Farmfield
Huntingdon Rd
Cambridge
27/7/66

Dear Mr Huang

Thank you for your letter and reprints. I was particularly interested in the axisymmetrical waves near the edge of the sheet shown in photos nos 3 & 4 at $W_e = 880$ & 1040. I cannot help thinking that these are essentially waves connected with the normal reaction of the air and are essentially similar to those illustrated in fig 11 plate 1 opp p6 in my R.S. paper P.R.S.A 259 (19[illegible]) I would be interested to know how the lighting of these photographs was arranged and whether the waves were at rest in space or moving partly [illegible] outwards. As pointed out in my 1959 paper the edge which breaks up into drops travels inwards at the same speed as the antisymmetrical waves travelling outwards and if the waves you show are at rest in ~~space they are travelling inward at a speed slightly less than that of waves~~ space it is difficult to account for them. On the other hand if they are moving slowly outwards they may well be the waves considered by Squire which can I think move ~~in~~ relatively to the water more slowly than ~~those which~~ the edge.

I am sending by surface mail the papers to which you refer but I fear I have ~~[illegible]~~ published nothing since on the break up of sheets. Hopkins is mistaken about my paper given to the Congress for applied Mechanics. I gave one on that subject at the Congress in Stresa in 1960 and one ~~at~~ Munich in 1964 on the bursting of drops in an electric field. I have included ~~the~~ two papers published on this subject this year but unfortunately I have no copies left of the papers which I published in Proc Roy Soc ~~[illegible]~~ 1965 ~~and~~ or of the one I published with McEwan in J Fluid Mechanics 1964

I fear Hopkins was mistaken about the paper I read at the meeting of the Congress for Applied Mechanics in Munich in 1964. That one was on points produced mechanically or electrically on fluid surfaces. I did give a paper on the waves in thin sheets at the previous meeting of the Congress in Stresa in 1960. I have no reprints but all I said there was in my two papers which I have sent.

I notice that you mention Dombrowski's observation that holes are formed in sheets and that these grow leaving filaments which break up by the Rayleigh instability. This seems to be true with mercury sheets. I think it is due to small drops formed at the point where the boundary layer inside the orifice emerges. These drops may pierce the sheet and if they make a hole bigger than a certain fraction of the thickness of the sheet it will grow. Perhaps if you blew a spray of fine drops at your sheets they might produce the Dombrowski's effect. There is one point in your photo 4 which looks as though a drop had produced waves. It would be very interesting if you could measure the speed of the waves shown in your photos 3 and 4 and 5, ~~the and~~ Also the interpretation of the ~~end of~~ shape of the wave profile would be interesting if you can interpret this from knowledge of your optical system. It might be interesting also to make photos like 3 & 4 in ~~the~~ hydrogen atmosphere to see whether the inertia of the air is relevant as it is in Squire's theory.

Yours sincerely

G I Taylor