that a pit is an entity of an individual cell, and two opposite pits of adjacent cells, hitherto referred to as a single pit, are called a "pit-pair."

Thirteen tables are given showing the occurrence or absence of certain structural characteristics in large numbers of families or genera. Thus one can see at a glance which families have scalariform perforations in the vessels, which genera have tyloses or gum deposits in the vessels or which dicotyledonous genera contain intercellular canals, etc.

Brief mention is made of some woods with anomalous structure, particularly those having phloem included within the xylem.

Only such physical properties as bear on identification are discussed, particularly color, scent, taste and density.

Part II is concerned primarily with the identification of the economic woods of the United States and Canada covering some 80 different kinds of woods. A comprehensive artificial key is presented in which the gross structure, as visible with the naked eye or hand lens, is given in text type, while the histological features visible only with a microscope are given in smaller type. The specific gravity is given for each species, which is a guide as to the relative weight and hardness of the wood.

In addition to the rather detailed or "descriptive" key there are supplementary notes on each species, containing short accounts of the size, distribution and relationships of the trees, and the properties, principal uses and commercial importance of the wood. References to further information are supplied for many of the species, and a general bibliography on wood is given. The text is supplemented by a map of the United States, showing the principal forest regions, and 30 photomicrographs, showing types of wood structure, and 47 text figures.

The reviewer wishes to dissent from the author's use of the terms "early wood" and "late wood" for the inner and outer parts of the annual ring, respectively. To the uninitiated it may not be clear that "early" and "late" refer to the growing season, and he may wonder why some wood should have been formed prematurely while some was tardy. That difficulty is largely removed when the terms spring wood and summer wood are used.

Very little is said about variations that occur in each species of wood, largely because the information does not exist. Wood technologists are recognizing more and more the need of study along that line, since, without knowledge of variation within a species, specific identification is risky or impossible in many cases.

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REPORTS

THE NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

THE New England Intercollegiate Geological Excursion was held on October 12, 13 and 14, at Bates College, in Lewiston, Maine. Dr. Lloyd W. Fisher, head of the department of geology at Bates College, had charge of the trips illustrating minerals, rocks and structures, and was assisted by Dr. Edward H. Perkins, of Colby College, Waterville, Maine, who conducted all the glacial trips. Despite occasional rain, snow and hail and chilling winds, all the trips were run on scheduled time and all localities visited. At the evening meeting held in Carnegie Science Hall, on the Bates Campus, there were 72 people, representing 19 colleges, in attendance. Drs. Perkins and Fisher conducted the discussions relative to the points of interest visited on the trips, and an open forum was held following these discussions. The members of the association sent a telegram of greeting to Dr. Wilbur G. Foye, of Wesleyan University, who was unable to attend the meeting because of illness.

GLACIAL TRIPS

On Friday afternoon Dr. Perkins led his group over the plain of the Little Androscoggin River, and topographic features of the plain and wind-drifted sands were studied. Several underfit streams were examined. It was suggested that the flat floor of the valleys represented the clay level and the valley walls represented the sand, which was more easily eroded. In one case clay was found in the walls. Gravel terraces of Bog Brook were believed to be formed by a rapidly flowing stream between valley walls and ice walls. Disturbed strata in the outer portion of the deposit indicate some movement of the ice. West of Welchville, Dr. Ernst Antevs pointed out till rising from the sand plain. The contact between the sand and the till is believed to represent the upper marine level at an elevation of about 350 feet, corresponding with delta surfaces east of Lewiston. A gravel ridge south of Poland village, near Lower Range Pond, represents either a true esker, or crevasse filling. No definite conclusion was reached.

The party continued southward to the village of Gray, where kame topography was crossed. Gravel and till terraces occur to the north of the village. The feature of greatest interest was the great kettle-hole to the east of Gray. This kettle stands in a broad sand and gravel plain that extends several miles to the south. The plain is formed of stratified materials

and was probably built to the marine limit of 300 feet. There was some discussion as to why no marine clay was found, and it was suggested that the sea was at its upper limit a very short time and that during this time the hole was filled with ice.

The party continued on to Lewiston, studying some marine clays en route. On Saturday morning the glacial party stopped at a pit in Auburn. Evidence here indicated the following: Deposition of cross-bedded sands near the ice front; deformation of the deposits by local ice movements; dropping of masses of till into the sand and gravel. The retreat of the ice was followed by marine deposition, during which several feet of marine clay were laid down. The upper and younger beds were believed to be loess deposited on the exposed surface after the retreat of the sea. The source of the material in the loess was probably the exposed mud-flats left over the valley as the sea receded.

Following the Androscoggin River southeastward, the party noted erosional features. At the village of Durham a stop was made on the elevated kame surface, which seems to be of glacial origin and might have served as a dam, causing the river to swing northward. It was suggested by Goldthwait that the deposits might have been formed in an enclosed basin with ice walls on all sides and built up to the water level of the basin. This level might or might not agree with that of the sea outside. If surrounding ice was tight it might maintain its own water level some distance above sea level of the time.

Only a brief stop was made at the famous kettle-bottom, because of the present "glacial" climate. The opinion seemed to be that the ice-contact margin went all around the kettle-bottom, which allowed the deposit to build up to water level in an ice-locked basin. A block of ice in the center of the basin was responsible for the kettle.

Delta structures south of Sabattus Lake were studied, and a stop was made in a pit near the margin of the deposits where very coarse ice-front deposits were examined. An esker here ends in a complex of kame ridges merging into the delta. Again the question arose as to whether the esker was formed in a tunnel or an open crevasse. Again, as usual, the question was unsettled.

On Saturday afternoon the large gravel deposit just west of Leeds on Maine Highway 100 was visited. The southern slope is too gentle to be an ice contact, and is believed to represent a deposit at a free edge. The northern slope appears to contain a buried esker which projected above the general surface. The deposits showed ice contacts north and east, which are probably deltas. East of the delta the country is rolling and is covered by an unknown thickness of clay, which is exposed in an old brickyard near Leeds Junction. Goldthwait is of the opinion that the ice stagnated in places and was covered with sea water in which clay was deposited. As the ice melted the clay was lowered in an irregular manner, producing hummocky topography. Another theory stated that the clay cover was thin and mantled a buried pre-marine topography, which was reflected in the present surface.

On the road east of Sabattus Lake, another steep-sided gravel plateau was noted. Ice-contact slopes appeared to extend on all sides which are visible from the road. It may represent a delta or an ice-locked deposit. The final stop was made at an elevated gravel mass southeast of Sabattus Lake on Highways 9 and 126. Fresh pits showed cross-bedded sands under well-developed foreset and topset beds. Ice-contact slopes of very coarse material are found on the northwest and northeastern sides of the deposits, while foreset dips down the valley to the south. All agreed that the deposit was a delta built in a bay in the front of an ice tongue which filled the valley to this point.

On Sunday, Dr. Perkins led another group of glacial geologists northward from Lewiston, visiting the typical marine clays of the Kennebec valley near Gardiner; an esker buried by marine clays in the City Pit of Augusta; delta and related deposits in the northern part of the town of Augusta. The delta here is one of a series along the Belgrade esker. Two new cuts showed topsets and foresets dipping toward the delta front. A short trip was made over the esker. A pit in the esker at Horse Point, Belgrade, revealed some marine fossils. In Waterville, stratified gravels and marine clays pass over the top of the esker in the Drummond Avenue pit. The clays are full of fossils, 16 species having been found here. These deposits are without doubt post-esker age and thus represent a clay distinct from that of Horse Point. Esker deposition, subaerial erosion, marine clays resting on the unconformity, gravels and sands, partly wind-blown on the clay, were noted in the Waterville City Pit.

MINERAL, ROCK AND STRUCTURE TRIPS

The Friday morning trip was made to a newly opened granite quarry along the Mechanic Falls-Welchville road. Several small basic dikes show small offsets; one large basic dike appears to have been reopened and reinjected. Faintly perceptible banding in the granite might be due to flow or to weak metamorphism. A coarse pegmatite veinlet yielded some excellent feldspar crystals.

On the return to Lewiston the Keith pegmatite quarry, from which many beautiful clear-colored tourmalines have been extracted, was visited. A

search was made here for radioactive minerals in an effort to secure enough material for an age relationship. Near the basic dike which cuts through the pegmatite the feldspars become more albitic and seem to be more prolific in their gem-bearing nature.

The abandoned Franklin quarry, in Auburn, Maine, shows the pegmatite invading a limy rock, which is conceded to be an equivalent of the Lewiston limestone. Here also is an interesting development of hornblende and tourmaline along the walls of a large fracture and in the rock mass.

The Friday afternoon trip began by making a cursory study of famous old Mt. Apatite, in the town of Auburn. Dr. Fisher pointed out the most interesting features of the quarry, and the party visited practically all the numerous pits in this interesting locality. Of special interest are the very large massive development of lepidolite, the development of large garnets in zones, the baked contacts of the basic dikes in the pegmatite, and the small amount of contact minerals developed in the invaded country rock. Considerable time was spent in picking over the dumps and many interesting and beautiful mineral finds were made.

From Mt. Apatite the party proceeded to the Rapids of the Androscoggin, between Lewiston and Auburn, and here a pegmatite sill, intruded into metamorphics, forms the lip of the falls; a basic dike shows twisting and faulting; numerous well-developed potholes were found in the gneiss and pegmatite alike.

The next stop was made at the City Quarry, in Lewiston, where the Lewiston limestone, slightly metamorphosed, is invaded by pegmatite dikes and by at least 16 melanocratic dikes. Some of the latter show chilled and baked contacts and others do not. One or two of the basic dikes show slight displacement. The age of these dikes is in question, and again attempts were made to find samples that might be used for age determinations. In the Lewiston limestone, Dr. Fisher pointed out numerous bands of biotitic and hornblendic material, which represents schistose and gneissoid material formed from impure bands of limestone. It was further pointed out that the problem of the age of the Lewiston limestone, the invading pegmatites and tourmaline granites and the melanocratic dikes will probably have to be settled from the relationships between these rocks in the City Quarry. The melanocratic dikes are the youngest and might be Triassic or Keweenawan, but it was also suggested that, since igneous activity occurred in Maine in Silurian and Devonian time, these dikes might be connected with that activity. If the dikes are Triassic, the limestone might range anywhere from Grenville to Carboniferous; if Keweenawan, the limestone would have to be Grenville, at least, pre-Cambrian.

Leaving the City Quarry, the party was shown outcrops whose structure is in question. One of these, at the Wiseman farm, east of Lewiston, shows the metamorphosed equivalent of the Lewiston limestone, the Thorncrag member, slightly folded. It was conceded by some to represent a push by the invading pegmatite; others believed it to represent actual folding. Nearby an overturned anticline was noted in a roadside exposure. A slight hail and snow storm disturbed the party here, and the return to Lewiston was begun.

On Saturday morning the trip was conducted in such a manner as to show a cross section of rock types. A coarse-grained granite was visited on Hedgehog Hill, northeast of Lewiston, and southeast of it a granite gneiss was studied. A short distance from the latter is a gneiss, definitely of sedimentary origin. The theory was advanced that the gneiss between the one of sedimentary origin and the granite represents an assimilated country rock which was later metamorphosed.

Going westward from the latter area an interesting pegmatite was studied. It showed large feldspar plates that are apparently well oriented, as though by pressure.

Unaltered limestone was studied near Sabattus, about six miles from the type locality in the City Quarry. Southeastward of Sabattus, along Route 9 toward Webster, an interesting outcrop shows metamorphosed limestone now occurring either as a gneiss with a strong development of pyroxenes, and a much more finely laminated metamorphic which can be called a schist. The gneiss is termed the Thorncrag formation, and the schist, the Sabattus schist. Both are members of the Lewiston limestone series, which shows different degrees of metamorphism. Pegmatite lit-par-lit invasions in this outcrop render the problem more difficult. Heavy rain at this particular stop prevented much thorough discussion.

The Sabattus schist at Mann Hill, east of Sabattus, controls the topographic features of the immediate vicinity. It is fractured, and along the fractures coarse-grained granite has been intruded. Some disturbance occurred after the invasion of pegmatite veinlets, for these are faulted and stretched out and broken. From the study made at this point it is believed that there are at least three different stages of pegmatite invasions in the Lewiston area.

The party returned to Lewiston and, meeting with the glacial party, enjoyed the warmth of the fireplace of Thorncrag cabin, where hot coffee was prepared by members of the Bates College Outing Club.

In the afternoon a large group visited the now famous topaz locality—the Fisher mine—near Topsham, and collected numerous attractive specimens. On Sunday six cars of visitors were taken westward

to beyond Hebron, Maine, where collecting was indulged in at the pit formerly operated by the General Electric Company for pollucite.

The name Lewiston limestone was proposed by Dr. Fisher for the limestone occurring at the City Quarry in Lewiston. He also proposed calling two definitely distinguishable metamorphosed phases of it the Thorncrag gneiss and the Sabattus schist. Another member of the series, the Hill Ridge biotite gneiss and schist, was not included in the itinerary. The age of the pegmatites, so common in the area, might be ascertained from the study of included radioactive minerals or from the age of the Hedgehog Hill granite. Dr. O'Connell suggested that the Lewiston series might be more or less analogous to the Inwood limestone, Manhattan schist and Fordham gneiss, but until definite age relationships are established for the Lewiston rocks no definite correlations will be made.

No definite meeting place for next year has been decided on. The group has been invited to visit several localities in New Hampshire and in and around New York and Long Island.

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BATES COLLEGE

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ELECTRICALLY-HEATED SLIDE-RINGING DEVICE

IN preparing permanent slides of material mounted in lacto-phenol or other non-hardening medium, it is customary to use a suitable cement to fix the cover slip firmly to the slide. A satisfactory cement is Noyer's, which consists of 80 per cent. rosin and 20 per cent. anhydrous lanolin and is described in Langeron's "Précis de Microscopie." Ordinarily this cement is applied to the cover slip by means of a small coil of wire which has been heated in the Bunsen flame, dipped in the cement and subsequently applied to the slide. In using this method one tends to overheat the wire coil in an attempt to retain enough of the cement in the coil to deposit a complete ring around the slide with one application. There is, in consequence, uneven heating, frequent burning of the cement and the production of acrid smoke.

It is the purpose of this account to describe briefly an electrical heating device which maintains a constant and satisfactory temperature and greatly facilitates slide ringing by this method.

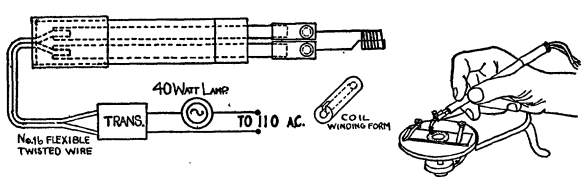

FIG. 1

The device consists of a heating coil held in a convenient handle by which it can be manipulated. The general character can easily be understood from the accompanying illustration. It consists of two insulated brass rods in a fiber tube with No. 16 flexible twisted wire soldered to the rods at one end and the other end bearing set screw connections to which is attached a small heating coil of No. 21 nichrome wire. To make the heating coil, a piece of wire approximately 7 inches in length is wound as follows: A right angle bend is made in the wire at a distance of about 1¼ inches from one end. This is inserted in a brass tube ⅛ inch external diameter and 1/16 inch internal diameter, with a small slot cut in the end of the tube. The long end is fitted into the slot and a coil is wound closely on the outside of the tube until the remaining end is about one inch in length. The coil is then removed from the tube and the two free ends are firmly attached by tightening the set screws. The coil thus wound is compact and the windings are equally spaced. The ends attached at the set screws are then bent at approximately a right angle to facilitate using the device.

The proper temperature is obtained by passing a current of about 5 amperes through the coil, which heats it to a dull red. A convenient source of this is the transformer used for microscope illumination. This transformer, however, with its primary input of 110 volts, 60 cycles, A.C., has an output of 18 amperes at 6 volts which is excessive, but can easily be brought to the proper intensity by placing a 40-Watt lamp in series with the primary of the transformer.

When the device is connected and pressed into the cement, the cement melts easily and enough is retained to deposit a sealing ring of cement around a cover slip of as much as ⅞ inch diameter. For circular slides a turn table has proved very satisfactory. The slides should be cleaned and seepage of the mounting fluid should be avoided. When lacto-phenol is used, this excess can be removed by a cotton swab moistened in 95 per cent. alcohol.

The device has also been found useful in affixing paraffin imbedded material to blocks for sectioning. The material is placed on the paraffin covered top of a block and the coil applied gently to the sides, until the paraffin melts sufficiently to affix the material to the block.

This coil retains sufficient cement to ring a slide with one application and the even heat obtained minimizes the smoke and avoids change in the com-