



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*Vegetable  
Country*

**LINCOLN  
COLLEGE  
NEW ZEALAND**



GIANNINI FOUNDATION OF  
AGRICULTURAL ECONOMICS  
LIBRARY

SEP 9 1970

*WITHDRAWN*

**DEPARTMENT OF HORTICULTURE**

**BULLETIN 8**

**Economics and Management  
of Vegetable Production**

Editor : T. M. Morrison

1911

1912

1913

1914

1915

PROCEEDINGS OF A SHORT COURSE ON  
ECONOMICS AND MANAGEMENT OF VEGETABLE GROWING

MAY 1969

Edited by Professor T.M. Morrison

Department of Horticulture  
Lincoln College  
Canterbury  
New Zealand

Department of Horticulture  
Bulletin No. 8 1969

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
5800 S. UNIVERSITY AVENUE  
CHICAGO, ILLINOIS 60637

MEMORANDUM

TO: [Name]

FROM: [Name]

DATE: [Date]

## PREFACE

The Vegetable and Produce Growers Federation for a number of years has been encouraging collection of costs of production of process crops. While this is valuable in maintaining a watching brief on processor pay-outs, it is only one factor in assessing the relative profitability of competing crops. The full science or art, of management must be brought to bear on the problems before any solution can be suggested.

With farmers diversifying into vegetable production and others likely to follow as processing expands into export it is opportune that a course such as this was held at this time. Some of the discussions show the pertinence of papers to problems facing the industry right now. Others show the way to the future.

The course offered a new look in education to vegetable growers. We have maintained that our greatest contribution to the established grower is to bring recent information to his notice - preferably after he has been in the industry for some time. With a recession in fresh vegetable prices, "economic" management is probably the most serious omission from growers' education. Fortunately in this department and others in the College we can present an expertise in this modern subject.

The papers do not attempt to answer all specific questions but are designed to give a base on which the individual grower can build for himself from his own experience. They also may serve to demonstrate to the grower that in horticulture we have a long way to go to fill the gaps in our "management" knowledge. It behoves all growers to help us and consequently themselves to acquire this knowledge.

Finally I must thank all lecturers at this course for they provided a stimulating four days and all growers who attended, for without a receptive audience no course can succeed.

T.M. Morrison  
Professor of Horticulture  
Lincoln College

The first part of the report deals with the general situation in the country. It is noted that the economy is still in a state of depression, and that the government has taken various measures to stimulate it. The report also mentions the progress of the reconstruction work in the damaged areas.

In the second part, the report discusses the social conditions. It is pointed out that the standard of living is still low, and that there is a need for social reforms. The report also mentions the progress of the educational system and the state of the labor market.

The third part of the report deals with the political situation. It is noted that the government has taken various measures to improve the political system, and that there is a need for further reforms. The report also mentions the progress of the judicial system and the state of the public administration.

In the fourth part, the report discusses the foreign relations. It is pointed out that the country has maintained friendly relations with its neighbors, and that there is a need for further international cooperation. The report also mentions the progress of the diplomatic relations and the state of the international trade.

The fifth part of the report deals with the military situation. It is noted that the country has a strong and modern military, and that there is a need for further military reforms. The report also mentions the progress of the military training and the state of the military equipment.

In the sixth part, the report discusses the cultural and scientific progress. It is pointed out that there has been a significant increase in the number of students in the universities, and that there is a need for further cultural and scientific reforms. The report also mentions the progress of the cultural and scientific activities and the state of the cultural and scientific institutions.

The seventh part of the report deals with the conclusion. It is noted that the country has made significant progress in various fields, and that there is a need for further reforms. The report also mentions the progress of the overall development and the state of the country's future prospects.

## CONTENTS

<u>Page</u>		
1.	The vegetable industry	Hon. B.E. Talboys
10.	The vegetable industry and the National Economy	Dr R.W.M. Johnson
18.	The requirements to build up an export in vegetables	R.J. Ballinger
28.	Market research	G.W. Kitson
36.	Risk and uncertainty in decision making	A.T.G. McArthur
47.	Local marketing - a summary of present outlets, their advantages and disadvantages to the grower	D.W. Goble
52.	The economics of fertiliser use and plant protection in vegetable growing	R.C. Jensen
61.	Labour management on horticultural holdings	G.F. Thiele
71.	Management planning and budgets	N.W. Taylor
79.	Prepare to meet thy doom	J.P. Goldsmith
85.	The analysis of crop returns and the incorporation of frozen peas in mixed farming	B.J.P. Ryde
95.	Processors' views on costs now and in the future	M. Wraight
100.	Capital investment and its associated financing for machinery and buildings	N.G. Gow
118.	Work study	I. Calvert
126.	Choosing the crop using linear programming	G.F. Thiele
140.	Horticultural production in mixed-crop farming	G.A.G. Frengley
145.	The economics of liquid nitrogen fertiliser	M.B. Thomas
156.	Soil structure problems	R.A. Crowder
159.	Patterns of change in vegetable production	G.J. Wilson
166.	Vegetable breeding and selection	Dr H.C. Smith
171.	Extensive, intensive vegetable production	R.A. Crowder
177.	Horticultural education	Professor T.M. Morrison
182.	The future of the vegetable growing industry	T.H. Warburton



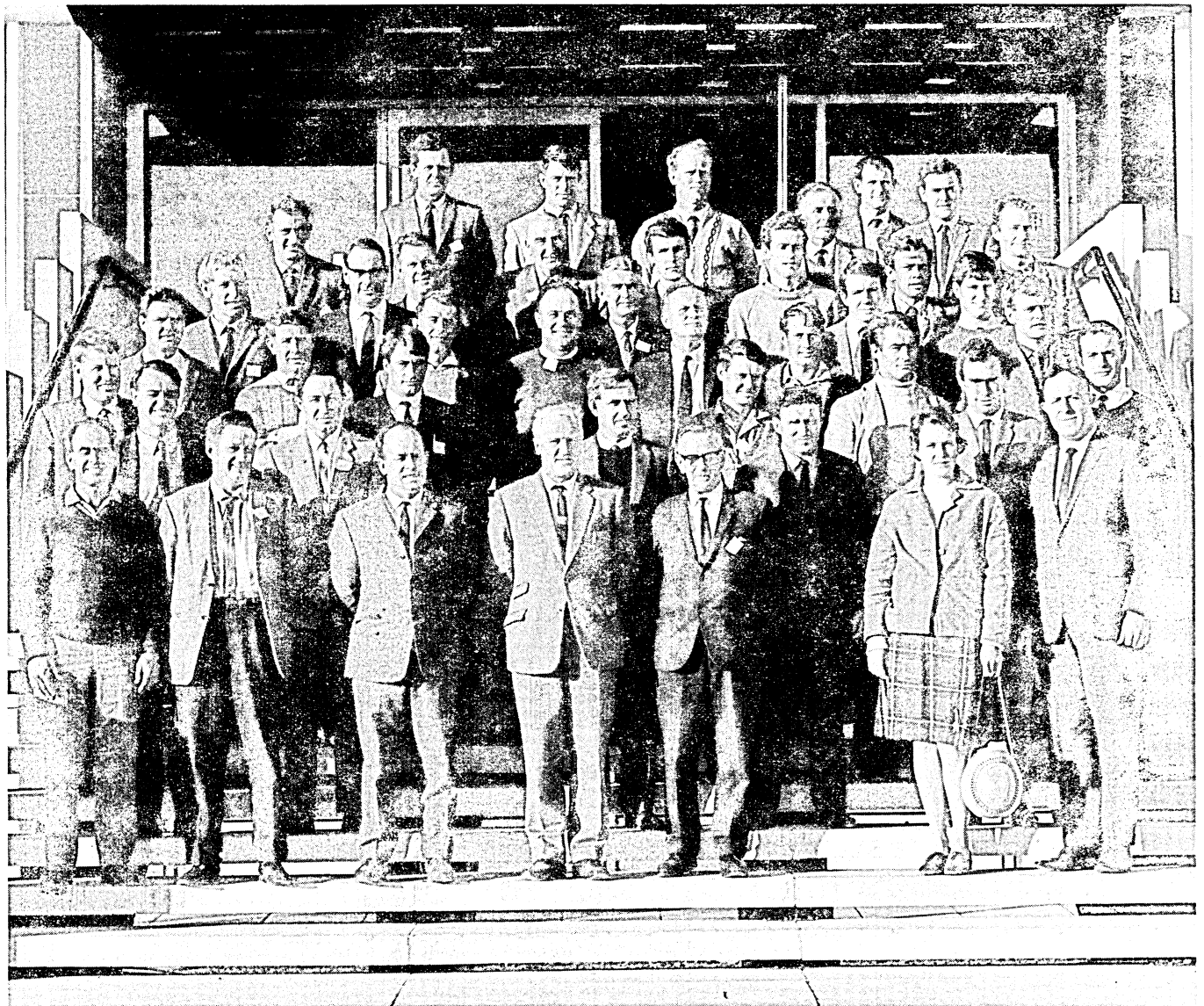
1. Introduction	1
2. Objectives	2
3. Scope	3
4. Definitions	4
5. Organization	5
6. Responsibilities	6
7. Procedures	7
8. Reporting	8
9. Review	9
10. Appendix	10
11. Glossary	11
12. References	12
13. Distribution	13
14. Revision History	14
15. Approval	15
16. Signatures	16
17. Date	17
18. Contact Information	18
19. Revision History	19
20. Appendix	20
21. Glossary	21
22. References	22
23. Distribution	23
24. Revision History	24
25. Approval	25
26. Signatures	26
27. Date	27
28. Contact Information	28
29. Revision History	29
30. Appendix	30
31. Glossary	31
32. References	32
33. Distribution	33
34. Revision History	34
35. Approval	35
36. Signatures	36
37. Date	37
38. Contact Information	38
39. Revision History	39
40. Appendix	40
41. Glossary	41
42. References	42
43. Distribution	43
44. Revision History	44
45. Approval	45
46. Signatures	46
47. Date	47
48. Contact Information	48
49. Revision History	49
50. Appendix	50
51. Glossary	51
52. References	52
53. Distribution	53
54. Revision History	54
55. Approval	55
56. Signatures	56
57. Date	57
58. Contact Information	58
59. Revision History	59
60. Appendix	60
61. Glossary	61
62. References	62
63. Distribution	63
64. Revision History	64
65. Approval	65
66. Signatures	66
67. Date	67
68. Contact Information	68
69. Revision History	69
70. Appendix	70
71. Glossary	71
72. References	72
73. Distribution	73
74. Revision History	74
75. Approval	75
76. Signatures	76
77. Date	77
78. Contact Information	78
79. Revision History	79
80. Appendix	80
81. Glossary	81
82. References	82
83. Distribution	83
84. Revision History	84
85. Approval	85
86. Signatures	86
87. Date	87
88. Contact Information	88
89. Revision History	89
90. Appendix	90
91. Glossary	91
92. References	92
93. Distribution	93
94. Revision History	94
95. Approval	95
96. Signatures	96
97. Date	97
98. Contact Information	98
99. Revision History	99
100. Appendix	100
101. Glossary	101
102. References	102
103. Distribution	103
104. Revision History	104
105. Approval	105
106. Signatures	106
107. Date	107
108. Contact Information	108
109. Revision History	109
110. Appendix	110
111. Glossary	111
112. References	112
113. Distribution	113
114. Revision History	114
115. Approval	115
116. Signatures	116
117. Date	117
118. Contact Information	118
119. Revision History	119
120. Appendix	120
121. Glossary	121
122. References	122
123. Distribution	123
124. Revision History	124
125. Approval	125
126. Signatures	126
127. Date	127
128. Contact Information	128
129. Revision History	129
130. Appendix	130
131. Glossary	131
132. References	132
133. Distribution	133
134. Revision History	134
135. Approval	135
136. Signatures	136
137. Date	137
138. Contact Information	138
139. Revision History	139
140. Appendix	140
141. Glossary	141
142. References	142
143. Distribution	143
144. Revision History	144
145. Approval	145
146. Signatures	146
147. Date	147
148. Contact Information	148
149. Revision History	149
150. Appendix	150
151. Glossary	151
152. References	152
153. Distribution	153
154. Revision History	154
155. Approval	155
156. Signatures	156
157. Date	157
158. Contact Information	158
159. Revision History	159
160. Appendix	160
161. Glossary	161
162. References	162
163. Distribution	163
164. Revision History	164
165. Approval	165
166. Signatures	166
167. Date	167
168. Contact Information	168
169. Revision History	169
170. Appendix	170
171. Glossary	171
172. References	172
173. Distribution	173
174. Revision History	174
175. Approval	175
176. Signatures	176
177. Date	177
178. Contact Information	178
179. Revision History	179
180. Appendix	180
181. Glossary	181
182. References	182
183. Distribution	183
184. Revision History	184
185. Approval	185
186. Signatures	186
187. Date	187
188. Contact Information	188
189. Revision History	189
190. Appendix	190
191. Glossary	191
192. References	192
193. Distribution	193
194. Revision History	194
195. Approval	195
196. Signatures	196
197. Date	197
198. Contact Information	198
199. Revision History	199
200. Appendix	200
201. Glossary	201
202. References	202
203. Distribution	203
204. Revision History	204
205. Approval	205
206. Signatures	206
207. Date	207
208. Contact Information	208
209. Revision History	209
210. Appendix	210
211. Glossary	211
212. References	212
213. Distribution	213
214. Revision History	214
215. Approval	215
216. Signatures	216
217. Date	217
218. Contact Information	218
219. Revision History	219
220. Appendix	220
221. Glossary	221
222. References	222
223. Distribution	223
224. Revision History	224
225. Approval	225
226. Signatures	226
227. Date	227
228. Contact Information	228
229. Revision History	229
230. Appendix	230
231. Glossary	231
232. References	232
233. Distribution	233
234. Revision History	234
235. Approval	235
236. Signatures	236
237. Date	237
238. Contact Information	238
239. Revision History	239
240. Appendix	240
241. Glossary	241
242. References	242
243. Distribution	243
244. Revision History	244
245. Approval	245
246. Signatures	246
247. Date	247
248. Contact Information	248
249. Revision History	249
250. Appendix	250
251. Glossary	251
252. References	252
253. Distribution	253
254. Revision History	254
255. Approval	255
256. Signatures	256
257. Date	257
258. Contact Information	258
259. Revision History	259
260. Appendix	260
261. Glossary	261
262. References	262
263. Distribution	263
264. Revision History	264
265. Approval	265
266. Signatures	266
267. Date	267
268. Contact Information	268
269. Revision History	269
270. Appendix	270
271. Glossary	271
272. References	272
273. Distribution	273
274. Revision History	274
275. Approval	275
276. Signatures	276
277. Date	277
278. Contact Information	278
279. Revision History	279
280. Appendix	280
281. Glossary	281
282. References	282
283. Distribution	283
284. Revision History	284
285. Approval	285
286. Signatures	286
287. Date	287
288. Contact Information	288
289. Revision History	289
290. Appendix	290
291. Glossary	291
292. References	292
293. Distribution	293
294. Revision History	294
295. Approval	295
296. Signatures	296
297. Date	297
298. Contact Information	298
299. Revision History	299
300. Appendix	300
301. Glossary	301
302. References	302
303. Distribution	303
304. Revision History	304
305. Approval	305
306. Signatures	306
307. Date	307
308. Contact Information	308
309. Revision History	309
310. Appendix	310
311. Glossary	311
312. References	312
313. Distribution	313
314. Revision History	314
315. Approval	315
316. Signatures	316
317. Date	317
318. Contact Information	318
319. Revision History	319
320. Appendix	320
321. Glossary	321
322. References	322
323. Distribution	323
324. Revision History	324
325. Approval	325
326. Signatures	326
327. Date	327
328. Contact Information	328
329. Revision History	329
330. Appendix	330
331. Glossary	331
332. References	332
333. Distribution	333
334. Revision History	334
335. Approval	335
336. Signatures	336
337. Date	337
338. Contact Information	338
339. Revision History	339
340. Appendix	340
341. Glossary	341
342. References	342
343. Distribution	343
344. Revision History	344
345. Approval	345
346. Signatures	346
347. Date	347
348. Contact Information	348
349. Revision History	349
350. Appendix	350
351. Glossary	351
352. References	352
353. Distribution	353
354. Revision History	354
355. Approval	355
356. Signatures	356
357. Date	357
358. Contact Information	358
359. Revision History	359
360. Appendix	360
361. Glossary	361
362. References	362
363. Distribution	363
364. Revision History	364
365. Approval	365
366. Signatures	366
367. Date	367
368. Contact Information	368
369. Revision History	369
370. Appendix	370
371. Glossary	371
372. References	372
373. Distribution	373
374. Revision History	374
375. Approval	375
376. Signatures	376
377. Date	377
378. Contact Information	378
379. Revision History	379
380. Appendix	380
381. Glossary	381
382. References	382
383. Distribution	383
384. Revision History	384
385. Approval	385
386. Signatures	386
387. Date	387
388. Contact Information	388
389. Revision History	389
390. Appendix	390
391. Glossary	391
392. References	392
393. Distribution	393
394. Revision History	394
395. Approval	395
396. Signatures	396
397. Date	397
398. Contact Information	398
399. Revision History	399
400. Appendix	400
401. Glossary	401
402. References	402
403. Distribution	403
404. Revision History	404
405. Approval	405
406. Signatures	406
407. Date	407
408. Contact Information	408
409. Revision History	409
410. Appendix	410
411. Glossary	411
412. References	412
413. Distribution	413
414. Revision History	414
415. Approval	415
416. Signatures	416
417. Date	417
418. Contact Information	418
419. Revision History	419
420. Appendix	420
421. Glossary	421
422. References	422
423. Distribution	423
424. Revision History	424
425. Approval	425
426. Signatures	426
427. Date	427
428. Contact Information	428
429. Revision History	429
430. Appendix	430
431. Glossary	431
432. References	432
433. Distribution	433
434. Revision History	434
435. Approval	435
436. Signatures	436
437. Date	437
438. Contact Information	438
439. Revision History	439
440. Appendix	440
441. Glossary	441
442. References	442
443. Distribution	443
444. Revision History	444
445. Approval	445
446. Signatures	446
447. Date	447
448. Contact Information	448
449. Revision History	449
450. Appendix	450
451. Glossary	451
452. References	452
453. Distribution	453
454. Revision History	454
455. Approval	455
456. Signatures	

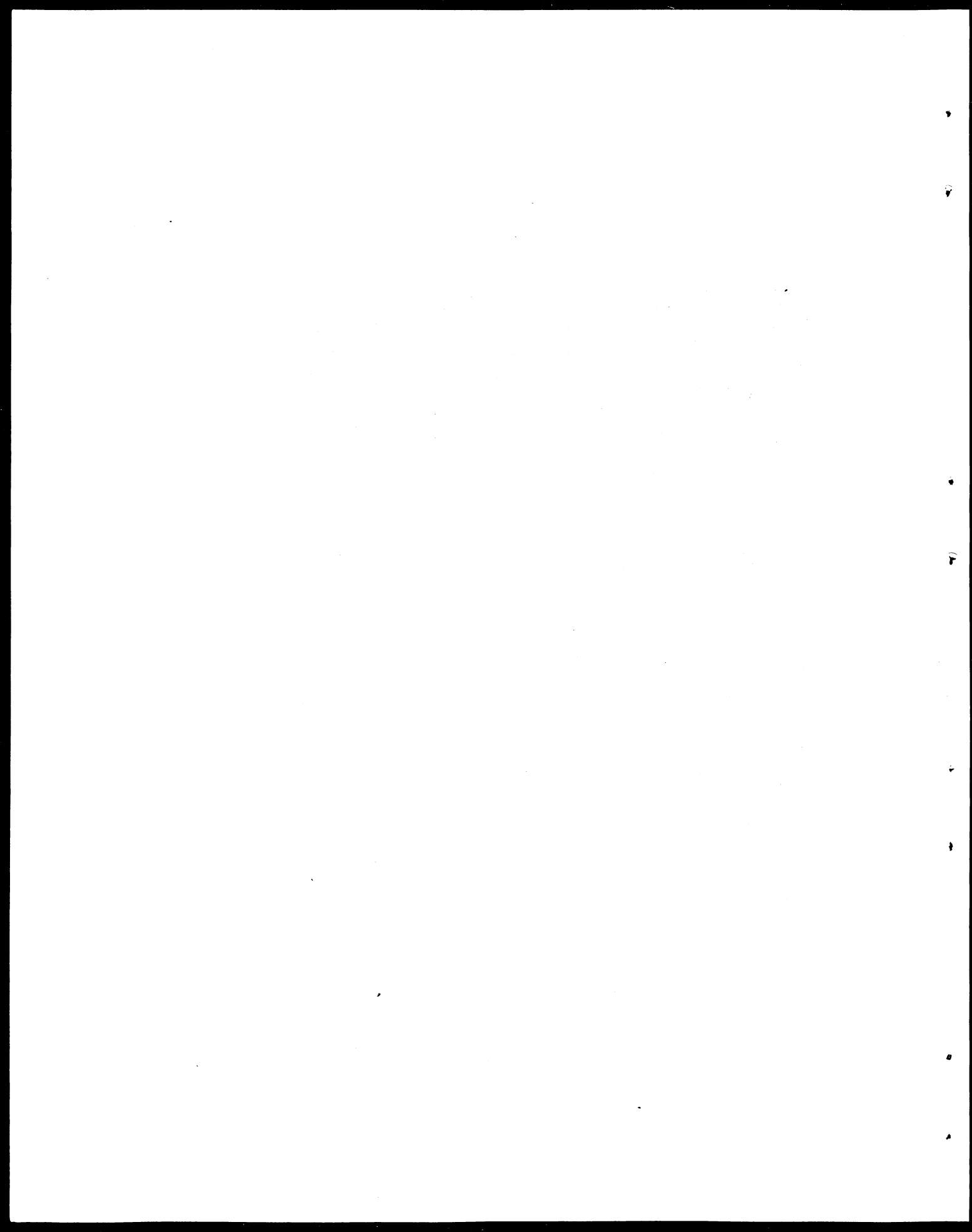
Page

190. Epilogue
191. Process Crop Seminar Crop Research Division
192.           Session 1 - Research
199.           Session 2 - Extension
206.           Session 3 - Crop Production
211.           Session 4 - Processing
220.           Evening - Hon. B.E. Talboys
- 
226. Department of Horticulture list of published bulletins.

---oooOooo---







## SOIL STRUCTURE PROBLEMS

R.A. Crowder  
Department of Horticulture  
Lincoln College

During this next 30 minutes I have to deliver an address related to the soil and in particular the maintenance of health of the soil.

It is of course an old subject which in the flow of scientific knowledge tends to get forgotten or pushed aside as it has been for generations. New Zealand has ample evidence of this with its scarred hillsides, evidence of the poor understanding man has for his environment. All over the world man has left a trail of havoc due to a lack of understanding of soil management. Today we still find that growers have a poor understanding of what soil is. Soil is not - "just to keep the plant upright" - as I was once told by an enlightened grower keen on the use of a new chemical wonder fertiliser, it is a living medium which must be nurtured very carefully if it is to give of its best.

Two factors are of importance when considering soil. They are (1) structure and (2) pest and disease incidence. The structure of the soil determines the degree to which the basic constituents of the soil i.e. sands, clays, silts and organics (texture of soil) are bound together into particles or crumbs.

A soil that has a good structure is one in which there are ample air spaces between the particles for air and water to be held. Under such conditions the soil acts as a sponge during rain and absorbs and holds water while gas exchange between roots, the soil and the atmosphere is uninhibited. Such a soil stands flood and drought for a long period.

Much of the structure of the soil is determined by its organic matter content which encourages active biological activity in the soil with constant release of available N, P and K. The action of breaking into the balanced environment immediately causes deterioration. Exposure to the atmosphere of the soil crumbs results in their breakdown, rain drops batter the soil, frost causes heaving of the soil and implements play their part also. It is necessary to be aware of these factors right from the start in order that remedial action can be taken.

Remedial action can be classed into three distinct sectors:

a) There is the situation of the small-scale grower with 10 acres or so who may be cropping 2 or even 3 crops a year especially in the North Island. Such a grower will probably be using soils of natural high fertility and strong structure. i.e. the strongly structured basalt soils of Pukekohe and the slopes of Banks Peninsula. Even though the soils are strongly structured attention should be given to the incorporation of organic matter in the form of rotted straw, compost or animal manures, chickens etc. In this way high fertility will be maintained despite intensive and continued cropping. The problem of diseases will remain unless a definite rotation of crops is developed. However, on such small areas soil sterilisation chemically is a possibility due to the high value of the crops usually grown.

b) The situation of the large scale vegetable grower. By large scale we mean those growers with over 10 acres under vegetables and often as much as 100 or 200 acres. On such large areas it is impossible to apply organics in sufficient quantities and alternative cropping programmes will be necessary. The use of green crops to rest the soil is advocated and rotation of crops with only one crop per year is probably an answer here. If no attention to soil structure maintenance is given in the early stages then even the strongest structured soils will eventually succumb to abusive use.

c) Finally we have the recent appearance of vegetable growing by the farmer particularly in association with the process industry. This development is particularly important at the present time in Canterbury where the soils are essentially weakly structured and soon break down under intensive cultivation. Here soil structure maintenance will be more critical than on the more strongly structured soils but farmers have the advantage of being engaged in a mixed cropping type of farming where crops follow on periods of grassland and animal production. The growth of grass is perhaps the most efficient way of restoring soil structure and it is to be hoped that the mixed cropping rotation will be maintained by farmers growing process crops.

A further advantage in Canterbury is the relative freedom of the land from those diseases which plague process growers in the North Island. This is a definite advantage which can and must be maintained by means of a wide rotation. There must not be a concentration of process crops close to the factory even though this may be economic initially. There are large areas within an economic distance of Christchurch suitable for process vegetables therefore let us utilise these areas and have wide distances in time and distance between crops. In this way disease built up in the district will be kept to a minimum and optimal crop spacings will not be dependent on disease control.

In addition high density cropping creates a rapid cover over the soil and provides a greater ploughable residue to maintain soil structure. Slides were shown to illustrate the points made:

1. To illustrate certain aspects of growing in an intensive area of vegetable production such as Pukekohe. From the air large areas were seen to be under cultivation leaving little room for a return to grass or green cropping.
2. The breakdown of soil associated with heavy equipment working on wet soil and point out how soil deterioration has led to only one crop being grown where two a year were normal. A green crop or barley has replaced the second crop.
3. The effect of rain on gently sloping land and pointed out the dangers of erosion.
4. The effect of water on good and poor structured soil gave a good indication of what happens to soils as they deteriorate.
5. Comparison between the Pukekohe soils which took 40 years to breakdown to a critical level and Canterbury soils which breakdown in only 5 years.

6. The effect of continuous cropping of the same crop compared to cropping in "clean" soil. Cabbage grown in old soils was heavily infected with "black rot", a bacterial disease, despite extensive spraying while a few miles away a crop grown following pasture was growing clean and spray free.

In conclusion let me reiterate the importance of soil structure and rotation in vegetable cropping. The build up of many diseases has become critical in widely spaced areas. Verticilliums, Fusariums, Sclerotinia, all play havoc in soils often as a result of too little attention to rotation.

Plant breeding is one answer to these problems, chemical sprays another and soil sterilisation yet another. All these methods cost money but a wide rotation does not, particularly in Canterbury where a mixed cropping system is already established.

Good soil structure leads to ease of management and maximum productivity. When destroyed it leads to general soil problems which cost money to remedy. Let us then learn from the mistakes of others and let Canterbury in particular take special note of these factors as it embarks on, we hope, a successful vegetable processing industry.

Finally a last thought for the day for Canterbury farmers embarking into vegetable production. Can you really afford to burn that valuable pea and cereal straw if you are thinking of intensifying your cropping for higher value crops? Perhaps irrigation and a bag of nitrogen will be more beneficial than the wasteful burn off.

---



