duction of chemistry among the Essex farmers and horticulturists is largely due, could no doubt furnish some interesting information on this subject. At any rate, it was by the close observation of Mr. Dymond's work during the period of my connection with the Essex Technical Instruction Committee that I was most strongly convinced of the suitability of chemistry as a subject for secondary rural schools.

Mr. Dunstan may, however, not include the work being done at the Chelmsford central school within the range of his criticism, as the pupils there catered for are certainly beyond the age of those attending the other two schools dealt with in this letter. In defending the claims of chemistry as a suitable subject—not dogmatically, for I am quite open to arguments against my view—it is hardly necessary to say that the most liberal interpretation of the definition of the term is asked for, and that my advocacy presupposes that the subject is properly, *i.e.* scientifically, taught. I am quite aware that distinguished authorities like Prof. Clifford Allbutt and Sir William Ramsay have expressed views similar to those of Mr. Dunstan. That makes it all the more necessary, however, to raise the whole question and have it authoritatively handled in the interests of rural education. R. MELDOLA.

April 5.

Carnivorous Habits of the New Zealand Kea Parrot.

IN your issue of December 28, 1905, there occurs a note referring to statements made at a meeting of the Philosophical Institute of Wellington with regard to the habits of *Nestor notabilis*, to the effect that the carnivorous habits that have been attributed to this parrot are exaggerated, if not totally untrue. It is unfortunate that this report of the meeting has obtained the wide currency that NATURE will give it, for it is abundantly evident that the speakers at Wellington were unacquainted with the facts about the kea.

In the course of various trips about the South Island of New Zealand during the last five or six years, I have made inquiries from shepherds and others likely to know about the kea as to how far their own personal acquaintance with this bird tallied with the common statements that they attack sheep. I was surprised to find that, in North Canterbury and in Marlborough, these men doubted the truth of these statements. They had never known the kea attack sheep in these districts. I was, consequently, inclined to take the view just put forward by the members of the Wellington Institute. I then wrote a series of identical letters to run-holders, shepherds, and others who were supposed to have had experience in this matter in Otago, with the result that overwhelming evidence of the existence of this habit was presented to me. Possibly the "naturalists and estate agents" of the Wellington Institute had not tapped the right district; that they gave their opinion in good faith I do not for a moment doubt.

It must be borne in mind that the kea is confined to the high mountainous country of the South (or Middle) Island, and does not occur in the North Island. It lives in the rough mountain tops in Alpine districts, and it is in this high, rough country that the damage to sheep has occurred, as Sir W. Buller has pretty fully described in his monograph on the "Birds of New Zealand."

It was in the Wanaka district, in Otago, that the greatest amount of damage was done in the early days of sheep-farming, and it was to managers of stations, to shepherds, musterers, and "kea shooters" employed on some of these stations that my inquiries were directed.

Several of these run-holders lost sheep by thousands, and reckoned their losses from kea attacks by thousands of pounds; some were practically ruined by the kea and the rabbit combined.

They engaged men specially to shoot and otherwise destroy keas; the county councils gave 1*s.* to 2*s.* 6*d.* a head for the birds; the squatters and Government also paid for beaks. Is it probable that these people would expend hundreds, nay, thousands, of pounds on a chimera?

Let me quote one or two extracts from letters received by me from men who have seen the kea attacking sheep, who have seen the sheep coming in at muster with holes in their sides and the entrails hanging therefrom, and on shearing have noted the wounds on the skin. These men, I may say, are well known in the district, and I have taken every care to apply only to those whose word may be relied on to give their own personal experience. These letters I hope to publish in full in the Transactions of the New Zealand Institute next year, so that their personal experiences in the early days of sheep-farming may be preserved.

Mr. Fraser, now stock inspector in Nelson province, writes:—"I was engaged sheep-farming in the Hawea and Wanaka lake districts in 1871–1883. I lost thousands of sheep from keas. I have seen the kea attacking the sheep, and also eating into a sheep when the latter was stuck in deep snow. I have opened scores of kea crops and found wool and meat therein. I have laid poison in dead sheep in snow, gone back later and found dead keas."

It was at Mr. Henry Campbell's station near Lake Wanaka, Otago, that these injuries to sheep were first (in 1868) traced to the kea, and I quote a letter from a Mr. J. H. King, who, early in the 'seventies, was employed to shoot the keas:—

"I have seen a flock of twenty or thirty birds attack a mob of sheep in the high precipitous country. The sheep as soon as attacked would huddle together as if driven by dogs; the keas would harass them until one kea would suddenly alight on a sheep's back, holding on to the wool of the rump. The sheep so attacked would immediately single itself from the mob and rush frantically about, and would either go over a bluff or drop down from exhaustion, when the kea which had still held on was joined by several others, and they soon destroyed the sheep."

Mr. King has shot a kea which was on a sheep's back.

It may be noted that the attacks are mostly made at night, hence the rarity of personal observation of these attacks; that they occur in a comparatively limited area, from the region of Mount Cook and the Mackenzie country in South Canterbury to the Takitimu range in Southland, but the centre of the area is round lakes Wanaka, Hawea, and Wakatipu.

Finally, as a comment on the irresponsible statements made at the Wellington Institute, I may quote from the *Otago Daily Times* of February 16, 1906:—"A meeting of landholders at Culverden to-day passed a resolution urging the Government to increase the bonus of 6*d.* each paid for keas' heads, and asking the county councils of Canterbury affected by the kea nuisance to cooperate with them in petitioning the Government for assistance in reducing the pest. The keas have been very numerous in the mountainous parts of Amuri county during the last two years. They seem to have moved northwards from Otago. . . ."

The report then proceeds to give the experiences of various Canterbury run-holders, which are in all respects similar to those recorded thirty years ago by the Otago men (*vide* Buller's "Birds" and Hutton's "Animals of New Zealand").

There can be no doubt that the keas have wrought, and are still causing, great havoc among sheep in certain districts.

It may be worth noting that the statement frequently made (*vide* Wallace's "Darwinism") that they "go for the kidney-fat" especially is an exaggeration. Those men whom I have interviewed tell me that the kea will eat any part, even the entire carcase, of a sheep, leaving the bones clean; they are not such "gourmets" as has been supposed. W. B. BENHAM.

Dunedin, February 18.

A New Product of Actinium.

RECENT work has directed attention to the great similarity in the modes of transformation of actinium and thorium. Thorium, probably itself inactive, gives rise to radio-thorium (Hahn, *Jahrbuch d. Radioact. u. Elektron.*, ii., 3330) which emits α rays; radio-thorium forms thorium X, which is followed by the other well known products, the emanation and the active deposit. Actinium behaves in a very similar way. By the same method, which was successful in separating thorium X from thorium, Godlewski (*Phil. Mag.*, July, 1905) showed that a new