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J(J-1) and J(J+3) spectra with a Q.Q interaction -Elliott Rotations. ARUN KINGAN, XIAOFEI YU, LARRY ZAMICK, Rutgers Univ — To get Elliott's SU3 results with a Q.Q interaction without the momentum terms in a shell model calculation one must introduce a single particle splitting in which the highest L state lies highest e.g. D higher than S in the SD shell.When this is done one gets the multi-degenerate states predicted by Elliott. We have here taken a hard look at the spectra of 20Ne. We obtain the well studied ground state band with the spectrum of a K=0 rotational band J(J+1) with J=0,2,4,6, 8. But out main point concerns 2 excited bands, A and B. Band A has a J(J+1) spectrum J=1,2,3,4,5,6,7. Band B covers the same energy levels but with J values J=2,3,4,5,6,7,8. Our main result is that the spectrum of Band B is J(J-1).By calculating magnetic moments we find that Band A is of the form [LS]J=[L1]L and band B [L1](L+1) starting with L=1. Because the interaction is spin independent we can stretch out the spin in Band A to form Band B at no cost in energy. There is also a third band C starting with [1 1]0 J=0,1,2..6 with E(J)-E(0)= 0.149 J(J+3). All bands have the same moments of inertia. Elliott noted that the static quadrupole moments of the ground state band agree with those of the rotational model , not the B(E2)'s. For excited bands B(E2)'s have many branchings.

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