explanation of this phenomenon. The theory then put forward attributes the ascent of the sap to transpiration from leaves of the tree and the tensile strength or cohesion of the fluid in its capillary tubes.

Another matter of very great general interest was dealt with by Joly when he determined the age of the ocean by estimating the amount of common salt carried to it by the rivers and calculating the length of time that must have elapsed in order that the salt in sea water should have acquired its present concentration.

Sections of various kinds of rock show remarkable little rainbow-colored circles. Joly was the first to prove that these rainbow-like circles or pleo-chroic haloes occur about particles of salts of the rare metals uranium and thorium; metals which are always undergoing decomposition into elements of lower atomic weight. The haloes are due to the bombardment of the substance of the rock by the radio-active particles discharged from the heavy elements. The rate of transformation of uranium and thorium into these radio-active substances being known, it has been possible to calculate the length of time necessary for the formation of the haloes and therefore the age of the rocks.

Joly has been a pioneer in the applications of radio-activity to geological phenomena, *e. g.*, the origin of mountain ranges.

The late Professor Lowell's book on Mars led Jolly to offer a relatively simple explanation of the canals of Schiaparelli. He attributed them to the gravitational effects of small satellites falling into the planet.

Even biological problems have engaged the versatile professor's attention. In a book entitled "The Abundance of Life" he submits a dynamic basis for evolution.

His interest in radio-activity led him at an early date to suggest the insertion of radium into cancers, and recently—in conjunction with Captain William Stevenson, R.A.M.C.—he suggested the use of emanation needles, which he invented, for therapeutic purposes.

Joly has for many years been a keen yachtsman, and recently has devoted much time to problems connected with submarine warfare. He has suggested many applications of modern science to navigation, and especially those dependent upon the principles of synchronous signalling.

In his own university Professor Joly is known as a reformer, being largely responsible for various recent changes. He became secretary to the Academic Council on the death of Professor Edward Dowden, the Shakespearean scholar.

During the rebellion in 1915 he took an active part in the defense of the college. An account from his pen of this episode appeared in *Blackwood's Magazine*. He is a commissioner of Irish Lights. He is warden of the Alexandra College for Women. For many years he has been secretary of the Royal Dublin Society. He is a fellow of the Royal Society. In 1910 he received from the society a royal medal. In 1911 he received a royal medal from the Royal Dublin Society.

Among his many publications are to be noted —"Radio-activity and Geology," "Synchronous Signalling in Navigation," "The Birthtime of the World," and a vast number of contributions to various scientific journals, notably to the *Philosophical Magazine*, of which he has been one of the editors for many years.

WILLIAM JOHN KEEP

WILLIAM JOHN KEEP, consulting engineer for the Michigan Stove Company, manufacturer of testing machines and writer on foundry topics, died on September 30. He was born in 1842, at Oberlin, Ohio, and studied at Oberlin and at Union College, where he was graduated in 1865 with the degree of civil engineer. For several years during his residence in Troy he gave a course of lectures on the steam engine to the senior class of the Rensselaer Polytechnic Institute.

During all his life Mr. Keep was very much interested in experimental tests with cast iron and other metals. In 1885 he discovered the relation between the shrinkage and chemical composition of cast iron and devised the systems of "Keep's Test," which he later named "Mechanical Analysis." This is used largely in the United States and other countries instead of chemical analysis. His

method was devised as the result of many thousands of tests described in numerous papers on the influence of silicon, phosphorus, sulphur and manganese on cast iron, on shrinkage, strength and impact of cast iron, "Keep's Cooling Curves," aluminum, etc.

His most important publication is his book "Cast Iron" (John Wiley and Sons, 1902). He was also author of a large number of scientific papers, most of which are printed in the transactions of the different organizations to which he belonged. At the time of his death he had just finished a paper "Static and Dynamic Tests with Transverse Test Bars," which gives a description of his later experiments and which will be published. Mr. Keep patented many of his devices, one of the most important of which is a system of matchplates for foundry use. His testing machines are well known, also his apparatus for "Mechanical Analysis." He was a member of the American Society of Mechanical Engineers, (vice-pres. 1903–5), American Institute of Mining Engineers, Iron and Steel Institute of Great Britain, International Association for Testing Materials, American Foundrymens Association, Franklin Institute, Detroit Engineering Society (past pres.), fellow of the American Association for the Advancement of Science, honorary member of the Rensselaer Society of Engineers and of the Foundrymen's Association of Philadelphia.

SCIENTIFIC EVENTS

SCIENCE AND INDUSTRY IN TASMANIA

Mr. W. H. Twelvetrees, government geologist in Tasmania, reports to the British Science Guild that the Tasmanian State Committee of Science and Industry has started the discussion of several subjects which can be usefully considered at the present juncture. Small working committees have been formed to deal with the questions of fuel, alcohol, improvement of seeds, tuberculosis in stock, utilization of kelp and Irish blight.

The committee has drawn up a scheme in regard to the study of problems connected with the realization of forest products. The scientific subjects for investigation are particularized as:

1. The production of wood pulp, cellulose, etc., by the disintegration of the main body of the timber.
2. The production of volatile and essential oils by the distillation of the leaves and twigs.
3. The production of a potash fertilizer from the ash obtained from the burning of the leaves and twigs.
4. The production of dyes, tannins, etc., from the various parts of the wood and possibly from the leaves.
5. The production of various distillation products from the waste timber and the conversion of same into higher priced materials for which markets could be found in different parts of the world.
6. The production of building materials from the sawdust and wood after breaking down into pulp; probably after chemical treatment for the removal of various soluble organic materials in the wood, such as lignin, hemicellulose, etc.

The state committee, without neglecting other subjects, has decided to specialize for the present on the forest industry generally. Its investigations are expected to indicate where and how the large timber areas in Tasmania can be improved, and profitable industries initiated. The committee has urged the Commonwealth Advisory Council to call delegates of the various state committees together so as to coordinate the work of carrying out a general scheme, but the council being only a provisional institution is of opinion that general research on forest products had better wait till a forest products laboratory is established under the permanent institute. In the meantime, specific research will be supported by grants-in-aid.

The production of electrolytic zinc by means of current supplied by the state hydro-electric installation is proceeding satisfactorily at Risdon, near Hobart. The chairman of the company announces that the establishment of this industry in Tasmania has been owing to a desire to prove the application of the electrolytic process to Australian ores and concentrates for the production of munition zinc,