













disturbed by the drain of metabolites to the pustule. On the other hand, the observed effect may be interpreted in the light of reports of toxin production from uredospores (Bushnell and Allen 1962) and from rust colonies on infected leaves (Silverman 1960). In the present case, metabolically active substances, originating from either the fungal hyphae or the leaf cells in the infection court, may produce the observed effect by direct contamination or by stimulating a response in the uninfected cells.

#### V. ACKNOWLEDGMENTS

The provision of wheat and rust material by Professor I. A. Watson is gratefully acknowledged. The authors are indebted to Professors J. F. Turner and I. A. Watson and Associate-Professor N. H. White for helpful discussions. During these studies a Commonwealth Research Studentship was held by one of us (C.W.W.).

#### VI. REFERENCES

- ANON. (1964).—Annual Report, The International Rice Research Institute, Los Banos, The Philippines. p. 261.
- BARRETT, R. E., and MCLAUGHLIN, J. (1954).—*J. Agric. Fd. Chem.* **2**: 1026–9.
- BUSHNELL, W. R., and ALLEN, P. J. (1962).—*Plant Physiol.* **37**: 50–9.
- CLARKE, J. T. (1964).—*Ann. N.Y. Acad. Sci.* **121**: 428–36.
- DAVIS, B. J. (1964).—*Ann. N.Y. Acad. Sci.* **121**: 404–27.
- GÄUMANN, E. (1950).—“Principles of Plant Infection.” p. 389. (Crosby Lockwood and Son, Ltd.: London.)
- GRAHAM, J. S. D. (1963).—*Aust. J. Biol. Sci.* **16**: 342–9.
- GREEN, G. J., KNOTT, D. R., WATSON, I. A., and PUGSLEY, A. T. (1960).—*Can. J. Pl. Sci.* **40**: 524–38.
- GOTTLIEB, D. (1964).—*Endeavour* **23**: 85–9.
- LEE, J. W., and WRIGLEY, C. W. (1963).—*Aust. J. Exp. Agric. Anim. Husb.* **3**: 85–8.
- LIVNE, A. (1964).—*Plant Physiol.* **39**: 614–21.
- LOWRY, O. H., ROSEBROUGH, N. J., FARR, A. L., and RANDALL, R. J. (1951).—*J. Biol. Chem.* **193**: 265–75.
- RUDOLPH, K., and STAHMANN, M. A. (1964).—*Z. PflKrankh. PflSchutz.* **71**: 107–12.
- SHAW, M., and SAMBORSKI, D. J. (1956).—*Can. J. Bot.* **34**: 389–405.
- SILVERMAN, W. (1960).—*Phytopathology* **50**: 130–6.
- STAPLES, R. C., and STAHMANN, M. A. (1964).—*Phytopathology* **54**: 760–4.
- STEWART, F. C., and BARBER, J. T. (1964).—*Ann. N.Y. Acad. Sci.* **121**: 525–31.
- STROBEL, G. A., and SHARP, E. L. (1965).—*Phytopathology* **55**: 413–14.
- TROWN, P. W. (1965).—*Biochemistry* **4**: 908–18.
- WILDMAN, S. G., and BONNER, J. (1947).—*Arch. Biochem.* **14**: 381–413.
- WRIGLEY, C. W., WEBSTER, H. L., and TURNER, J. F. (1966).—*Nature, Lond.* **209**: 1133–4.

