Peter Smith, *Introduction to Formal Logic* (CUP, 2nd edition)

Exercises 8: Negation and other connectives

(a) Usually, we can ambiguously negate a statement by prefixing it with 'It is not the case that'. Can you think of any exceptions?

(b) Give negations of the following in natural English:

(1) It is not the case that both Jack and Jill went up the hill.
(2) Neither Jack nor Jill went up the hill.
(3) No one loves Jack.
(4) Only tall men love Jill.
(5) Everyone who loves Jack admires Jill.
(6) Someone loves both Jack and Jill.
(7) Some who love Jill are not themselves loveable.
(8) Jill always arrives on time.
(9) Whoever did that ought to pay for the damage.
(10) Whenever it rains, it pours.
(11) No one may smoke.

(c) Two propositions are *contraries* if they cannot be true together; they are *contradictories* if one is true exactly when the other is false. (Example: 'All philosophers are wise' and 'No philosophers are wise' are contraries – they can't both be true. But maybe they are both false, so they are not contradictories.) Give examples of propositions which are contraries but not contradictories of the propositions in (b).

(d) Render the following as best you can into the PL language with the following glossary:

P: Jack loves Jill.
Q: Jill loves Jack.
R: Jo loves Jill.
S: Jack is wise.

(1) Jack is unwise and loves Jill.
(2) Jack and Jo both love Jill.
(3) It isn't true that Jack doesn't love Jill.
(4) Jack loves Jill but Jo doesn't.
(5) Jack doesn't love Jill, neither is he wise.
(6) Either Jack loves Jill or Jill loves Jack.
(7) Either Jack loves Jill or Jill loves Jack, but not both.
(8) Either Jack is unwise or he loves Jill and Jo loves Jill.