filament current and plate potential are both provided by means of transformers. The author finds that, operated in this way, the triode tube gives results which compare favourably with those obtained with the usual direct-current method, and that it has the advantage of not requiring a high-voltage generator or battery, while over a limited distance signals may be received with a non-oscillating detector. A more complete account of this work is to appear as a Scientific Paper of the Bureau.

MR. S. J. PEACHEY, lecturer in chemistry at the College of Technology, Manchester, claims to have discovered a process for the cold vulcanisation of rubber. This is applicable not only to rubber in its solid forms, but also to solutions. The final product may be obtained containing no free sulphur. Leather waste, wood-meal, and starch cellulose may be mixed with rubber so as to yield cheap, fully vulcanised products with new properties and great durability. Leather waste and rubber may be converted into a product resembling leather, and at the same time waterproof. No details of the process are given beyond the fact that it employs "two gases which are by-products of several chemical manufacturing processes, and are available at a very low cost." If these claims can be substantiated, it appears that the process should be one of very great technical interest and importance.

FACILITY of manipulation and precision in adjustment are two prime features in X-ray tube stands. They appear to have been carefully considered in the models Mark III. and Mark IV. which we find in Bulletin 255 of Messrs. Watson and Sons, Ltd. In the screen attachment to the latter model there is an arrangement whereby the X-ray tube and the screen move together during vertical examinations. We would suggest that a valuable addition to the illustrations of these models would be the protective devices to be employed with them. It is especially necessary during screening examinations to avoid stray radiation reaching the operator, and the adoption of rigorous protective measures would no doubt become more general if publicity were given to this requirement.

IN the course of an article on Pelton-wheel construction by Mr. Percy Pitman, in *Engineering* for June 25, the author describes the method adopted for improving the jets, which were unsatisfactory in the existing turbine. Experimental nozzles were made in fluid-pressed bronze, and four rustless steel blades, 5 mm. thick, were dovetailed into them so as to lie in axial planes. These blades were ground and highly polished up to a thin knife-edge. A great improvement resulted; the jets were of extraordinary solidity and transparency, the water for about 2 ft. issuing almost like a glass rod. Those interested in the design of Pelton-wheel buckets will find a good deal of useful information in this article; there is but little of practical value in text-books, and the author gives the complete lay-out of the new buckets, and includes copies of the working drawings.

Our Astronomical Column.

AN EASY METHOD OF FINDING LATITUDE.—The *Observatory* for June contains an article by N. Liapin on a method of finding latitude which is interesting and a useful exercise for astronomical students, and requires no other instrument than a watch. The method consists simply in observing the number of seconds between first and last contacts of the sun with the horizon at sunrise or sunset. The formula for solution given by the author is $\cos^2 \text{latitude} = \sin^2(\text{sun's decl.}) + 4(\text{sun's radius})^2/(\text{time interval})^2$, where the radius and time interval must be expressed in the same units. This formula does not take account of the change of sun's decl. in the interval; a correction for this may readily be made.

Five actual determinations by this method are given, the resulting latitude being 10′ from the truth. While a sea horizon is preferable, any straight and level horizon will serve.

INCREASING THE PHOTOGRAPHIC POWER OF TELESCOPES.—In the Proceedings of the U.S. National Academy of Sciences for March Dr. Shapley describes a method of increasing the photographic power of large reflectors for the purpose of photographing extremely faint objects. The faintest stars at present reached by the 60-in. reflector are of magnitudes 20 to 21, and it is believed that the great Hooker telescope will gain about one magnitude over this. Dr. Shapley is of the opinion that this is bordering on the limiting magnitudes in globular clusters, and if one or two fainter magnitudes were available for study, some most important information might be obtained with regard to several questions of stellar and galactic evolution. The method employed is quite simple, consisting essentially in shortening the effective focal length of the telescope by means of a short focus lens placed between the mirror and the plate. The brightness of the image is thus increased, though, of course, a reduction of scale is inevitable. This, however, is immaterial in many sidereal problems. A trial series of exposures with different intensifiers seems to have yielded satisfactory results, and questions relating to globular clusters, the limits of the galactic system, and similar problems appear to be more hopeful of solution.

A NEW SPECTROPYRHELIOMETER AND SOLAR MEASUREMENTS MADE WITH IT.—In No. 378 of the Scientific Papers of the U.S. Bureau of Standards, recently issued, Messrs. W. W. Coblentz and H. Kahler give an account of a new spectropyrheliometer and measurements of the component radiations from the sun and from a quartz-mercury vapour lamp. The spectropyrheliometer consists of a quartz spectrograph and cylindrical condensing lens placed upon an equatorial mounting, thus eliminating the ultra-violet absorption produced in heliostat mirrors. The paper sums up the data given on the relative components of infra-red, visible, and ultra-violet radiation from the sun and from a quartz-mercury arc lamp, also on the gas-filled tungsten lamp, the iron arc, and the carbon arc. In the first appendix methods are given for excluding ultra-violet light from buildings, one of these being the use of a kind of Venetian blind or louvre of wide slats, painted buff to reflect the light into the building, the buff or red paint absorbing the ultra-violet, thus protecting the contents of the building (balloon hangars, etc.) from photochemical action. The second appendix suggests methods for protecting projection lantern films from the heat of the lamp, and a simple method put forward is to provide the water-cell with windows of Corning "heat-absorbing" glass, which is very opaque to infra-red radiation.

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