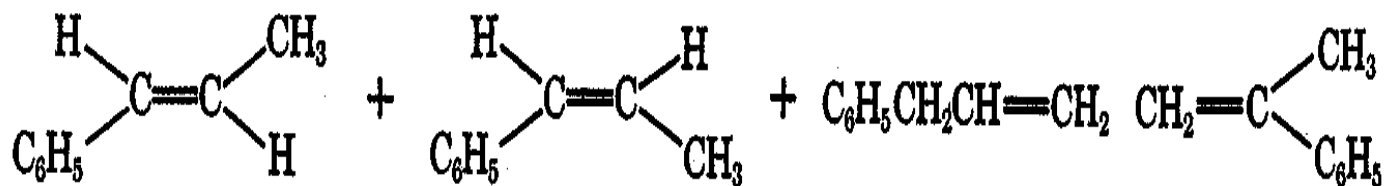
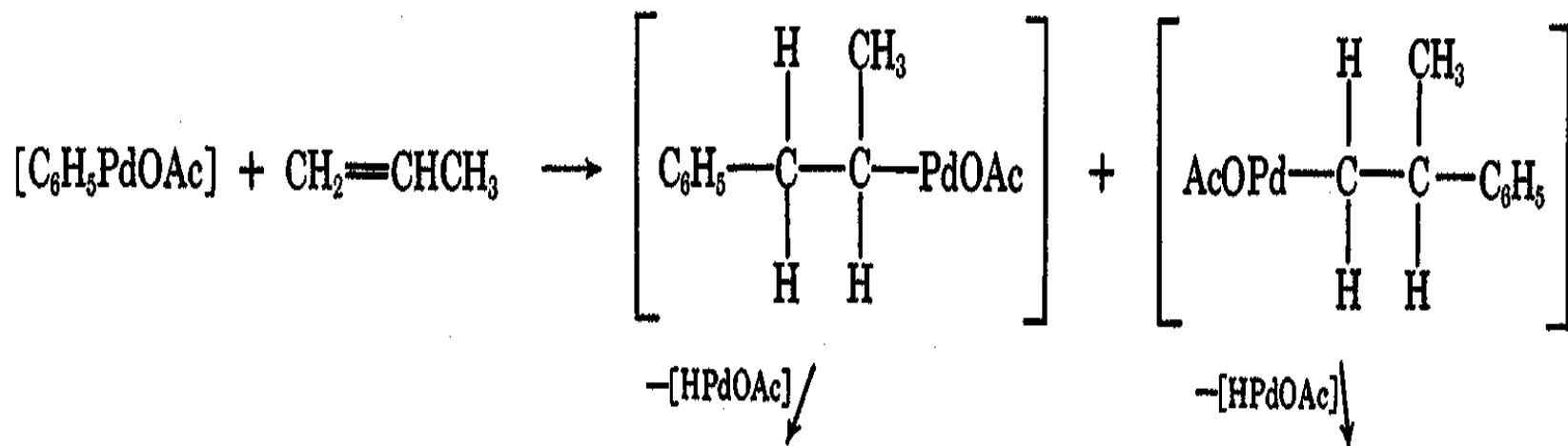


# **PALLADIUM REACTIONS FOR ORGANIC SYNTHESES**

**Prof. Richard F. Heck  
Emeritus of the University of Delaware**



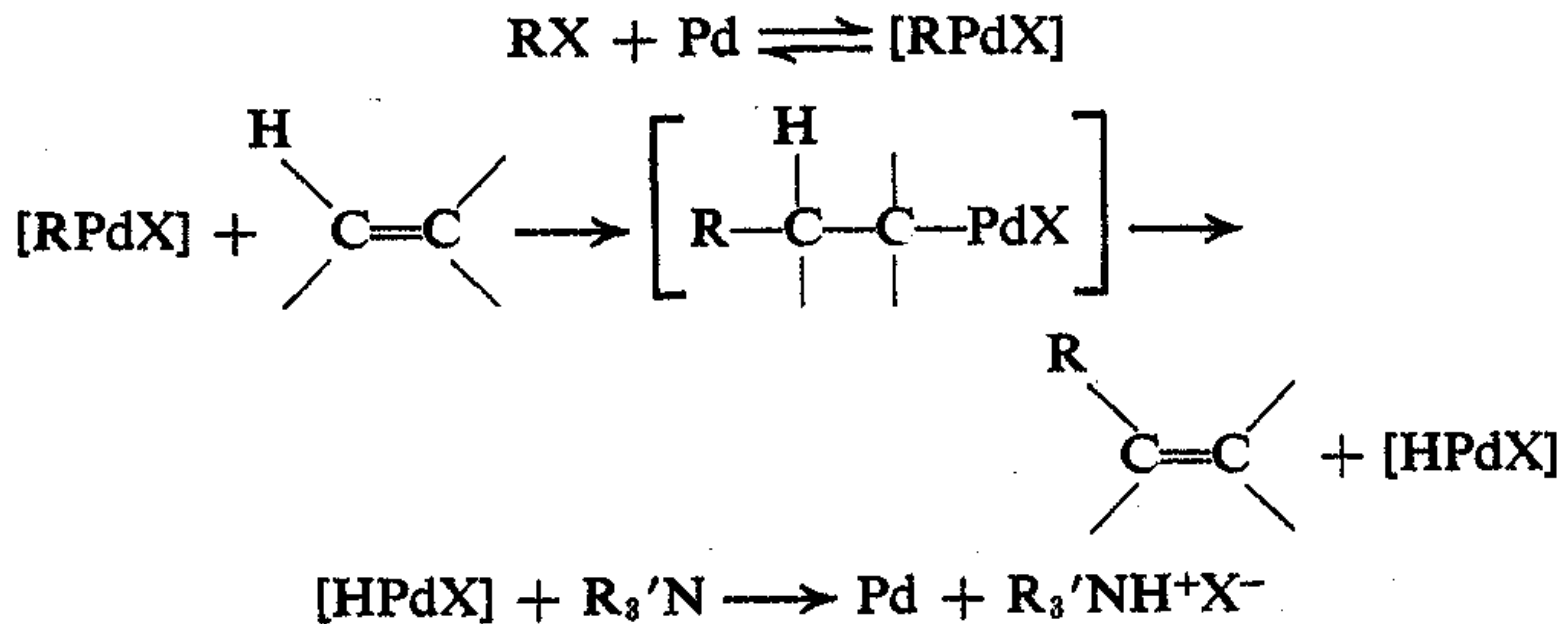
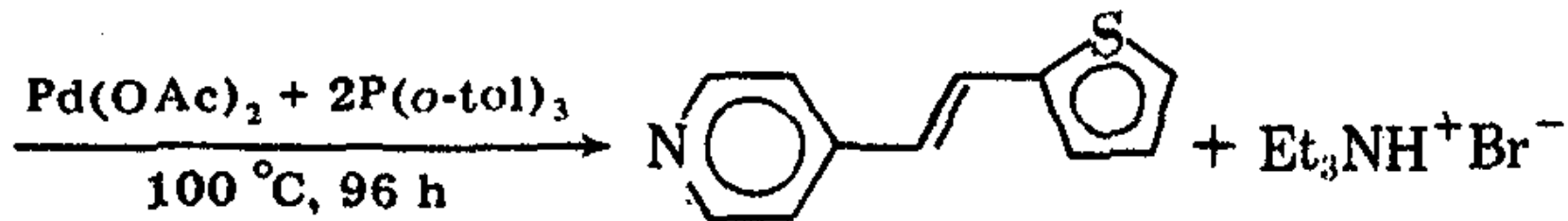
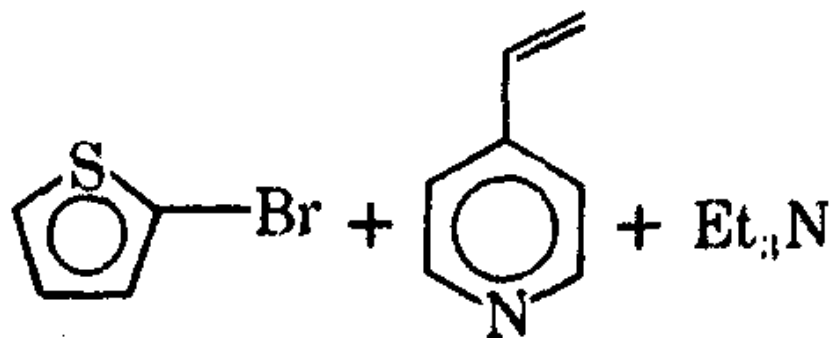


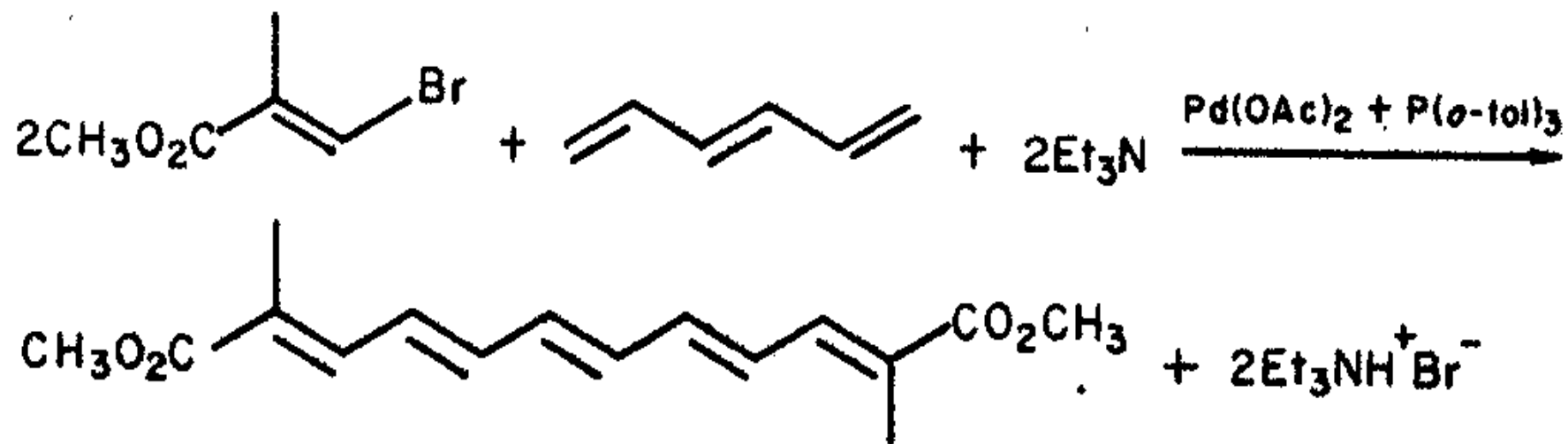


Table II. Influence of the Organophosphine on the Palladium-Catalyzed Reaction of 4-Bromophenol with Methyl Acrylate<sup>a</sup>

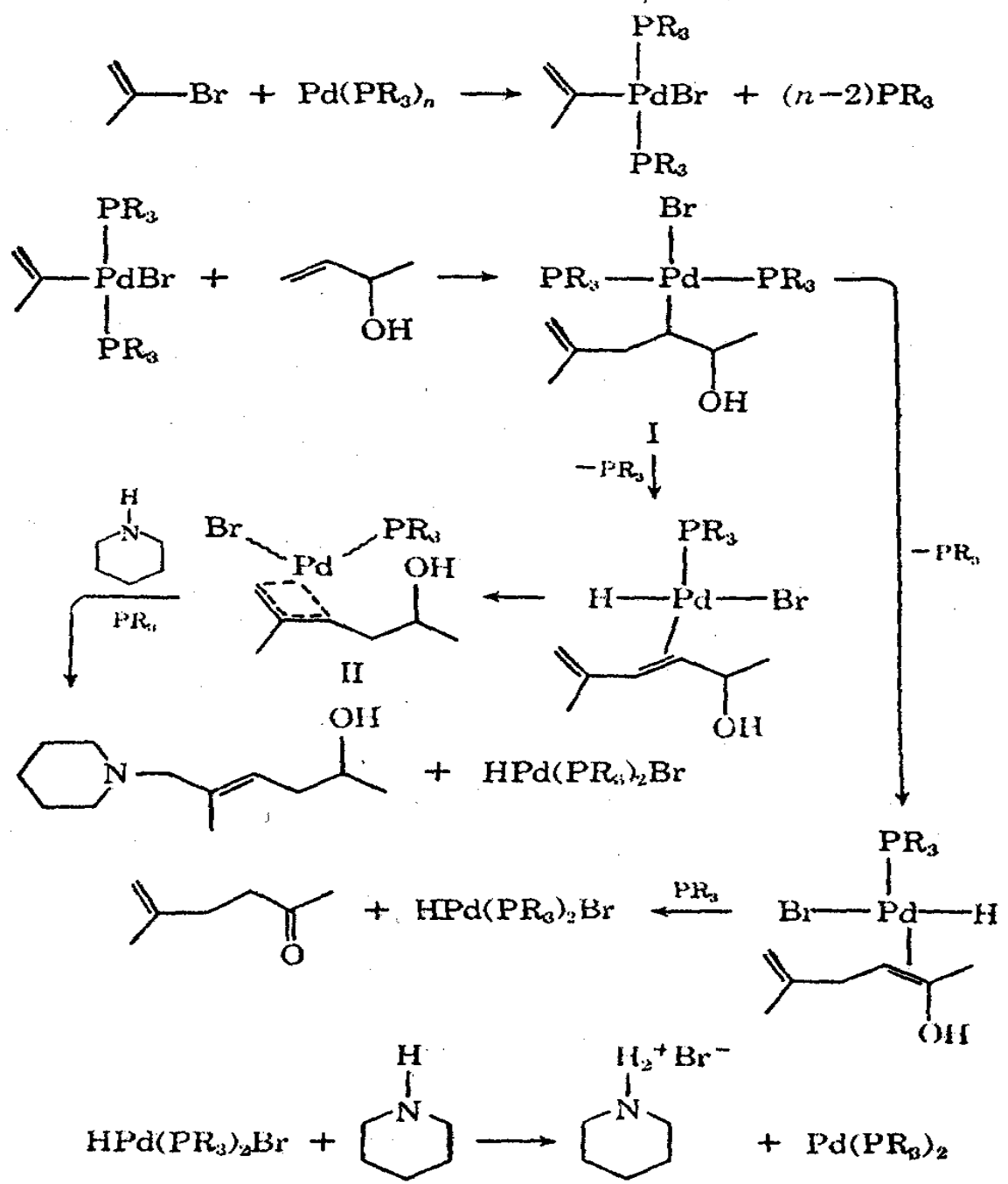
phosphine	registry no.	P/Pd	reaction temp, °C	time, h	% yield (GLC)
Ph <sub>3</sub> P	603-35-0	2	75	6 <sup>b</sup>	3
Ph <sub>3</sub> P		6	75	50 <sup>b</sup>	5
( <i>o</i> -tol) <sub>3</sub> P	6163-58-2	2	75	22	98
( <i>o</i> -tol) <sub>3</sub> P		6	75	49	95
( <i>p</i> -tol) <sub>3</sub> P		2	100	45	26
( $\alpha$ -nap) <sub>3</sub> P	3411-48-1	2	100	45	8
(4-CH <sub>3</sub> OCOC <sub>6</sub> H <sub>4</sub> ) <sub>3</sub> P	66417-54-7	2	75	50	4
(4-(CH <sub>3</sub> ) <sub>2</sub> NC <sub>6</sub> H <sub>4</sub> ) <sub>3</sub> P	1104-21-8	2	75	50	~0
[2,3,4,5-(CH <sub>3</sub> ) <sub>4</sub> C <sub>6</sub> H] <sub>3</sub> P	66417-52-5	2	75	90	37
[2,3,4,5-(CH <sub>3</sub> ) <sub>4</sub> C <sub>6</sub> H] <sub>3</sub> P		6	75	100	8
(2-C <sub>2</sub> H <sub>5</sub> C <sub>6</sub> H <sub>4</sub> ) <sub>3</sub> P	50777-27-0	2	75	51	43
(2-C <sub>2</sub> H <sub>5</sub> C <sub>6</sub> H <sub>4</sub> ) <sub>3</sub> P		6	75	50	95
(2,5- <i>i</i> -Pr <sub>2</sub> C <sub>6</sub> H <sub>3</sub> ) <sub>3</sub> P	63600-29-3	2	75	53	27
(2,5- <i>i</i> -Pr <sub>2</sub> C <sub>6</sub> H <sub>3</sub> ) <sub>3</sub> P		6	75	50	68
[2-CH <sub>3</sub> -5- <i>t</i> -BuC <sub>6</sub> H <sub>3</sub> ] <sub>3</sub> P	66417-48-9	2	75	51	87
[2-(CH <sub>3</sub> -5- <i>t</i> -BuC <sub>6</sub> H <sub>3</sub> )] <sub>3</sub> P		6	75	49	95
(2-CH <sub>3</sub> -4-(CH <sub>3</sub> ) <sub>2</sub> NC <sub>6</sub> H <sub>3</sub> ) <sub>3</sub> P	66417-47-8	2	75	50	20
[2-CH <sub>3</sub> -5-CF <sub>3</sub> C <sub>6</sub> H <sub>3</sub> ] <sub>3</sub> P	66417-45-6	2	75	35	29
[2-CH <sub>3</sub> -5-CF <sub>3</sub> C <sub>6</sub> H <sub>3</sub> ] <sub>3</sub> P		6	75	49	95
2,6-(CH <sub>3</sub> O) <sub>2</sub> C <sub>6</sub> H <sub>3</sub> PPh <sub>2</sub>	66417-43-4	2	75	8 <sup>b</sup>	1
(NCCH <sub>2</sub> CH <sub>2</sub> ) <sub>3</sub> P	4023-53-4	2	75	4 <sup>b</sup>	~0

<sup>a</sup> Carried out with 1 mol % of palladium acetate based upon the aryl halide. <sup>b</sup> No further increase in yield was observed with longer reaction time.

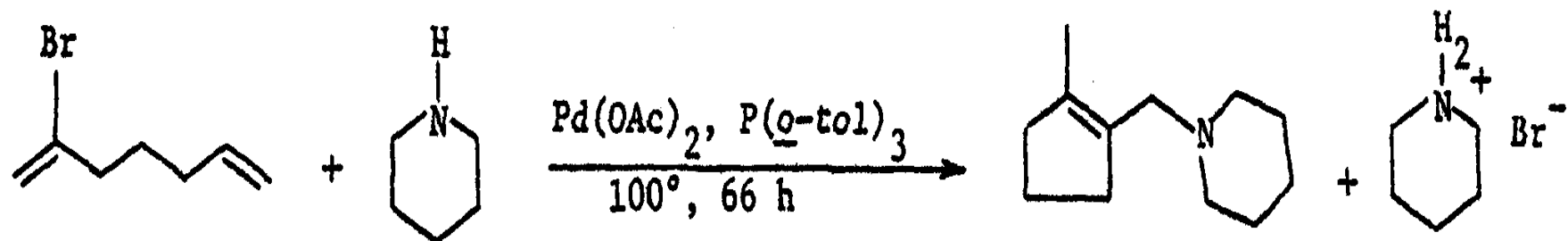




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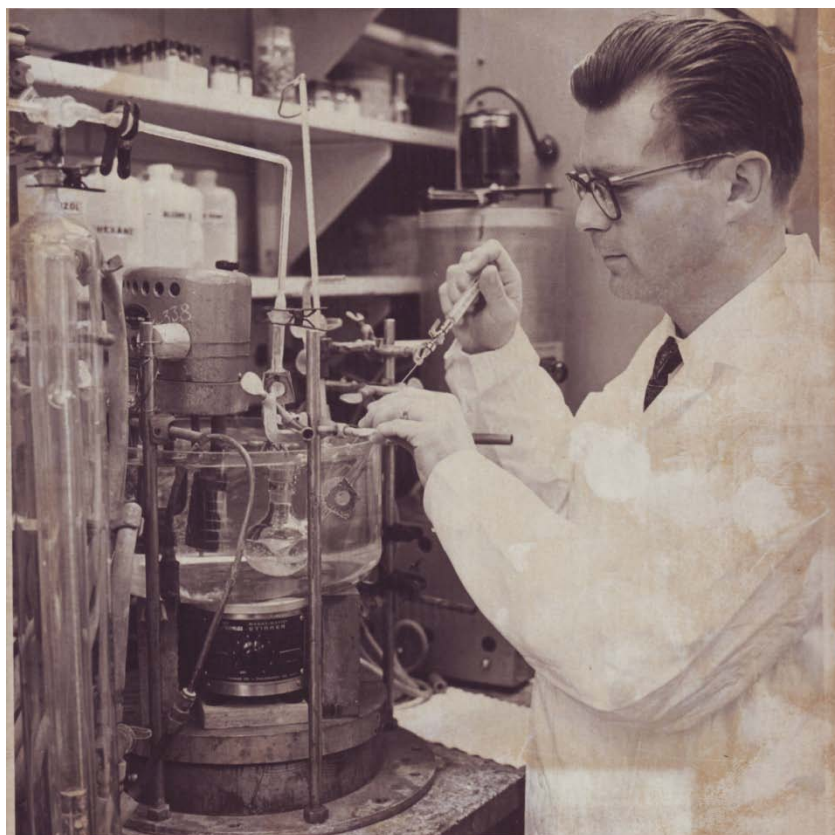
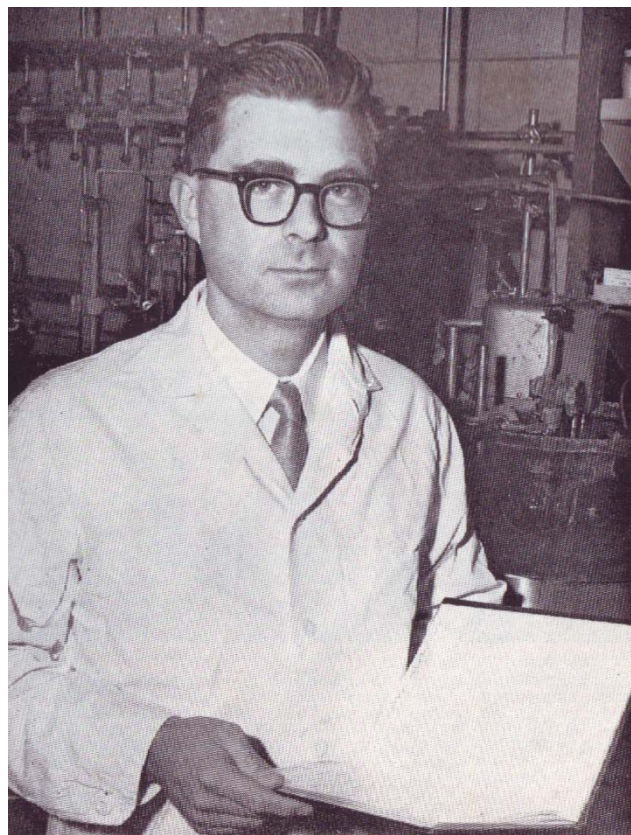






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III



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