thousand miles out and the same distance back after due allowance has been made for the weight of an atomic bomb payload. These machines will fly in the stratosphere at thirty or forty thousand feet with speeds of five hundred miles per hour or better. Thus the means of intercontinental attack even today are well within the limits of established practice. The over-all cost, including casualties, of operating bombers these great distances with a payload of ordinary h.e. would certainly not be worth while but ith atomic bombs, each of which is at least several thousand times more powerful weight for weight, this limitation would not exist.

An aircraft flying in on a target at stratosphere heights at five hundred miles per hour or more poses an exceedingly difficult problem for the defence. It takes a long time for a defence rocket to rise to forty thousand feet or so, and jet propelled fighters have as yet a very limited endurance. As a result, it seems possible that at least a proportion of the attackers will get through. Applied to the small numbers of atomic bomb carriers required, a high casualty rate does not represent the prohibitive scale of loss which it would be if the same, or even a fraction of the same, percentage of loss were applied to the vastly larger numbers of sircraft required with ordinary h.e. bombs to give a comparable result. Thus it does not seem that the expectation of **casualties** an be counted on as a deterrent to intercontinental attack with atomic bombs borne in manned aircraft. In this connection, I would observe that modern methods of radio navigation permit these aircraft to know their position at all times with the precision required for bombing a city.

The third method of using atomic bombs to which I have referred was their placement by submarines or suboteurs who would set the delay to give plenty of time for escape. I do not think it necessary to enlarge on these methods except to say that against skilled operators I can for esce great difficulties in establishing any really effective defence against atomic bombs because their secret placement is so much less difficult than ordinary h.e., where the volume and weight of the explosive required to secure a worth while result is so vast that the chances are it could not be placed in position secretly let alone kept hidden if it were. Thus whether by guided missiles, by manned aircraft, by submarine or by suboteur it seems that it will not be possible by any conceivable physical means to prevent an attack with atomic bombs which ifght conceivably result in a crippling blow through the destrucion of centres of population and industry which, as I have said, are the kinds of target against which the atomic bomb will be used.

However, with the prospect of atomic war no nation will leave all its defence resources in these vulnerable locations, and it is not probable therefore that an atomic attack would determine the outcome. In consequence in the military establishments the atomic outcome does not replace the army, navy or air force -- it is a weapon is special application which is added to all other weapons.

If we accept, as I think we must on the evidence available, he thesis that there is no physical defence against atomic war, hen what avenues of hope remain to us for the preservation of the orla?

There are indeed two possibilities which merit consideration. There are indeed two possibilities which merit consideration. The first and most attractive is to develop an international agreeant under which we may hope that all nations may come to have affidence that atomic energy will be used for peaceful purposes My. As part of this agreement, it is proposed to set up a system affeguards and controls which will in fact ensure that atomic

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