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The information capacity of a noisy quantum channel depends in principle on whether product states or entangled states are used to encode the messages at the input, and whether product or entangled measurements are used at the output. The signals are represented by density matrices, and the noise is described by a completely positive trace-preserving map acting on the input signals. Recent results are discussed, as well as related mathematical questions about additivity of certain natural functions of completely positive maps. (Received September 25, 2000)