Union, etc.] during, the Rocky Mountain revolution (''Elements of Geology'').

The reviewer therefore does not hesitate to state that to him the evidence relating to the field relations and stratigraphy, the orogeny and paleogeography, and the invertebrate and vertebrate fossils of the Montana series and the Fox Hills and Lance formations is now well enough in hand to conclude that all are unmistakably of Mesozoic time. Furthermore, as the Lance and Fort Union are continuous formations, have wholly archaic mammal faunas, and are broken by a period of orogeny and lack of deposition from the succeeding Eocene deposits with their wholly different and modernized mammal faunas, the line separating the Mesozoic from the Cenozoic apparently lies between the Fort Union and the Wasatch, and not between the Fox Hills and the Lance. From this conclusion the paleobotanists will of course dissent, but we have now come to the parting of the ways. Our floral brethren will continue to say that the Cenozoic begins with the Lance, but the dominating faunal evidence of the invertebrates and vertebrates, backed as it is by the field relations and the two movements of the Laramide revolution, binds invertebrate paleontologists and geologists together in the conviction that the Lance and the Fort Union are of Mesozoic time. The U. S. Geological Survey should now reverse its former conclusion and adapt itself to the fuller evidence.

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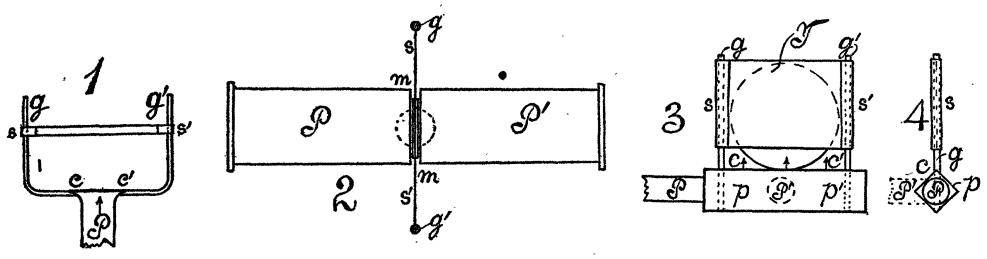
SPECIAL ARTICLES

AN ADJUSTABLE EMBOUCHUER

THE device shown in Fig. 1 was designed to evoke a definite note, fundamental or overtone, from cylindrical tubes, closed at one end or open at both. It consists of a brass tube *P*, pinched down at *cc'*, so as to form a crevice 2 or 3 cm. long and not much more than ½ mm. broad. From this issues a lamina of air striking the strip of thin brass *ss'* about 5 mm. broad. The strip *ss'* which is always to lie in plane of the lamina, is on guides *gg'* of thick copper wire, bent at right angles, as shown, and soldered to the ears of the crevice *cc'*. In proportion as a higher or lower note is to be evoked, *ss'* is placed nearer *cc'* or removed from it; for the nearer *ss'* is to *cc'* the higher the mean pitch of the siffling. For high overtones the adjustment is rather delicate and should be made (preferably) with a micrometer. In Fig. 1, *ss'* slides with slight friction and is moved by the fingers. In use, the apparatus is placed across the end of the pipe with the plane *gcc'g'* normal to the axis. The particular note wanted is obtained by correctly setting *ss'*, which operation sometimes requires patience. The best results are obtained with pipes of the one-foot octave, and of a diameter less than twice the width *cc'*, pipes of about equal width with *cc'* being most satisfactory. From inch gas pipe, two feet long, a whole series of overtones may be evoked in succession. With a less exacting demand for an immediate response, clear notes may be obtained from a great variety of vessels. Thus bottles, deep tumblers and beakers, flat jars (like sardine boxes), truncated cones, thistle tubes and even thimbles respond, often very loudly.

Very disconcerting sounds are often obtained. Thus, for a wide-mouthed cylindrical jar, 3″ in diameter and 6″ high, tapering



down at the top to a mouth 1½" in diameter, the fundamental appears at once (*ss'* across the middle). If now the distance *sc* is decreased, the overtone will appear loudly. It is *not* the fifth above, however, but the *octave*, itself. As the kinematics of the stationary waves are given, the overtone belongs to an original wave of 3/2 longer wave-length than the fundamental.

Figure 3, 4, is another form of blower adapted for wide pipes, made of square brass tubing *pp'*. One edge of this has been filed down until a rift *cc'* may be cut with the fine blade of a knife. The strip *ss'* here advantageously covers the pipe *T* to be tested; or the hands may be used to cover projecting sides of *T*. The form, Fig. 3, with an alternative influx *P'*, may be duplicated, affording two opposed rifts and strips. Tin cups, funnels, etc., as well as long wide tubes respond to it sonorously.

Interference.—This experiment succeeded beautifully with the strip *ss'* of the blower, Fig. 1, placed between two coaxial pipes, *P* and *P'* (Fig. 2), each about 10 cm. long and 2 cm. in diameter (for instance) and closed at the outer end. Either pipe alone sounds vigorously when in position and actuated by the blower. With the two together there is a mere siffling, the wave running from end to end of the (virtually) double closed pipe *PP'*. Nevertheless, there is abundant room at *mm* for the escape of sound; indeed, one pipe, *P*, for instance, may even be placed at right angles to the other, leaving a wide open space, and still almost the whole compression of one pipe is alternatingly absorbed by the other. The experiment is an excellent illustration of the *reversal* of spectrum lines.

The nodes here are respectively dense and rare; *i.e.*, always opposite in the two pipes. Hence, the interference. In the cross pipe used heretofore, the nodes were necessarily identical in sign, and, therefore, gave marked reenforcement. The same will be true if the pipes *P*, *P'* are each open at the further end.

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THE WESTERN DIVISION OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The first Annual Meeting of the new Southwestern Division of the American Association for the Advancement of Science was held in El Paso, Texas, on Thursday, Friday and Saturday, December 2, 3 and 4, 1920. The officers at the meeting, elected at the Organization Meeting in April, 1920, were: President, Dr. Edgar L. Hewett, of Santa Fe; Vice-president and chairman of the Executive Committee, Dr. E. C. Prentiss, El Paso; Secretary-Treasurer, Dr. A. E. Douglass, Tucson. The Executive Committee included also Dr. John D. Clark, Albuquerque, Mr. A. L. Flagg, Phoenix, Professor Fabian Garcia, Mesilla Park, Mr. Arthur Notman, Bisbee, Mr. Robert S. Trumbull, El Paso, Professor Milton Updegraff, Prescott and Dr. Chas. T. Vorhies, Tucson. Dr. D. T. MacDougal was chairman of the organization committee. The affiliated societies participating in this meeting were, The American Association of Engineers, Southwestern District, The Medical and Surgical Association of the Southwest, The New Mexico Archæological Society. The Sante Fe Society of the Archæological Institute, The Mexico Medical Society and the El Paso County Medical Society. The trustees of Temple Mount Sinai loaned their very convenient rooms and auditorium for two days. The El Paso High School did the same for the final day and provided lunch. The Ad Club of El Paso entertained the members at lunch; the El Paso County Medical Society were hosts at a reception and dance at the Toltec Club. Excursions to points of interests were provided.

An important event of the meeting was the session on Friday afternoon in the Mexican City of Juarez. As the members entered the Juarez theater, they were received with the strains of the "Star Spangled Banner," played by a Mexican military band. This was followed by the Mexican National