

Registered 20.6.23

ZOOLOGICAL PROBLEMS.

PROFESSOR H. JOHNSTON'S ADDRESS.

At the University on Tuesday night Professor Harvey Johnston delivered, to a large audience, the first of a series of three illustrated lectures, entitled "Zoological problems in connection with Australian primary industries." The other two lectures will be delivered on June 19 and July 3.

Professor Johnston, in opening his lecture, explained that all prickly pears belonged to the cactaceous family of plants, and were all natives of America. The numerous species which occurred naturalized in Australia to-day had been introduced on different occasions, some at the time of the first settlement in 1788 by Capt. Phillip, who obtained his material when his ship called at Rio Janeiro. The first serious centre of invasion was in the upper Hunter district, New South Wales. Plants had been distributed previously to a number of centres in southern Queensland, in order that they might be planted out as stock fodder in times of drought. Thus the plant was distributed to the Darling Downs, whence it was carried to many other parts of Queensland. From those various centres it was distributed partly by human agency, but chiefly by flood waters, rivers, cattle, and certain birds. It was noteworthy that when fruits were eaten by animals and birds, the seeds, owing to their very hard coats, passed through them unharmed, and were in a condition for ready germination. The invaded area was now estimated to be between 30 and 40 million acres in Queensland and between five and six million acres in New South Wales. In the former State the annual increase was said to be about one million acres, while in New South Wales it was put down at 5 per cent. The infested areas were mainly in those regions which possessed a rainfall of 20 to 35 points annually, and in which most of the rain fell during the summer. On those grounds he concluded there was little likelihood of prickly pear ever becoming established in South Australia or the south-eastern portion of the continent to such an extent as to constitute a pest. He predicted its further spread in New South Wales and Queensland—into those regions with a rainfall of about 15 in. during summer. The losses due to the presence of the pest were hard to estimate, but in New South Wales it was stated several years ago that the State's loss was over £500,000 through the diminution in value of the land and its sheep-rearing capacity. Approximately £1,000,000 had been spent in Queensland by pastoralists and agriculturists in keeping their land clear. That amount did not include any money expended on selections or holdings forfeited during each year. Neither did it include the losses to the State in the way of depreciation of land, which was understood to average from £3 to £10 an acre, and which, through not being freed from prickly pear, was regarded as being worth about 1/6 an acre on the average. Vast areas had no value at all. In fact, the purchase price of large areas in Queensland was even at present set down as nil, as the cost of clearing was often considerably greater than the value. For many years bonuses up to £4 an acre had been offered by the Government to assist in clearing the land, but that was seldom availed of.

Continuing, Professor Johnston dealt with the losses due to land being thrown out of the agricultural and pastoral industries, and the effect on closer settlement. It was possible, he said, the present cottongrowing boom in Queensland might result in the clearing of some of the more likely infested areas owing to the enhanced land values for that particular purpose. He gave a brief survey of the attempts to control the menace by administrative measures, mechanical means, chemical methods, and by its utilization as cattle fodder, material for paper pulp making, and alcohol production. The main portion of his address dealt with the attempts at biological control of the pest—that was the attempt to make use of those animals, including insects, and diseases which were known to be restricted to prickly pear, and which were known in their native homes in America to cause considerable damage to the plant. The fact that prickly pear when introduced to Australia was free from such organisms which controlled its spread had been largely instrumental in bringing about the prickly pear problem. In 1912-14 the Queensland Government sent abroad a prickly pear travelling commission consisting of the lecturer and Mr. H. Tryon, the Government entomologist, to investigate possible biological control. That commission discovered certain insects, called wild

cochineal insects, in Ceylon and northern India, where they had practically eliminated one kind of prickly pear but had not attacked any other kind. That bacterial was sent to Australia, and some to South Africa. In both countries the liberation of the progeny of those insects had led to the utter destruction of a particular species of prickly pear. That outstanding success caused the Institute of Science and Industry to look favourably on the remaining recommendations of the commission regarding the introduction of certain specified insects. Eventually the Commonwealth Government and those of New South Wales and Queensland fell into line, and provided the necessary funds for investigation, placing the administration of the fund in the hands of the Commonwealth Prickly Pear Board, which was at present under the Chairmanship of Mr. G. H. Knibbs, C.M.G. The scientific portion of the work was entrusted to the lecturer, the University in Queensland having seconded him for the duty. He again visited North and South America with some of the members of his staff, and arranged for the collection and breeding up of the desired insects, so that they might be raised in Australia free from parasites, to carry out their destructive influences on the prickly pear. The plan of campaign called for the utilization of insects which attacked various parts of plants. Some literally ate the tissues of the plant, including the fruit, and roots. Others fed within the plant tissues, and thus destroyed them, while another kind lived on the juices, thus sickening, or even killing parts of the plants. Some fed exclusively on new growth, thereby preventing a further development of the plant. Some also attacked the developing seeds, and frustrated the production of fruit, and other insects were found to be capable of acting as transmitting agents to some fungoid and bacterial diseases which were also introduced. The main Australian object was carried out at the Prickly Pear Board's Laboratory at Sherwood, near Brisbane, and subsidiary laboratories in the north-west of New South Wales and Central Queensland.

The result of the work to date, proceeded the speaker, was that there had been established in Australia a group of prickly pear insects capable of attacking different parts of the plant, so that their combined activities were almost certain to have a very marked effect on the spread of the prickly pear once the numbers of such insects became sufficiently great for liberation to take place. It must not be forgotten, said the lecturer, that the prickly pear had had at least 60 years, if not a century's, start on the scientists of Australia. Therefore some time would be necessary before the introduced insects could be expected to make their presence felt, although the fact should not be overlooked that in the space of a few short years one introduced insect controlled one of the several kinds of prickly pear growing in Australia.

Professor Johnston illustrated his lecture with lantern slides, showing many kinds of prickly pear and views of the affected parts in Australia.

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PRICKLY PEAR.

ITS SPREAD IN AUSTRALIA.

LECTURE BY PROFESSOR JOHNSTON

The extent of the invasion of Australia by the prickly pear, its effect on pastoral and agricultural industries, and what is being done to control the pest, were explained by Professor Harvey Johnston at the University on Tuesday evening, when he delivered the first of his series of three lectures on "Zoological problems in connection with Australian primary industries." The lecturer illustrated his address with a large number of lantern slides, and the audience found it most instructive.

Dr. Johnston pointed out that all prickly pears belonged to the cactaceous family of plants, which were natives of America. The many species naturalized in Australia had been introduced on different occasions, some at the time of the first settlement in 1788 by Captain Phillip, who obtained his material when his ship called at Rio Janeiro. The first serious centre of invasion was in the Upper Hunter district, New South Wales. Plants had been distributed previously to a number of centres in Southern Queensland in order that they might be planted out as stock fodder at times of drought. Thus

the plant was distributed to the Darling Downs, whence it was carried to many other parts of Queensland. From various centres it was distributed partly by human agency, but chiefly by flood waters, rivers, cattle, and certain birds. It was noteworthy that when the fruit was eaten by animals and birds the seeds, owing to their hard coats, passed through them unharmed and were then ready for germination. The invaded area was now estimated to be between 30 and 40 million acres in Queensland, and between five and six million acres in New South Wales. In the former State the annual increase was said to be about one million acres, and in New South Wales it was put down at five per cent. The infested areas were mainly in those regions which possessed a rainfall of 20 to 35 inches annually, and in which most of the rain fell during the summer. For this reason there was little likelihood of prickly pear ever becoming established in South Australia, or the south-eastern portion of the continent, to such an extent as to constitute a pest. He predicted its further spread in New South Wales and Queensland—into those regions with a rainfall of about 15 inches during summer.

The losses due to the presence of the pest, said Professor Johnston, were hard to estimate, but in New South Wales it was stated several years ago that the State's loss was over £500,000 through the diminution in value of the land and its sheep-rearing capacity. Approximately £1,000,000 had been spent in Queensland by pastoralists and agriculturists in keeping their land clear. That did not include any money expended on selections or holdings forfeited. Neither did it include the losses to the State in the way of depreciation of land, which was understood to average from £3 to £10 an acre. Vast areas now had no value at all. In fact, the purchase price of large areas in Queensland was set down as nil, as the cost of clearing was often considerably greater than the value. For many years bonuses up to £4 an acre had been offered by the Government to assist in clearing the land, but that was seldom availed of.

Professor Johnston also dealt with the losses due to land being thrown out of the agricultural and pastoral industries, and the effect on closer settlement. It was possible, he said, that the present cotton-growing boom in Queensland might result in the clearing of some of the infested areas. He gave a brief survey of the attempts to control the menace by administrative measures, mechanical means, chemical methods, and by its utilization as cattle fodder, material for paper pulp making, and alcohol production. The main portion of his address dealt with the attempts at biological control of the pest— attempts to make use of animals (including insects), and of diseases which were known to be restricted to prickly pear, and which in their native homes in America caused considerable damage to the plant. The fact that prickly pear when introduced to Australia was free from such organisms

which controlled its spread had been largely instrumental in bringing about the prickly pear problem.

The Queensland Government in 1912-14 sent abroad a prickly pear travelling commission, consisting of the lecturer and Mr. H. Tryon, the Government Entomologist, to investigate possible biological control. That Commission discovered wild cochineal insects in Ceylon and Northern India, where they had practically eliminated one kind of prickly pear, but had not attacked any other kind. They were sent to Australia and some to South Africa. In both countries the liberation of the progeny of those insects had led to the utter destruction of a particular species of prickly pear. This outstanding success caused the Institute of Science and Industry to look favourably on the remaining recommendations of the Commission regarding the introduction of certain specified insects. Eventually the Commonwealth Government, and the Governments of New South Wales and Queensland, fell into line, and provided a fund for investigation, placing its administration in the hands of the Commonwealth Prickly Pear Board, which was at present under the chairmanship of Sir George Knibbs. The scientific portion of the work was entrusted to the lecturer, the University in Queensland having seconded him for the duty. He again visited North and South America with some of the members of his staff, and arranged for the collection and breeding up of the desired insects, so that they might be raised in Australia free from parasites, to carry out their destructive influences on the prickly pear. The plan of campaign called for the utilization of insects which attacked various parts of plants. Some literally ate the tissues of the plant, including the fruit and roots. Others fed within the plant tissues and thus destroyed them.

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At the Cambridge University last week the degree of Doctor of Philosophy was conferred upon Mr. W. W. Hurst, B.Sc., a graduate of the Adelaide University. Dr. Hurst received his early education at Houghton, and proceeded from there to the Adelaide High School. At the end of 1913 he obtained honours in the higher public examination, and gained a Government scholarship for the Adelaide University. Specializing in mathematics and chemistry he secured his B.Sc. degree in 1916, and obtained honours in chemistry the following year. From 1917 to 1919 he held the post of lecturer and demonstrator in



DR. W. W. HURST, B.Sc.

physics at the University under Professor Kerr Grant. In 1920 he went to Cambridge, entering Jesus College as a research student in chemistry. After three years of original research he has been successful in obtaining his degree of Doctor of Philosophy. Dr. Hurst is a son of Mr. R. M. Hurst, of Paracombe, and in 1919 married Miss Audrey Morris, a daughter of Mrs. C. R. Morris, of Unley Park. Dr. Hurst will pay a visit to South Australia shortly, and is to leave England on July 12.

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Mr. S. C. G. Wright, who was recently admitted to the Bar, has commenced practice as a solicitor and barrister at Morialta Chambers.