relays to dry out, installed extra steam radiators in a room 11 ft. by 20 ft. so that the temperature in this drying room could be maintained at 190 deg. F. With forced ventilation that cleared evaporated moisture from the room, the relays could be so thoroughly dried that they rang clear in 48 hrs.

Batteries that have been flooded, but not subject to the force of a stream current, can usually be brought back to service readily. On the Western Maryland and on the Lackawanna, primary battery cells were flooded at numerous locations in 1936, but these cells were returned to service when the water was pumped out of the wells or boxes. In some instances, the excess water at the top of the jars was dumped off and new oil applied. Storage batteries, especially the types with sealed glass covers and vent plugs, seemed to go through the flood with but little damage. Any excess water that may get in on top of the electrolyte can be dumped off. Of course, if mud gets into the cells, the entire assembly must be taken apart and cleaned, using new electrolyte.

In spite of the fact that the equipment may have been given the most thorough cleaning possible in the time available, and seems to be operating satisfactorily when re-installed, it may be that some moisture is still present or some slight defects have been overlooked. Consequently, it will be well to watch all of this apparatus very closely. As a safety measure, it might be well to send every flooded relay through the regular repair shops in order that special emphasis may be given to the electrical tests.

Electrical Engineers' Handbook—Electric Power. *Harold Pender, Editor, and William A. Del Mar, associate editor, and 49 contributors. John Wiley & Sons, Inc., New York, 1936. 1300 pages, 709 illustrations; 5⅝ in. by 8⅝ in.; flexible binding; $6.00.*

The Pender-Del Mar handbook on electric power covers the entire field of electrical engineering, with the exception of communication and electronics. These subjects have been removed to a separate volume and are available in a separate book edited by Harold Pender and Knox McIlwain, which sells for $5.00.

The encyclopedic arrangement used in the early editions of this handbook has been abandoned. The material in the new edition is arranged in a sequence more convenient for purpose of study and of gaining a perspective of the field. The change in arrangement and format has necessitated practically a complete revision of all the material. The subjects covered in the electric power handbook include: mathematics, units and symbols; properties of materials; electric circuits and electric lines; resistors, reactors, magnets, measurements and measuring apparatus; principles of electro-chemistry; batteries; direct-current machines; alternating-current machines; transformers; converters and rectifiers; switching, control and protection; power stations and substations; power transmission and distribution; lighting and heating.