The very hungry caterpillar

Document study for secondary students

In 1925 in Australia, prickly pear invaded Queensland and New South Wales. Over 25 million hectares of land were infested. The answer came in the form of a small South American caterpillar – *cactoblastis cactorium*. By 1931 it had eaten its way to success. Cactoblastis was clearly very effective. But biological control of pests also reminds us of biological disasters like the cane toad. Is it worth the risk?

Investigation
Examine the documents and describe four methods of prickly pear eradication. Use the documents to describe how you would have eradicated the pear. Discuss the strengths and weaknesses of your approach.

Reflection
Taking into consideration new technologies, discuss what other methods or solutions are available today. Consider the short and long-term economic, environmental and social ramifications of your choice.

This task can take the form of an in-class discussion, small-group or individual project.

Extension
Compare the introduction of the *cactoblastis cactorium* with the introduction of the cane toad. Discuss some of the long-term ramifications of introducing a biological control. Can the risk of importing a biological control ever be justified?

Today the prickly pear is being farmed in parts of southwest Sydney. The fruit tastes like a cross between a peach and mango. Do you think this could have been one potential solution to the pear problem? How do you think it might have been marketed back in the 1920s?
Photograph of prickly pear before Cactoblastis attack
In a recent issue we published information supplied by Mr. L. Hodway, C.M.G., the Governor botanist, in reply to questions by a resident in the Channel district, as to material available in Australia for the manufacture of paper. Our correspondent has asked for further information on certain points, and, in reply, Mr. Hodway has kindly sent the following publication:—

“With regard to your correspondent’s letter asking whether spirit suitable for internal combustion can be made from the feathery shoots of prickly pear, and, then, whether the remaining Thorns from prickly pear cannot be used to assist in the production of paper fuel, Mr. Jean Wallis has been employed for some years by the Queensland Government at a high salary for the sole purpose of handling the prickly pear fuel. We may be quite sure that your correspondent is fully aware of the work carried out by Mr. Wallis under the advice of the Queensland Government. He will find them a very live lady, who will well appreciate the knowledge we may place at their disposal.”

Our recent note on the spread of prickly pear in Queensland stated that 30,000,000 acres are now overrun with the pest, has called forth a suggestion from a correspondent which may or may not be original, but which appears to us to be worthy of consideration. Mr. A. G. Nuthnagin, Narraway, Ennerdale, writes as follows:—

“Do you know if steam rollers have been used to destroy the pear? I suppose there is much of the land almost level, where a heavy roller could be used, and the crushed mass would surely be useful if ploughed in with lime disc ploughs, especially for heavy soils.

An ordinary municipal roller would not be suitable for rough work of the kind indicated, but the large rollers that are used in the mines for breaking down the scrub would at least come to no harm. But our correspondent’s suggestion calls upon visions of the reputation ‘‘fright’’ that are doing such execution in Flanders. Some adaptation of the ‘‘Gautier’’ tractor should give us a machine that would roll down, chop up and plough under the succulent stuff in one act.

At the conclusion of the war the Queensland Government may even be able to secure a few of these war machines, and turn them, if not into pansies, then something not unlike it.

And what an ideal job to give the returned soldiers! Let them attack the prickly pear with the same vigor as they did the goose bilemace, and, having rid the land of the pest, occupy it themselves.

An ingenious American has been making the attempt with poison gas, but the results do not appear to have come up to expectations.

It would be strange if regression were bad to another war device for the same purpose. To clear the whole invaded area—territory as large as 425,000 square miles—within a reasonably gradual period by these means would be impossible, but not to clear it bit by bit for settlement

The experiments initiated by the Queensland Government to test the feeding value of prickly pear as a fodder are bearing some definite results. An area in the dry west was set aside, and acacia and bulnesia were then introduced for the purpose of feeding stock or in part on prickly pear. The experiments have been conducted on a most comprehensive scale, and recently some of the beasts were killed under veterinary supervision for the purpose of observing the effects of the use of pear as fodder. The results have not been announced, but it is said that they will form a good basis for the future and throw much light on this vexed question.”

Prickly Pear Destruction

Experiments in prickly pear destruction are still being conducted by the Department of Agriculture at Wos Wos, Gresailles, and Logan. An area of 200 acres has been set aside for the purpose of feeding stock or in part on prickly pear. The experiments have been conducted on a most comprehensive scale, and recently some of the beasts were killed under veterinary supervision for the purpose of observing the effects of the use of pear as fodder. The results have not been announced, but it is said that they will form a good basis for the future and throw much light on this vexed question.
Sir Albert Gould.

Dear Sir,

With reference to our interview re “Prickly Pear country. I have the honour to lay the conclusions I have come to before you.

Thousands of acres of the best Downs country in Queensland (land which is worth from $3 to $5 an acre) close to important centres is so thickly infested with pear that it is impenetrable to man or beast. This land is flat and free from large timber and suitable in every other way for farming.

Every attempt to touch this country has completely failed. The question of crushing the pear with tanks has been brought up before the New South Wales Lands Department and been turned down utterly, owing to the expense of operating the tanks etc.

Having seen a great deal of the working of tanks, and been engaged for some years with high powered internal combustion engines, I beg to differ from the conclusions arrived at.

Firstly, a tank can be worked by an expert and another man. Secondly with kerosene instead of petrol the cost can be greatly reduced. Thirdly, when the pear is crushed, the clearing up of the land becomes quite feasible.

The land to be dealt with is so rich (some of the best in Queensland) that the men employed in the initial work would gladly take it up, if sure of some assistance, such as Australia is freely offering to returned soldiers.

Co-operation with the use of Light Agricultural Tractors might be encouraged.

The labour to be employed would be that of returned soldiers and would fit in with repatriation.

Tanks can be had as they are now being scrapped and would freely be given to any colony asking for them.

A squadron of tanks would be necessary and a repair shop and a few mechanics.

The rest of the labour would consist of returned country men who have now to be supported in idleness till they can be placed on the land.

That the tanks can do the work is unquestioned. That the land is suitable for closer settlement is also admitted.

I acknowledge that the land considered by the N.S.W. Land Boards about Scenic and district is unsuitable for tanks and to deal with in this way would be unprofitable. The land is not impenetrable and can be dealt with otherwise if considered worth it.

The rich black soil country about Toowoomba and Dalby is quite another matter, and would be ideal for tank work, being level, without heavy timber, extremely rich and very suitable for the small settler. It is impenetrable and present with prickly pear and absolutely given up to it.

Queensland must be prepared to spend millions on the destruction of Prickly Pear and to my mind this is the
psychological moment to attack it.

Without closer settlement to clear up and keep the land free any method of destruction would be futile.

While poison may be useful in clearing up small rough corners any attempts to deal with large tracts of impenetrable country in this way is out of the question.

I myself am going to England next month and would gladly assist the Government in any way.

On being demobilized and returning to Australia, I am prepared to take up country and demonstrate the feasibility of this scheme, and know many others who would join me.

I have the honour to remain,
Yours faithfully,
(SGD.) A. PENTLAND, M.C., D.F.C.
Capt. Royal Air Force.
Dear Sir,

I have just received from Mr. H. S. Baldwin, of Delungra, New South Wales, a letter which reads as follows:

"Having frequently read during the course of the war, of the instrument used by the Germans for throwing liquid fire, called, I believe, a "flammenwerfer", having had a good deal of experience with prickly pear and other noxious weeds such as saltbush and etc, I have been thinking that these "flammenwerfers" or an adoption of the principle may be of considerable value in fighting these pests. There is no question about fire being very effective against these pests, the point to be considered is the cost. I would be very pleased if you could obtain any information regarding these instruments, particularly the material used to produce the fire; the approximate cost of same (say one gallon); the distance that the instruments will throw the flames and approximately the length of time a given quantity (say one gallon) will last under continuous use. Any other information regarding these instruments will be very acceptable. I dasessay a good deal of alteration would be necessary to adapt these instruments to this work. So far as prickly pear would be concerned one operation could not reasonably be expected to complete the work, yet it may be a very great help especially in rough country or where the pear is in heavy clumps.

If you have not the information at hand, perhaps you may be able to inform me where I may be able to get it."

The Secretary,
Advisory Council of Science & Industry,
Melbourne.
Department of Public Lands,
Brisbane
3rd June, 1919.

R. E. Pappin, Esq.,
C/o Commercial Travellers' Assoc. Club,
15 Moore Street,
Sydney.

Sir,

I have the honour to acknowledge your letter of the 1st May, 1919, and in doing so wish to express much appreciation of your keen interest in endeavouring to systematically and economically deal with this State's appalling soil affliction, viz. Prickly Pear, and furthermore so openly and frankly placing before me your interesting and valuable suggestions of not only eradicating the Peal, but of turning it (Pear) into a commercial product. I may point out that I have also a copy of your letter dated the 23rd December 1916 written to the President of the Commonwealth Advisory Council of Science and Industry, Melbourne. The several suggestions in this latter letter are most valuable, and I only wish the B. of S. & I. would take the matter up and thoroughly test same.

1. In referring to your letter to me, I would say that I thoroughly agree with you that mechanical means must eventually play a big part in the universal destruction of Prickly Pear, but at present it is hard to say what the special mechanical means will consist of, that will do the work at a reasonable cost per acre.

2. That I have had placed before me many elaborate and exhaustive plans of machinery, that of course, was said would do the work most thoroughly and economically. Also have I had actual demonstrations of machinery but so far not up to the mark, much too costly per acre, as the whole work of eradicating prickly pear must be done at a fair valuation of the land if free from pear.

3. That as you are a clever, practical, mechanical engineer, and personally know the general class of land in this State on which Pear grows, then...
could you not invent a piece of machinery that would deal at one time with all standing on that land, pear, timber, etc. etc. Never mind the by-products, let us first deal only with the clearing of the land, and the after results will come with closer settlement and cultivation, etc.

4. That your mechanical scheme of dealing with the Pear using a 75 H.P. tank tractor together with the cost figures per acre is most interesting but notwithstanding the using of the cheap spirit for fuel purposes, I do not think the work as you describe could be actually done for anything like the price you state per acre.

5. As for the use in such work mizza (pear eradication) of a re-constructed war tank in my opinion is out of place, much too costly, and unsuitable. The matter of using war tanks for such work has been for a long time frequently brought before me, but I cannot conscientiously recommend the Government to go to the big expense of trying the use of same.

6. That the piece of machinery I want to see tried and feel almost certainly it would be successful, is that of a powerful steam roller tractor (wood and water plentiful for such work) on caterpillar wheels, such a machine as this would or should be so constructed to roll down (within reason) all before it, and further built (covered over) in such a manner (something like a tank or turtle back) that any timber falling on the machine would not damage it. The effect of such a machine's work would be to not only crush the pear, but roll down the timber and later on, when the pear and timber dry, a good fierce fire run through the area would practically clean it up. At any rate it would leave the land in such a condition that it could be finally dealt with by closer settlement (settlers). That the Government at present has no money to spend in such a big experiment as you would wish them to undertake, but later on should the Government be prepared to spend money carrying out such experiments, then I will, with pleasure, place your proposition before them.

6. The little bottle of liquid came to hand, and its contents to me smell as if Phenyl. Then if so it has been tried two or three times on Prickly Pear, without success, but it will destroy small weeds and shrubs.

Whilst again thanking you for your several valuable suggestions and regretting I cannot at present give you a more favourable reply. I have the honour to be,

Sir,
Your obedient servant,

A. P. CLERE
Inspector.
NEW SOUTH WALES.

DEPARTMENT OF AGRICULTURE,
LANDS BUILDING, BRIDGE STREET,
SYDNEY, 28th January, 1921.

When replying please quote:-
I.21/469.

Dear Sir,

I am furnishing hereunder for your information particulars in regard to a method of eradicating prickly pear by mechanical means which has been brought under the Minister's notice by a Mr. S. H. Wilton of Mudgee.

This gentlemen's idea is to adapt the war tank, for the purpose of destroying the pear, by means of a set of circular saws in front of the machine. These saws would be run by a separate engine on top of the tank. There would also be rollers on the machine, which would be adjusted so that the cutting saws could be raised or lowered to deal with pear of different heights. The machine is also intended to carry a poison spray to treat the pear after it has been lacerated by the cutting and rolling machinery.

Yours faithfully,

GEORGE VALIER,
Under Secretary and Director.

The Director,
Bureau of Science and Industry,
Bank's Buildings,
391 Bourke Street,
Melbourne,
VICTORIA.
The Honourable the Premier of New South Wales,
SYDNEY.

Sir,

Liberation of Cactoblastis Cactorum.

The genus, Cactoblastis, contains two known species, viz. C. cactorum and C. baccarum from Argentina and Uruguay. Both feed upon species of prickly-pear native to those countries and are not known to attack other plants.

Cactoblastis is extremely closely related to the genus Melitaea, and seems to hold a position in regard to prickly-pears in South America similar to that of Melitaea to prickly-pears in North America. The feeding habits are identical; the cocoons are similar, the peculiar habit of depositing the eggs in straight sticks is common to both genera, and for all purposes Cactoblastis cactorum could be regarded as a species of Melitaea, the release of several species of which has already been sanctioned after the completion of comprehensive tests. As an additional safeguard, however, the Board decided that a limited number of tests with Cactoblastis cactorum should be carried out, and tests with newly-hatched larvae have therefore been completed in respect of the undermentioned 15 plants:

- Fig, eucalypt, arrowroot, banana, sugarcanes, peach, mango, orange, grapes, pineapple, cotton, maize, plum, cabbage, and tomato.

Twenty larvae were used in each test. In every case the larvae died within 48 hours, and in no case was there any attempt at feeding. In the control tests the larvae entered the pear joints, commenced to feed, and continued to develop rapidly.

In view of the results stated, no tests with half-grown larvae were considered necessary.

The Board therefore recommends that permission be granted for the liberation of the insect in the field for the destruction of prickly-pear. It has increased at a very rapid rate at Sherwood and probably within the next month more eggs will be deposited than the existing cages can accommodate.

Will you kindly submit the matter to your Government and advise the Board as soon as possible if your views in the matter.

Yours faithfully,

[Signature]

[Stamp: Commonwealth Agriculture Board]

[Stamp: Commonwealth Prickly-Pear Board]

[Stamp: Brisbane, 16th January, 1926]

[Stamp: Chair, Member]
Patent application for 'An improved machine for mincing prickly pear into fodder'