

carrying out the deformation by hammering, two small specimens, each weighing about one gram, were used. The temperature was raised to 900° C. and then lowered in about ten minutes to 695° C. After fifteen minutes the manganese steel rod was carefully placed on one of them, and a smart blow given with a hammer. To neutralise the effect of any slight difference in temperature between the end of the rod and the pieces, the rod was also placed on the other, but no blow was given. The positions of the two pieces were then interchanged. After an interval of ten minutes, the temperature still being 695° C., the above procedure was repeated in varying order about six times, and after a further five minutes the specimens were quenched in water. The deformations produced were comparatively small, not exceeding  $\frac{1}{16}$  of an inch. Repeated experiments all agreed in showing that the lag at Ar 1 was diminished by this slight deformation. The author shows two photomicrographs. In one of these (the hammered specimen) fully half the austenite areas have been converted into pearlite. In the other (an unhammered piece) only one such area has undergone a change.

The same apparatus was used in the deformation by bending experiments. A V-shaped notch,  $\frac{1}{8}$  of an inch deep, was cut in the top of the anvil, and the end

of the manganese steel rod was shaped like a chisel. The metal used was a mild steel strip  $\frac{1}{2}$  in.  $\times$   $\frac{3}{16}$  in.  $\times$   $\frac{1}{16}$  in. This was placed across the notch, heated to 900° C. and cooled to 695° C. After fifteen minutes the rod was placed upon it so that the end was in line with the notch, and two or three light blows were given with the hammer. In this way the strip was bent to an angle of about 60°. After a further five minutes at 695° C. the strip was taken out and quenched. This experiment was made repeatedly, always with the same result. At the bend, as shown in the author's photomicrograph, pearlite was always present, but in the limbs where the metal had not been distorted, the structure consisted almost entirely of ferrite and martensite. A similar but less pronounced effect was produced when strips were bent while being maintained at a temperature of 700° C.

The author states in conclusion that although lag was reduced, it was not completely eliminated by the methods of deformation used, since, in a previous investigation with the same steel, globular pearlite was found to grow between 705° and 708° C. when carbide nuclei were present in the austenite. Both hammering and bending tests, however, agree in showing that the lag at Ar 1 can be appreciably diminished through deformation.

### Medical Education.

THE professional course has grown so full in the training of a medical student that it has become increasingly difficult to cover the ground and secure qualification in a reasonable time. Some years ago this fact raised in an acute form the position of the preliminary examinations in the pure sciences. If these examinations were abolished, or placed outside the professional course, obviously a gain in time would result for abler students. The best account of the matter is to be found in the appendix to the fifth report of the Royal Commission on University Education in London—especially under the evidence of Sir H. Morris, Mr. Flexner, and others. The practice in other countries in regard to the preliminary sciences is also clearly described.

The new regulations of the General Medical Council in regard to student registration presumably indicate the conclusions of that body on the problem. The preliminary sciences are retained, but two of them are placed outside the professional course; at the same time the age of student registration is raised to seventeen years. The examinations in chemistry and physics must be passed *before* registration but *after* the examination in general education. Biology may not be taken until after registration.

The examinations in these preliminary sciences must be conducted or recognised by one of the existing licensing bodies. It remains to be seen what provision the licensing bodies will make for these pre-registration examinations. The Conjoint Board has not yet issued its regulations. Student registration is, of course, at present not legally obligatory,

but the older licensing bodies, such as the Universities of Oxford and Cambridge, usually conform so far as possible to the requirements of the General Medical Council. It is at present unlikely that either Oxford or Cambridge will alter its current practice. Each will continue to conduct its present preliminary examinations and postpone student registration until after they have been passed.

These examinations can all of them now be taken under certain conditions before residence is begun. This comparatively recent concession on the part of these universities leaves their candidates practically unaffected by the new General Medical Council regulations. Boys going to these universities will postpone registration until after passing the preliminary examinations instead of, as at present, registering when they have passed the general education examination. It is not unlikely, however, that both Oxford and Cambridge may extend recognition to biology in their own Higher Certificate examinations—they will inevitably do so some day. This would prevent a hardship which may occur at present to a boy who can only proceed to the university if he wins a scholarship. The university scholarships are open up to nineteen years of age. If a boy waits for these and is unsuccessful, he would have obtained his qualification more quickly by leaving school at seventeen years of age and proceeding straight to a hospital. If he is allowed a certificate for all the preliminary sciences on the Higher Certificate examination, such a boy would lose less time.

### The Chilean Earthquake.

FROM the first accounts which have reached this country, it is evident that one of the world's greatest earthquakes occurred shortly before midnight on November 10-11 off the coast of Chile. As in all such earthquakes, the duration of the shock was considerable—nearly three minutes at Valparaiso and four minutes at Caldera—but it should be remembered that such estimates may include some of the immediately succeeding after-shocks. There can be no doubt, however, as to the great extent of the disturbed

area. Along the coast, the shock was felt from Antofagasta to Valdivia, a distance of 1100 miles. It was felt across the continent at Buenos Ayres, where it was strong enough to stop clocks. As this city is about 900 miles from Coquimbo (which appears to be near the epicentre), the disturbed area must contain more than  $2\frac{1}{2}$  million square miles. The shock is also said to have been felt at Hilo, in Hawaii, but, without further and much stronger evidence, the statement may be discredited. The district over