

as necessary. Taylor suggests that the sudden increase of consumption at high speeds is due to change from boundary to fluid film conditions, but Taub ascribes it to ring flutter.

The problem with internal combustion engine bearings is temperature rise. White-metals lose fatigue strength rapidly with increase of temperature (Macnaughtan, Williams), and consequently crack in service unless the temperature can be kept down. Williams gives results of actual temperature measurements in the bearings of an engine, showing the increase with increase of speed and inlet oil temperature, and decrease with increase of oil flow. Neave and Sallitt review the various copper-bearing alloys, including lead bronze, which is often used as a substitute for white-metal under high-duty conditions. Mickelsen suggests that, in view of the importance of cooling, it might be possible to lubricate the bearings with water or a water-oil mixture.

Several papers deal with filtration and oil purification by various types of apparatus, including de Langen's magnetic filter for removing iron particles. The importance of removing the fine particles which get into the clearance spaces of bearings is being realized, though it is difficult to achieve this with a filter of reasonable size.

RECIPROCATING STEAM ENGINES

Turning to the subject of the lubrication of reciprocating steam engines, the French and German State railways consider that various grades of superheated cylinder oil are desirable according to the degree of superheat in the cylinder, whereas Canadian National and English railways use only one grade; the majority favour compounded oils, the decomposition products of the fatty oil being thought to form stable and resistant boundary films. The oil is now supplied by pump instead of by a hydrostatic system, but there is some difference of opinion between the English and French railways as to the part of the stroke at which it is best to supply the oil.

In marine practice, according to Freeman, superheated steam valves, pistons and liners are lubricated by mechanical lubricators feeding into the steam pipe or round the high-pressure liners. Auld and Nicholson deal with oil circulation systems, and the changes that may occur in the oil. Nicholson emphasizes the advantages of a small amount of oil of the correct type properly applied; overfeeding may result in deposits in the cylinders and steam chests.

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[To be continued.]

Adult Education in the United States

ADULT education has been much discussed of late, especially from the point of view of education for citizenship in a democracy. This is a point of view now very widely canvassed in America, having found an enthusiastic advocate in Dr. J. W. Studebaker, the United States Federal Commissioner of Education. A year ago his bulletin "Education for Democracy: Public Affairs Forums" was noticed in these columns, and an appreciation of the 'Forum' system, based on six weeks' personal participation, by the secretary of the British Institute of Adult Education, was published in Bulletin No. VII of the World Association for Adult Education. The Forums are organized within the framework of the public school system under the control of the local education authority and are conducted by expert leaders using varying techniques according to the size and composition of the membership. Addressing the National Education Association last February on "Crucial Issues in Education" (Pamphlet No. 74. Superintendent of Documents, Washington. Pp. 20. Price 5 cents), Dr. Studebaker announced that nineteen public forum demonstration centres, officially sponsored by him and financed, as a temporary measure, with federal funds, were operating in as many States. In the preceding five months more than 350,000 people had attended 3,854 forum meetings.

Closely associated with the public affairs forums is the Commissioner's educational radio service, exemplified by a series of thirteen half-hour dramatic items broadcast on Monday evenings at 10.30, having as their theme, under the title "Let freedom ring", the "long struggle for the rights and liberties set forth in the Bill of Rights of the Constitution of the United States". The Commissioner stated that his office had received in seven months, in connexion with this radio service, 250,000 communications from

radio listeners. A radio script exchange service has been organized, moreover, and "hundreds of student groups are adapting and rewriting these radio scripts for their own productions", in association with dramatic art and social science classes and radio workshops. The Commissioner announced that he had officially made a request for the reservation in Washington of certain high-frequency wave-lengths for the exclusive use of local educational agencies and for the free discussion of civic affairs.

The address terminated on a note of urgency: "There is no time to lose. These programmes for popular enlightenment in the protection of popular self-government must be promoted in every State and community. I leave this crucial issue upon your conscience." The issue in question, arising out of the conflict between dictatorship and democracy, "a major conflict which is swiftly reaching the stage of a crisis throughout the world" is elsewhere phrased as "What more can education do to undergird American democracy".

One of the speakers at a discussion on adult education in the Education Section of the British Association at the recent meeting in Nottingham suggested that education unrelated to a specific social ideal is, in our day, an impossibility, that real education must be propagandist, aiming *either* at assisting to maintain stability *or* at preparing for change, and that adult education, to be a live force, must support "the organized working-class movement". Dr. Studebaker's adult education policy is frankly propagandist but exposes the fallacy of representing the aims of stability and change as mutually exclusive. He defines education's social ideal as a society where the majority will is law and in which the right and privilege of the minority to advocate a change are protected.