It is only necessary to pass the gas into a watery solution of the chloride of iodine, wash the reddish oil which collects at the bottom of the solution with dilute potash, and distil. The portion which passes over at about 145° Cent. is pure chloriodide of ethylene.

The specific gravity of the chloriodide at zero is 2·151. Heated with an alcoholic solution of potash, it suffers decomposition, iodide of potassium being formed, and a gas given off which burns with a green flame. This is no doubt chloride of aldehydene ($C_4 H_3 Cl$). This reaction goes far to prove that the true constitution of this body is represented by the formula $C_4 H_3 Cl, HI$, and not by the formula $C_4 H_3 I, H Cl$, proposed in my former paper.

Propylene gas derived from glycerine also yields an oil when passed into a solution of chloride of iodine, as I have already stated. In order to purify this, I found it necessary to distil it *in vacuo*, rejecting what came over at the beginning and towards the end of the process. The numbers I obtained on analysing this body prove its composition to be $C_6 H_6 I Cl$.

Chloriodide of propylene, as I may call this compound, is when freshly prepared a colourless oil, having an ethereal odour and a sweet taste. Its specific gravity at zero is 1·932. When an effort is made to distil it under atmospheric pressure, it suffers decomposition, hydriodic acid being evolved in large quantity. Mixed with an alcoholic solution of potash and distilled, it yields iodide of potassium and an oily liquid (contained in the distillate and separable from it by water) which is very volatile and burns with a green flame. This is doubtless chloride of allyle ($C_6 H_5 Cl$).

The oil formed by the action of chloride of iodine on propylene gas obtained from amylic alcohol, I have not been able to obtain in a fit state for analysis.

The application of the foregoing process to other hydrocarbons would no doubt place in our hands many similar compounds.

V. "On certain Developable Surfaces." By A. Cayley, Esq.

Received October 25, 1862. Read November 27, 1862.

(Abstract.)

If $U=0$ be the equation of a developable surface, or say a developable, then the hessian HU vanishes, not identically, but only by virtue of the equation $U=0$ of the surface; that is, HU contains U as a

factor, or we may write $HU=U.PU$. The function PU, which for the developable replaces, as it were, the hessian HU, is termed the prohessian; and since, if r be the order of U, the order of HU is $4r-8$, we have $3r-8$ for the order of the prohessian. If $r=4$, the order of the prohessian is also 4; and in fact, as is known, the prohessian is in this case $=U$. The prohessian is considered, but not in much detail, in Dr. Salmon's 'Geometry of Three Dimensions' (1862), pp. 338 and 426: the theorem given in the latter place is almost all that is known on the subject. I call to mind that the tangent plane along a generating line of the developable meets the developable in this line taken two times, and in a curve of the order $r-2$; the line touches the curve at the point of contact, or say the ineunt, on the edge of regression, and besides meets it in $r-4$ points. The ineunt, taken three times, and the $r-4$ points form a linear system of the order $r-1$, and the hessian of this system (considered as a curve of one dimension, or a binary quantic) is a linear system of $2r-6$ points; viz. it is composed of the ineunt taken four times, and of $2r-10$ other points. This being so, the theorem is, that the generating line meets the prohessian in the ineunt taken six times, in the $r-4$ points, and in the $2r-10$ points

$$(6+r-4+2r-10=3r-8);$$

it is assumed that $r=5$ at least.

The developables which first present themselves are those which are the envelopes of a plane

$$(a, b, \ldots \between t, 1)^n=0,$$

where t is an arbitrary parameter, and the coefficients $(a, b, \ldots)$ are linear functions of the coordinates; the equation of the developable is

$$\text{disct } (a, b \ldots \between t, 1)^n=0,$$

the discriminant being taken in regard to the parameter t. Such developable is in general of the order $2n-2$; but if the second coefficient b is $=0$, or, more generally, if it is a mere numerical multiple of a, then a will divide out from the equation, and we have a developable of the order $2n-3$: the like property, of course, exists in regard to the last but one, and the last, of the coefficients of the function. We thus obtain developables of the orders 4, 5, and 6 sufficiently simple to allow of the actual calculation of their prohessians. And the chief object of the present memoir is to exhibit these prohessians; but the memoir contains some other researches in relation to the developables in question.