

tated to place carnotite, which at most carries 60 per cent. of uranium, before the pure uranium mineral pitchblende, of which considerable deposits are known to exist both at St. Joachimsthal and in Cornwall, as well as in other countries.

Doubtless the bulk of the present supply of radium has been won from Colorado carnotite ores, but the discovery of radium, all the pioneer work on its separation, and the whole of our first supplies of the salts came from pitchblende. When the present abnormal conditions due to the war have passed, work upon uraninite, both in Bohemia and Cornwall, now practically suspended, will probably become considerable.

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The Growth of Conifers.

My friend, Mr. D. M. Andrews, has communicated to me an observation which seems to deserve comment. At the Government nursery near Monument, Colorado, at an altitude of 7000 ft., there are two beds of two-year-old seedlings of Engelmann spruce (*Picea Engelmannii*), a common tree of the Rocky Mountains. Each lot is shown to be hardy in the locality, having passed a winter in the open, protected only by a covering of oak branches. The seedlings in one bed, raised from seed gathered in the Pike's Peak, Colorado, region, were, when examined, about 2½ in. high, and had matured their buds and ceased growing for the year in the latter part of August. The seedlings in the other bed, from Arizona seed planted at the same time, were about 4 in. high, and had not yet completed their growth for the year. The Arizona seedlings were green, those from Colorado strongly bluish. Seeking an explanation for this difference, it appears probable that the Colorado trees became adapted to a more severe climate during the waning of the last glacial period, and have not yet lost the physiological characters appropriate to past conditions. The Arizona trees, the ancestors of which lived in a milder, more southern region, did not develop such adaptations, and now that our climate has changed they are actually better fitted for Colorado conditions than trees of Colorado ancestry.

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December 29, 1917.

THE OUTLOOK IN FRENCH AGRICULTURE.

THE *Revue Scientifique* for September 22 contains a report on the position and prospects of French agriculture presented by M. Louis Mangin, of the Académie des Sciences, to the National Council of the Ligue Française on behalf of the Committee on Economic Organisation of that body. The position revealed is far from reassuring. Wheat production has fallen to barely 70 per cent. of the pre-war crop, potatoes to 80 per cent., wine to 65 per cent., and sugar-beet to little more than 30 per cent. The situation as regards live stock shows the same disquieting features. Practically 20 per cent. of the pre-war head of cattle fell into the hands of the enemy, and ill-devised measures taken to secure the meat supply in the early days of the war further seriously accentuated the shrinkage. Although the cattle position from the point of view of numbers has since been substantially improved, the proportion of young stock is so

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great that substantial relief of the meat stringency cannot be expected from home resources for a considerable time. The decline in numbers of sheep which had set in long before the war has been greatly accentuated. Pigs also show a decline of 38 per cent. since the end of 1913. No reference is made to the position as regards milk production. A survey of the forest area completes the tale of depleted resources, something like one-eighth of this area having been already denuded, with but little provision for its replacement.

Many suggestions are put forward for the relief of the present situation and for the future restoration and strengthening of French agriculture. The claims of rice as a diluent of wheaten flour are strongly urged in view of the large supplies available in the Asiatic colonies. To overcome the difficulties of shortage of manual labour on the land, the organisation of supplies of African and yellow labour is suggested, whilst further relief could be obtained by a more active policy with reference to the production and use of motor tractors and farm machinery in general. The example of England in placing this manufacture under the same control as that of munitions of war is warmly commended. Consolidation of estates is urgently necessary and should be accompanied by a revision of the register of lands. The price of corn should be left sufficiently free to rise to encourage production, whilst at the same time the rise in the price of bread should be restricted by all appropriate means. It is suggested that these two apparently irreconcilable objects can be effectively attained through the establishment of municipal bread bureaux, which should subsidise or tax the bakers according to the fluctuations in the price of corn. This expedient was successfully resorted to during the Crimean War.

It is urged that the home production of manures should be fostered by using every measure to increase the output of sulphate of ammonia, by developing the synthetic manufacture of nitrates and ammonia from the atmosphere, and by increasing the production of superphosphate, all of which industries, it is urged, should have the same privileges as munition factories. To secure increased crops arrangements should be made for free distribution of manures to small cultivators.

Measures must be taken for restoring the head of live stock. To this end restrictions must be placed upon slaughter of home stock; the colonial resources of Madagascar and Africa must be drawn upon for meat, to be prepared there in frozen or otherwise preserved condition in order to reduce costs of transport. For the same reason abattoirs and refrigerating plants should be established in the home meat-producing districts, whereby cheaper production and reduction in the number of middlemen would be secured. The strong prejudice of the people against refrigerated or preserved meat must be broken down, and much could be done in this direction by the use of such products throughout the Army and Navy.