Anhydribose	Bredereck <i>et al.</i>	R. W. J.	G. R. B. and M. V. L.
m.p.	229–230° (sint. 225°)	231–232° (sint. 223°)	229° (sint. 224°)
Specific rotation in water	$[\alpha]_D^{20} + 7.8^\circ \pm 7.0^{**}$	$[\alpha]_D^{20} + 8.6^\circ \pm 0.5^\circ$ (c, 1.33)	$[\alpha]_D^{16} + 9.4^\circ \pm 0.5^\circ$ (c, 1.4)
Consumption of periodate		2.00, 1.92, 2.08 mol. (no formic acid produced)	2.03, 2.01 mol. (no formic acid produced)
Specific rotation of solution after oxidation		$[\alpha]_D^{20} + 46.5^\circ \pm 0.5^\circ$	$[\alpha]_D^{15} + 48^\circ \pm 0.7^\circ \dagger$
Tetra-acetyl anhydribose			
m.p.	169°	169–169.5°	168.5–169.5°
Specific rotation in chloroform		$[\alpha]_D^{20} + 51.0^\circ \pm 0.5^\circ$ (c, 0.97)	$[\alpha]_D^{18.60} + 50.6^\circ \pm 0.6^\circ$ (c, 1.19)

* Arithmetical error corrected.

† This was incorrectly published as -48° . We are indebted to Dr. Jeanloz for pointing out the mistake and have verified the sign by a second determination (G. R. B., M. V. L.).

of the anhydride removed the doubt previously expressed² as to the identity of the two materials.

In the accompanying table, we record the close agreement reached by the various authors, including some fresh data, and we wish to emphasize that the compound originally prepared by Bredereck, Köthnig and Berger is now to be regarded as 1:5'.5:1'-di-D-ribofuranose anhydride.

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¹ *Ber.*, 73, 956 (1940).

² Barker, G. R., and Lock, M. V., *J. Chem. Soc.*, 23 (1950).

³ Private communication.

Quick Test for the Early Diagnosis of Influenza

DURING infection of mice with influenza virus, the hæmagglutinin inhibitor, normally present in their respiratory mucus, disappears¹—presumably due to degradation by the enzyme of the multiplying virus². Human nasal secretions contain a similar substance which, when acted upon *in vitro* by influenza virus enzyme, loses its inhibitory capacity. As the disappearance of inhibitor was shown to be one of the most sensitive diagnostic signs of influenza in mice³, it seemed promising to apply the same method to the human disease. The recent epidemic of influenza A in Melbourne offered an opportunity of testing this proposition.

Nasal swabs were soaked in 1.0 ml. 0.9 per cent sodium chloride solution, and the inhibitory titre of the extracts was determined. Since even in normal persons the inhibitor content of nasal secretions varies widely, advantage was taken of the recent work on the adsorptive affinity of mucoids for different strains of influenza virus. As established by Stone⁴, each inhibitor shows a characteristic pattern when tested against a series of indicator viruses⁵; contact with active virus results in differential reduction of titres for the various indicators, that is, in a distortion of the normal pattern.

The samples were therefore titrated against three virus strains, *WS*, *MEL*, *LEE*, in parallel. In tests

on 137 specimens from twenty-nine normal individuals, the average ratio of titres against *WS* : *MEL* : *LEE* was 10 : 24 : 9. For convenience the findings are expressed in terms of the 'inhibitor index', $10 \times \frac{MEL + LEE}{WS}$. Thus the inhibitor index for normal

human nasal secretions is 33 with a standard deviation of ± 8 . Since the *WS*-inhibitor is the one most readily destroyed, the inhibitor index will rise whenever the mucus is acted upon by a viral enzyme.

The accompanying table summarizes the results obtained during the first month of the epidemic. The tests applied were: (a) determination of the inhibitor index; (b) amniotic isolation of the virus; (c) titration of antibodies directed against the virus particle; and (d) estimation of complement-fixing antibody.

CONTINGENCY TABLE OF DIAGNOSTIC TESTS FOR INFLUENZA

Based on the investigation of 84 patients during the 1950 epidemic of influenza A in Melbourne

a Inhibitor index	b Virus isolation		c Anti-hæmagglutinin		d Complement-fixing antibody	
	+	–	+	–	+	–
> 100 (+ +)	4	0	2	0	3	0
75–100 (+)	6	2	7	0	6	0
50–75 (±)	11	4	6	3	6	4
< 50 (–)	2	28	3	39	2	45

$\chi^2_{ab} = 27.9$; $\chi^2_{ac} = 31.4$; $\chi^2_{ad} = 40.0$.

(For purposes of the χ^2 -test all inhibitor indices exceeding 50 are considered positive. Yates's correction for small numbers was applied.)

The χ^2 -values calculated relative to the inhibitor index (cf. table) are of the same order as those obtained when the three tests are evaluated accordingly ($\chi^2_{bc} = 17.1$, $\chi^2_{bd} = 19.1$, $\chi^2_{cd} = 41.7$), thus proving a very high positive correlation. Hence, the proposed procedure may be listed among those giving objective evidence of influenza virus infection in man. The technique is simple, and an answer is available within an hour's time.

The inhibitor profile remains distorted during the first three to five days after the onset of symptoms; by the time antibody appears, all patients have their inhibitor indices within the normal range (< 50). No deviations from the normal were seen in a limited number of experiments on various other diseases of the respiratory tract (two lobar and three bronchopneumonias, one atypical pneumonia, two cases each of bronchiectasis, tracheo-laryngitis, and pharyngitis, and seven cases of common cold). Though it is quite realized that the number of controls has to be extended, the information available would suggest that enzymic destruction of the hæmagglutinin inhibitor of nasal mucus is restricted to infection with influenza viruses.

A full report on the work will appear elsewhere. I am greatly indebted to my colleagues in the Epidemiological Unit for collecting specimens and for making available the results of their investigations

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³ Fazekas de St. Groth, S., *Lancet*, i, 1101 (1950).

⁴ Stone, J. D., *Austral. J. Exp. Biol.*, 27, 557 (1949).

⁵ Stone, J. D., *Austral. J. Exp. Biol.*, 27, 337 (1949).