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ESSENTIAL REPLICATION FUNCTIONS OF
THE F PLASMID

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Thesis submitted in fulfilment
of the requirements for
the degree of
Doctor of Philosophy
May 1983

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ACKNOWLEDGEMENTS

I would like to express my appreciation to my supervisors, Professor P. Bergquist and Dr. D. Lane for their advice, assistance and encouragement, both during experimental work and in the preparation of this manuscript. I am also grateful for the help, comradeship and co-operation of the staff and students of the cell Biology Department. In particular I wish to thank Anne Lock and Penny Caughey. The DNA sequencing reactions in Ch. 6 were performed by Penny. I am obliged to Glen Grayston for assistance with the preparation of photographs, Wendy Olsen for typing this manuscript, and Robbie Robertson for assistance with the Wang word processor.

Finally, I would like to thank the University Grants Committee for financial support over the past three years, and my two sons Blair and Elton and flatmate Rob for encouragement and co-operation over the last three years.

ABSTRACT

The work in this thesis concerns the analysis of essential replication genes of the F plasmid of Escherichia coli. The techniques principally employed were the cloning of restriction fragments, transposition mutagenesis, maxicell analysis of proteins, and DNA sequencing. This work led to the following findings.

1. A 1.15kb region of f5 was shown to contain all the functions required for initiation of F replication. Insertions of a transposon within this 1.15kb region abolished mini-F replication.
2. A mini-F plasmid was constructed which constitutes the smallest F derivative so far reported. This plasmid has an elevated copy number, as a result of deletion of the incC region.
3. At least two proteins specified by the essential F replication region were identified in maxicells. The promoter fragments of two mini-F genes were fused to a β -galactosidase gene and demonstrated to have low but significant in vivo activities.