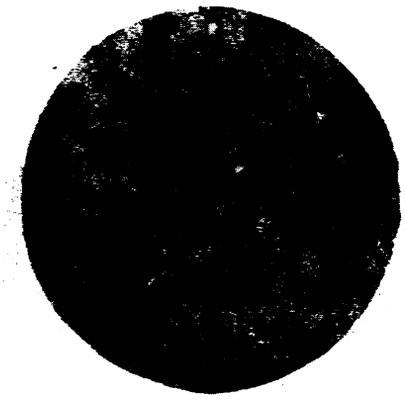

CARRARA

This pattern of crystals as seen through the microscope provided evidence that a suspected art treasure is no fraud.

ARCHAEOLOGY

Italian Tomb Cleared of Being Fraud After 9 Years

AN ITALIAN marble tomb, long suspected by critics of being an art fake palmed off on America, has been proved an authentic treasure, after nine years of scientific testing.

At the Boston Museum of Fine Arts, where the tomb aroused such violent controversy that it was removed from public exhibition, the case is settled.

Reporting its verdict, the Museum calls the tomb a fifteenth century monument of Tuscan workmanship, later restored in minor ways. A beautiful figure of a woman lying with folded hands is a feature of the monument.

Scientific tests included making paper-thin slices of samples from all fourteen pieces of marble in the tomb. These samples were studied under the microscope and compared with similar samples of known kinds of marble. This test, like that of human finger prints, is considered unmistakable. The tomb is of two kinds of marble, the famous Carrara marble and some from Olympia. Chisel marks were also examined by microscope, and ultraviolet tests were made.

The crystalline structure of the marble's surface was also studied, because scientists have learned that old marbles "breathe," that is, take in and give out air. In long years, this process leaves evidence in dark bands on the marble surface, visible through the microscope. This evidence of time and weathering was found on all parts of the tomb except where a new inscription was added, and a few restorations made.

Science News Letter, December 11, 1937

PHYSIOLOGY

Ultra-Speed Movies Capture Vibrations of Vocal Cords

Taken at Rate of 4,000 Frames Per Second With Special Lighting Show Speech at Its Origin

HIGH SPEED motion pictures of the little known vibrations of the human vocal cords, taken at the rate of 4,000 frames a second, were exhibited for the first time publicly at the meetings of the Acoustical Society of America in Ann Arbor, Mich.

The fundamental experiments in the origin of human speech have significance in solving that old, but basic, question of whether it is the cords or the shape of the mouth which predominate in determining speech characteristics.

Engineers D. Herriot and D. W. Farnsworth of the Bell Telephone Laboratories constructed the ingenious experimental arrangement which made possible these pioneer physiological pictures.

The method was to insert, far back in the mouth, a small dental mirror and by it and other mirrors to reflect an intense beam of light on the vocal cords. Light reflected by the cords came back out of the mouth, then through a small hole in one of the mirrors and finally into the special high-speed camera.

So fast is this camera, and so short the exposures for each frame, that it is useless for ordinary photography even out in bright sunlight. A large 2,000 watt bulb overloaded to gain greater brilliance was the light source employed.

Shining and glistening are the saliva-covered cords as they oscillate in speech. Their undulations start from the bottom as they close; then progress upward and finally and suddenly they open again to repeat the process.

Finally the subject, Mr. Farnsworth in this pioneer case, pauses for breath, the cords relax and the opening of the glottis enlarges as he inhales.

Interest of the telephone engineers in the work centers around potential improvements in equipment, for basic knowledge of human speech leads to the design of better apparatus. For the same reason the pictures should have significance for radio and sound motion pictures.

So new are the high speed speech movies that physicians have not yet seen them but they are believed to be of great interest to physiologists and anatomists.

Science News Letter, December 11, 1937

ENGINEERING

Vibrating Concrete Paving Increases Its Strength

SHAKING a concrete road into place, a novel method of road building developed only a short time ago, results in a stronger road with the same amount of material or enables considerable savings of cement, according to the experiences of highway engineers, reported before the Highway Research Board's annual meeting in Washington, D. C.

Giving a road the "shimmies" with a vibrator before the mixture has set enabled Illinois road builders to cut down on the amount of water mixed in with cement and obtain a firmer road as a result, V. L. Glover of the Illinois Department of Public Works informed his colleagues.

A second experiment in which the vibrator was used with a standard cement-water mixture resulted in a road that was 10 per cent. stronger than the ordinary type, he asserted.

The higher the frequency of the vibrator, R. D. Finney, Kansas State Highway Department engineer, declared, the more efficient it is.

A novel freezing-and-thawing test to show how different road-building materials will stand up under extremes of weather conditions was described by Prof. C. H. Scholer of Kansas State College. Since a given weight of ice occupies more space than the same amount of water, water seeping into a rock and

freezing will crack the rock. Prof. Scholer, by his testing method, imitates this condition to see how much of that type of strain a given material can stand.

Beautiful Highways

America's 15,000,000 pleasure-bound drivers, and the 9,000,000 others who make their living on the road, deserve and need highways that are safe and relaxing, it was stated generally at the session of the Joint Committee on Roadside Development.

Telephone poles, unsightly ditches, narrow shoulders, bare slopes attacked by erosion that endangers the road itself were all thoroughly criticized by leading highway engineers from every part of the United States.

Pointing to a photographic exhibition of the type of work that has been done and to what can be further done, H. J. Neale, chairman of the Joint Committee, asserted that these modern streamlined highways will prove cheaper in the long run.

"I don't know whether they will be 20 per cent. or 80 per cent. cheaper because we haven't got suitable figures yet," he declared, "but highways whose sides and shoulders are properly designed cost considerably less for maintenance once the road is built."

Wide shoulders—to allow cars to park well off the road and to remove the hazard represented by the ditch; wayside rests,—to allow the fatigued driver a chance to relax; slopes planted with grass and shrubs,—to prevent erosion from carrying earth and rocks down on to a road cut through a hillock or to prevent erosion from under-cutting the bed of a road raised above the countryside, were among the things urged on the Board by speakers.

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EXPLORATION

Expedition Ready to Secure Specimens From "Lost World"

Unscaled 8,000-Foot Peak Is On Eroded Plateau Of Which Mt. Roraima, Famed by Doyle, Is Also Part

ALMOST ready to poise their airplane for the takeoff, members of the Phelps Venezuelan Expedition at Ciudad Bolivar are whipping equipment into shape for a journey to a "Lost World" not yet on any map, it was reported by the American Museum of Natural History.

Dr. George H. H. Tate and his colleagues will leave from Cuidad Bolivar shortly to scale Mt. Auyantepuy, a "Lost World" discovered only a short while ago by an air-minded prospector flying over the country. The expedition is financed by William H. Phelps of Caracas and sponsored by the American Museum of Natural History.

Situated deep in the Orinoco jungle, one of the least explored regions of the world, Mt. Auyantepuy is a large remnant left when the table-land of which it was once a part was eroded away. The mountain is 8,000 feet high and 300 square miles in area. Two similar mountains, Mt. Duida to the west and Mt. Roraima to the east, were also parts of the same plateau. They were visited by Museum expeditions in 1928 and 1929.

Dr. Tate and his colleagues will bring back specimens of bird and mammal life as well as map the region they are visiting. They plan to reach the base of Mt. Auyantepuy by airplane. The air journey will take two hours as against the two months a similar journey through the jungle would require.

Dr. Tate was a member of the two previous expeditions to the region. Accompanying him this time are William F. Coultas, for years in charge of the Whitney Expedition in the South Pacific; and E. Thomas Gilliard and James A. Dillon of the Museum staff. Mr. Phelps will also accompany the party.

Many new species of bird life were found on Mts. Duida and Roraima and similar forms are expected to be found on the newly found table-land. Mt. Roraima is famous as the original of the late Sir Arthur Conan Doyle's "Lost World."

The table-land is situated near the point at which Venezuela, Brazil and British Guiana come together, in a particularly inaccessible part of South America, much of which still remains to be explored.

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ACOUSTICS

Easier To Talk to Driver Than for Him to Talk Back

THE OLD quips about backseat driving have a strong basis of scientific reality, it was disclosed at the meeting of the Acoustical Society of America.

Studies of the relation between automobile noise and speech intelligibility show that it takes ten times the intensity of speech sounds to carry intelligible conversation back to the backseat occupant than it does for the latter to talk to the hapless driver in front.

Dr. J. C. Steinberg and W. A. Munson of the Bell Telephone Laboratories, New York City, disclosed the studies. Scientists of Electrical Research Products, Inc., made the measurements from which the conclusions were drawn.

Three positions of two occupants in a car were investigated. When seated side by side in front intelligible conversation could be carried on at all speeds up to 60 miles an hour with little trouble. An increase of sound intensity of only two decibels was needed and this can be obtained by raising the voice.

In the test of conversation from backseat driver to the driver, no shouting was needed until 50 miles an hour was reached. Then a two decibel increase was required. At 60 miles an hour a six decibel rise was needed.

However, for the same position of car occupants but for conversation from the front seat to the back it was necessary to raise the voice to 18 decibels to obtain intelligible conversation at 60-mile-an-hour speeds.

Thus the backseat driver has a 12 decibel sound advantage in swift-flying conversations.

Actually what happens (as most people know without knowing why) is that the driver in front soon gives up attempts to carry on this conversation. The point is that a sound intensity of 16 decibels is almost at the limit of human ability to maintain intelligible conversation. Twenty decibels is the limit.

A single word can be shouted, said Dr. Steinberg, with an intensity of 30 decibels and some opera singers can attain an intensity of 40 decibels for a sustained note. But for intelligible conversation 20 decibels is the maximum.

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Developing a Longfellow-Evangeline State Park, in Louisiana, historians have delved into customs and home life of the Acadians, who were immortalized in the poem of Evangeline.